ATTACHMENT E

6124 N. County Rd. 29C
Bellvue, CO 80512
27 November 2019

Mr. Rob Helmick
Senior Planner
Larimer County Planning Department
Larimer County, Colorado

Dear Mr. Helmick:

I am writing to emphatically state that I oppose the Conceptual Glade Recreation Facilities Plan proposed by NISP. Although I consider the entire Glade Reservoir project a losing endeavor, I will focus this letter on reasons I believe the recreational plan is bad for both nearby residents and for Larimer County in general.

The proposed recreational facilities will adversely affect the property value and the quality of life of residents owning property along the west side Highway 287. These residents will be in close proximity to the reservoir and its access roads, parking lots (cars and trailers), boat ramps, and camping grounds. Construction of these roads and sites will destroy the natural beauty surrounding our properties by turning untouched hillsides and gorgeous vistas into unsightly roads, parking lots, and expanses of tents and RVs. The proposed recreational facilities will result in nearby residents having to endure noise pollution (radios, voices, motor boats, generators, vehicles), air pollution (road dust, vehicle/boat exhaust, campfire smoke, etc.), and light pollution. Perhaps most important, presence of new roads, parking lots, and camp grounds will significantly increase the risk of wildfire - a HUGE concern in our already vulnerable area.

The recreational facilities proposed will be visited by an estimated 379,000 visitors per year, more than 1,000 people per day. This presents a huge burden on Larimer County. The proposed facilities including roads, trails, parking areas, campgrounds, restrooms, entry station, visitor center will require significant county resources for patrol, management, and maintenance. In addition, the already overburdened emergency responders in the area will undoubtedly see calls for services increase greatly. Standing water in the proposed reservoir (particularly since Glade will have fluctuating water levels) along with presence of human food and waste, will undoubtedly result in increased spread of insect borne infectious diseases such as West Nile Virus, Pigeon Fever, and Vesicular Stomatitis Virus.

We residents of Larimer County depend on our Planners and Commissioners to protect our interests; yet most County residents will not receive water benefits from the Glade Reservoir. Nor are the proposed recreational facilities likely to offer enjoyable water

related activities since water quality and water levels are likely to be often inadequate. The proposed recreational benefits definitely do not outweigh the disadvantages.

I implore you to reject the Glade Recreational Facilities Plan proposed by NISP, and, in fact, to work toward rejection of Glade Reservoir entirely in favor of a more up to date and efficient water use/storage plan that will not destroy the natural resources of our lovely County.

Thank you for giving my thoughts and concerns your serious consideration.

Sincerely,
Janice. M. Bright

28Nov2019

Rob Helmick
hemicrp@co.larimer.co.us

Dear Mr. Helmick,
I am currently a resident living on N County Road 29 C and have so for approximately 11 years. My wife and I have worked and played here and bought this house/land because of the pristine nature of our surroundings and the peace and quiet this area brings into our lives. We are both retired and in love with the slow and quiet nature this valley brings to our golden years.

I am writing to vehemently oppose any development (Glade Reservoir and proposed recreational facilities) that would bring environmental chaos to our area including many of our neighbors here on N 29 C, our neighbors in Bellvue and Laporte, and our neighbors to the north living in beautiful and bucolic Bonner Peak Ranch.

What upsets me the most about this Glade proposal is that most of the people "benefiting" from this structure are living outside Larimer County while those living adjacent to the proposed reservoir will be bearing the personal costs and sacrificing our peaceful style of life that we hoped would last well into the future. There is a strong degree of social injustice that accompanies this entire proposal.

I am concerned about the impact this project will have on the noise level of our valley (noise pollution), air pollution, the detrimental environmental effects on wildlife biodiversity, light pollution (the loss of our dark skies devoid of light so we can see starlit skies and constellations), possible contribution to wildfires by increased traffic in our surrounding hills and forests, the potential for trespassers straying away from the reservoir and on to contiguous private property, and the potential contribution to new development to this region and overcrowding. I am also concerned about the incredible pressure that will come to bear on our emergency response personnel who are already stretched to the limit in providing adequate coverage to our neighbors. As mentioned earlier, perhaps the most undesirable consequence is the noise pollution we can expect from this project not only during its 4-5 years period of construction, but from the traffic to and from the recreational facilities that are proposed. I don't want to think about the incredible disturbance to our peaceful valley motorboats and their occupants will bring.

Most of my neighbors are older retirees and some suffer from heart and lung disease. The dust from the area and air pollution from fossil fueled engines of all kinds will likely trigger some difficult breathing issues for them.

Building a reservoir for the purposes intended seems technologically 'old school'. Surely through better and more stringent conservation measures and access to aquifers through more advanced engineering techniques will better serve the needs of development far into the future with minimal impact to surrounding homes and villages.

Please SCRAP this entire GLADE proposal and work on a more environmentally and personally satisfying solution for our future. Please do not let 'corporate America" once again shove their agenda in our lives! Greed and power are pushing this development which is SOP these days!

Thank you for your time and consideration.

Sincerely,

Ronald M Bright, DVM MS DACVS
Resident on N CR 29 C
Bellvue, CO

1715

Rob Helmick <helmicrp@co.larimer.co.us>

Suspend Hearings - Save Lives

1 message

'K.A. Wagner' via Planning Commission Board <pcboard@co.larimer.co.us> Wed, Mar 25, 2020 at 2:38 PM
Reply-To: "K.A. Wagner" <kaswagner@me.com>
To: pcboard@larimer.org

Begin forwarded message:

From: "K.A. Wagner" <kaswagner@me.com>
Date: March 25, 2020 at 12:13:56 PM MDT
To: bocc@larimer.org, Linda Hoffmann <hoffmalc@co.larimer.co.us>, Lesli Ellis <ellislk@co.larimer.co.us>, Rob Helmick <helmicrp@co.larimer.co.us>
Subject: Suspend Hearings - Save Lives

To the Larimer County Commissioners:

Please correct any misconceptions, but it appears that Larimer County refuses to suspend the public hearings on the huge Northern Integrated Supply Project (NISP) application during a national pandemic, that already poses dangerous health risks for your constituents.

Despite the fact that NISP has been in the works for 17+ years, you are unwilling to alter the hearing schedule, in order for affected and concerned citizens to participate in the public process to the fullest extent possible once the pandemic eases. It seems all too easy for the Board to say, “Our hands are tied”—the public be damned.

Furthermore, it appears you will senselessly put the nine citizen members of the Planning Commission, nonessential county staff, numerous representatives of the applicant, yourselves and your families at risk to conduct hearings, while limiting the full participation of the general public.

Is that the plan, when Jefferson, Adams, Arapahoe, Douglas, Boulder and Denver Counties are issuing orders to stay at home, as is the Larimer County Health Director?

Apparently being term-limited gives some commissioners free reign to demean citizens and local organizations (in the Board’s public emails,) when they express understandable frustration with the NISP hearing schedule. As elected officials, you should be more skilled in controlling your contempt.

Criticizing constituents shows your clear bias, makes the Board look petty and reflects poorly on your obligation to represent all of Larimer County. Be grateful that your constituents care how greatly NISP will impact the character and natural environment of the county they call home.

Will it be your legacy to push through a monstrous project that is unlikely to even be built during the current recession/coming depression, due to the fact that the NISP partners will no longer have the financial stability to move forward?

What’s the rush to stick taxpayers with an empty pipeline to a dry reservoir that requires rerouting a federal highway and permanently disrupting the lives of Larimer County residents?

Do the right thing for your constituents. Suspend public hearings until the pandemic is over.

Karen Wagner
Larimer County

WESTERN RESOURCE ADVOCATES

PROTECTING THE WEST'S LAND, AIR, AND WATER

Sent via email to Larimer County Planning Commission and Board of County Commissioners

March 27, 2020

Larimer County Planning Commission and
Board of County Commissioners
Larimer County Offices
200 West Oak, Suite 2200
Fort Collins, CO 80521

RE: Request to Postpone Upcoming NISP Planning Commission and Board of County Commissioner Hearings Due to Coronavirus and Extensive Materials to Review

Dear Planning Board and County Commissioners:

Western Resource Advocates supports the opportunity for public input on the Northern Integrated Supply Project (NISP). You recently announced an upcoming May 6 Planning Commission Hearing and June 8 Board of County Commissioners Hearing.

Due to unique current circumstances—the Coronavirus outbreak; recent county, state and national Declarations of Emergency; the extensive amount of material provided with Northern Water's First NISP permitting submittal (62 individual files, many of which are highly technical); and the complex and controversial nature of this project—we request that the County postpone scheduling these public hearings.

This unprecedented moment in time is impacting and complicating daily life for all of us. We believe insuring the public is provided adequate opportunity to review and comment on NISP permitting materials is a high priority and but will be extremely challenging under the current schedule. In addition to many citizens being largely absorbed in just getting through each day, some members of the community may not be accustomed to using and/or may not have access to computers and the internet. Thus the ability to comment online or otherwise likely isn't equitable across all citizens, particularly during these trying times when public computers and internet are inaccessible.

In-person attendance at public hearings provides a critical opportunity for community members to provide their comments and to hear from others. Given that we do not know when such in-person public hearings will be able to take place, we urge the County to delay any public hearings regarding NISP until this can occur. As an example, hundreds of individuals attended recent public hearings held by the County on the proposed Thornton Pipeline. We ask that you do not deny citizens a similar opportunity to provide you with their comments about NISP.

Arizona
1429 North First Street
Suite 100
Phoenix, AZ 85004

Colorado - Boulder
2260 Baseline Road
Suite 200
Boulder, CO 80302

Colorado - Denver
1536 Wynkoop Street
Suite 210
Denver, CO 80202

Nevada
550 W. Musser Street
Suite G
Carson City, NV 89703

New Mexico
409 E. Palace Avenue
Unit 2
Santa Fe, NM 87501

Utah
307 West 200 South
Suite 2000
Salt Lake City, UT 84101

Postponing these hearings seems appropriate given the timescale of this project proposal. The Army Corps of Engineers first issued a notice of intent to prepare an EIS for the NISP project in August of 2004, nearly 16 years ago. Re-scheduling County public processes related to permitting will undoubtedly support public engagement and is a minimal inconvenience in light of the overall project timeline.

Thank you for considering our request to postpone any public hearings, to protect and support public health and provide adequate opportunity for public review and comment on the voluminous permitting materials recently provided by the Northern Integrated Supply Project Water Activity Enterprise.

Sincerely,

Bart Miller
Healthy Rivers Program Director
Western Resource Advocates

Sent via email to:

bocc@larimer.org
jkefalas@larimer.org
swjohnson@larimer.org
tdonnelly@larimer.org
pcboardmember1@larimer.org
pcboardmember2@larimer.org
pcboardmember3@larimer.org
pcboardmember4@larimer.org
pcboardmember5@larimer.org
pcboardmember6@larimer.org
pcboardmember7@co.larimer.co.us
pcboardmember8@larimer.org
pcboardmember9@larimer.org
ellislk@co.larimer.co.us
laffermn@co.larimer.co.us
scrutcch@co.larimer.co.us

Western Resource Advocates is a nonprofit conservation organization, founded in 1989, dedicated to protecting the Interior West's land, air, and water. Since 2000, WRA has engaged with water utilities, state, and federal government agencies to find solutions to meet growing urban water demands while protecting stream flows, endangered fish, and critical habitat. We have provided detailed public comments to the U.S. Corps of Engineers on the NISP Draft Environmental Impact Statement (EIS), Supplemental DEIS, and Final DEIS.

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: NISP hearing suspension

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Sun, Mar 29, 2020 at 11:26 AM
To: John Kefalas <kefalajm@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioner Kefalas -- Forwarded for your information and consideration. Commissioners Johnson and Donnelly have requested that these duplicative messages be included in the public record without forwarding the emails to them as an intermediate step.

Rob -- Please include this message in the public record.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **David Rothenberg** <davidrothenberg2008@gmail.com>
Date: Sun, Mar 29, 2020 at 11:12 AM
Subject: NISP hearing suspension
To: <bocc@larimer.org>

Dear Commissioners,
I pride myself on living in Fort Collins, and tout our government often for being so responsive, transparent, and inclusive in its decision-making. It is for those same reasons that I implore you to suspend NISP planning hearings until the public has the opportunity to give its full attention and attendance.

Thank you for your service to our great city.

Kind Regards,
David Rothenberg

804 Alta Vista St
Fort Collins, CO 89524

No Pipe Dream supporter

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: NISP permitting, please suspend

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Sun, Mar 29, 2020 at 11:25 AM
To: John Kefalas <kefalajm@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioner Kefalas -- Forwarded for your information and consideration. Commissioners Johnson and Donnelly have requested that these duplicative messages be included in the public record without forwarding the emails to them as an intermediate step.

Rob -- Please include this message in the public record.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Lynn U Nichols** <lynn.healthwrite@gmail.com>
Date: Sun, Mar 29, 2020 at 11:03 AM
Subject: NISP permitting, please suspend
To: <bocc@larimer.org>

Hello Commissioners,
I understand you are considering allowing NISP permitting to happen over the next month despite the public being unable to meet during the pandemic. Please suspend any actions on NISP until business is back to usual.
Thank you,
Lynn

--
Lynn Utzman-Nichols
Larimer County

1720

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd:

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Sun, Mar 29, 2020 at 11:25 AM
To: John Kefalas <kefalajm@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioner Kefalas -- Forwarded for your information and consideration. Commissioners Johnson and Donnelly have requested that these duplicative messages be included in the public record without forwarding the emails to them as an intermediate step.

Rob -- Please include this message in the public record.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **carole sondrup** <scooter-pookie@hotmail.com>
Date: Sun, Mar 29, 2020 at 9:38 AM
Subject:
To: bocc@larimer.org <bocc@larimer.org>

Dear Commissioners,
I know you are meeting to discuss the Thornton project tomorrow. Given we are all in this together I would hope any further discussion will be postponed until the public can also attend and participate. This pipeline effects us all just as much as the virus. We are all in this together on both issues. To proceed at this time of crisis with out the public~ who's lives will be directly impacted~ would be wrong on so many levels. Please wait until such time we can all participate. That is the right thing to do!
Thank you for listening

Ron and Carole Sondrup

34310 County Road 13

Windsor, CO 80550

Sent from Mail for Windows 10

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: NISP

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Mon, Mar 30, 2020 at 1:36 PM
To: John Kefalas <kefalajm@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioner Kefalas -- Forwarded for your information and consideration. Commissioners Johnson and Donnelly have requested that these duplicative messages be included in the public record without forwarding the emails to them as an intermediate step.

Rob -- Please include this message in the public record.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Melinda Kontz** <melkontz13@icloud.com>
Date: Mon, Mar 30, 2020 at 10:06 AM
Subject: NISP
To: <bocc@larimer.org>

Please postpone all meetings regarding NISP until after the stay at home orders are lifted. It's the right thing to do!
Sincerely,
Melinda Kontz
Sent from my iPhone

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: Delay of NISP hearings

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Mon, Mar 30, 2020 at 1:37 PM
To: John Kefalas <kefalajm@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioner Kefalas -- Forwarded for your information and consideration. Commissioners Johnson and Donnelly have requested that messages of this type be included in the public record without forwarding the emails to them as an intermediate step.

Rob -- Please include this message in the public record.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Wendell Stampfli** <stampflicox@gmail.com>
Date: Mon, Mar 30, 2020 at 10:27 AM
Subject: Delay of NISP hearings
To: bocc@larimer.org <bocc@larimer.org>

Dear Commissioners Donnelly, Johnson and Kefalas,

As residents of Larimer County that may be directly affected by this project, we ask for the delay of these hearings while we are still being instructed to stay home. We know that it's possible to participate in these kind of proceedings online, but frankly, we seem to be spending in an inordinate amount of time just figuring out how to decontaminate our purchases from the grocery store. We can't imagine plowing through the pages of this current 1041 and coming up with a coherent statement that would adequately express our opinion on this proposed project. We don't believe we are alone. A delay will give us all a chance to reset, use our frontal lobes for more than survival during this pandemic, to address issues that affect our happiness here and now on this big whirling dirt ball we call earth.

We hope you, your families and friends stay Covid-19 free. We look forward to seeing you all in person.
Thanks much.
Betsy Cox and Wendell Stampfli
504 Canadian Parkway
Fort Collins Co 80524

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: Petition to Postpone 1041 hearings

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Mon, Mar 30, 2020 at 1:31 PM
To: "Helmick, Rob" <helmicrp@co.larimer.co.us>

For inclusion in the public record.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **John Barth** <barthlawoffice@gmail.com>
Date: Mon, Mar 30, 2020 at 8:47 AM
Subject: Petition to Postpone 1041 hearings
To: <bocc@larimer.org>, Steve Johnson <swjohnson@larimer.org>, John Kefalas <jkefalas@larimer.org>, Tom Donnelly <tdonnelly@larimer.org>
Cc: Jeannine Haag <haagjs@co.larimer.co.us>, Gary Wockner <gary.wockner@savethepoudre.org>, Mike Foote <mjbfoote@gmail.com>

Dear Commissioners:

Attached please find a Petition, on behalf of Save The Poudre, requesting that the Board of County Commissioners postpone all 1041 land use hearings as a result of the Covid 19 crisis. We are requesting a response to this Petition by April 3, 2020 at 5pm. Thank you for your consideration of the Petition.

--
John Barth
Attorney at Law
P.O. Box 409
Hygiene, CO 80533
(303) 774-8868
barthlawoffice@gmail.com

STP postponement petition 03302020 FINAL.pdf
70K

LAW OFFICE OF
JOHN M. BARTH

P.O. BOX 409 HYGIENE, COLORADO 80533 (303) 774-8868 BARTHLAWOFFICE@GMAIL.COM

March 30, 2020

By email
Larimer County Board of County Commissioners [bocc@larimer.org]
Commissioner Steve Johnson [swjohnson@larimer.org]
Commissioner John Kefalas [jkefalas@larimer.org]
Commissioner Tom Donnelly [tdonnelly@larimer.org]

Re: Citizen Petition for Indefinite Postponement of all Larimer County Land Use Hearings involving the Areas and Activities of State Interest Act ("AASIA"), Larimer County 1041 Land Use Code, Section 14.

Dear Commissioners:

On behalf of Save the Poudre and its approximately 600 Larimer County members, we hereby formally petition the Larimer County Board of County Commissioners to use its legal authority and/or emergency powers to indefinitely postpone all land use hearings under the County's 1041 regulations and pause in scheduling any future 1041 hearings until the current COVID 19 crisis is under control and would allow in person hearings. This Petition applies to, but is not limited to, any public meetings related to Northern Water's 1041 application for the Northern Integrated Supply Project ("NISP").

As you know, on Wednesday March 25, 2020 the Larimer County Health Department issued a "stay at home" order for all Larimer County residents.[1] Shortly thereafter, Governor Polis issued a "stay at home" order for the entire state of Colorado.[2] Neither order contains a provision allowing in person participation in a government sponsored land use hearing.

Despite the well-known COVID 19 crisis and various "stay at home" orders, Larimer County has scheduled 1041 land use hearings before both the Larimer County Planning Commission and Board of County Commissioners. By means of example, on March 18, 2020 Leslie Ellis of the Larimer County Community Development Department "scheduled a public hearing with the Larimer County Planning Commission in April 29 at 6:30 p.m.…[and] a public hearing with the Larimer County Board of County Commissioners on Monday June 8, 2020…" related to the NISP. We hereby petition the Board to overturn this decision by Ms. Ellis, indefinitely postpone all 1041 hearings, and pause in the scheduling of future hearings until the

[1] https://www.larimer.org/spotlights/2020/03/25/larimer-county-public-health-director-issues-stay-home-order-slow-spread-covid
[2] www.covid19.colorado.gov

current COVID 19 crisis is under control and would allow for in person hearings.

As the name implies, AASIA 1041 applications involve areas and activities of State interest. As such, they are some of the largest and most impactful construction projects occurring in the state. Such projects can often impact wide swaths of Larimer County, significantly impacting residents, including loss of property rights, interrupting traffic, causing congestion in emergency access routes, and other significant issues. Therefore, it is vitally important that the Larimer County citizens have adequate time and opportunity to both prepare for such land use hearings and present in person testimony at such hearings.

In recent days, Commissioner Johnson has received numerous emails from Larimer County residents asking the Board to use its legal authority and/or emergency powers to indefinitely postpone scheduled 1041 land use hearings. In response, Commissioner Johnson has taken the preliminary public position that the Board may not legally postpone any 1041 land use hearings. We disagree with Commissioner Johnson's interpretation of the law and hereby formally petition the full Board to override Commissioner Johnson's preliminary interpretation and indefinitely postpone all scheduled 1041 public hearings and pause the scheduling of any further 1041 hearings until the current COVID 19 crisis is under control and would allow for such in person hearings.

In Commissioner's Johnson's correspondence with Larimer County citizens, he indicated that he would confirm his preliminary interpretation with the Larimer County attorney. On March 25, 2020, Deputy Larimer County Attorney William Ressue stated that the county has flexibility in conducting its business, especially during a declared emergency.[3] We agree with your attorney and believe this flexibility allows an indefinite postponement of all 1041 public hearings until the present crisis is under control.

First, the Board has a legal duty to "be receptive to other policy initiatives from citizens…" Larimer County Land Use Code ("LUC") Section 2-67(4)(4). The Board also has a legal duty "to identify the needs of the citizens as they relate to the county's activities and scope of influence, and shall translate such knowledge into the articulation of board objectives policies." LUC 2-69(b). Further, one of the Board's strategic goals is to "proactively deal with threats from natural and human-caused hazards within and around the county." LUC 2-144(c). "In the event of an emergency, the county manager shall not fail to take appropriate action immediately to ensure the safety of the public and public and private assets, including authorizing specific actions by county staff and facilitating the declaration of an emergency by the board of county commissioners…" LUC 2-118(3). As confirmed by your attorney, these and other provisions of County and State law confer broad legal authority and/or emergency power to the Commissioners, which would include the indefinite postponement of 1041 public hearings during a nationwide public health crisis.

Given the State and County "stay at home" orders, conducting "virtual" public meetings

[3] https://www.coloradoan.com/story/news/2020/03/25/larimer-county-sets-public-hearings-nisp-water-project/5078944002/

instead of in person public meetings would not resolve our concerns. The "stay at home" orders prevent Larimer County citizens from meeting in person and coordinating effective preparation for both the Planning Commission and Board public hearings. While the County government may have access to expensive and sophisticated video conferencing, your Larimer County citizens have no such access.

Further, to date there has been no practical explanation why 1041 public hearings must be conducted in such a compressed time frame. For example, the Northern Integrated Supply Project has been in planning for years, is dependent on several additional state and federal permits that have yet to be finalized, and thus will not be poised to commence construction in the year 2020. As such, the only emergency is the COVID 19 emergency—there is no emergency to process any 1041 applications.

Finally, the Board has set a precedent by previously postponing public hearings on the Thornton Pipeline 1041 permit for a period of 4 months. More specifically, on August 1, 2018 the Board postponed the Thornton Pipeline 1041 hearing in order "to involve the public in the information-gathering process through public meetings or open houses."[4]

Unfortunately, time is of the essence. A 1041 Planning Commission meeting is one month away and a Board 1041 hearing is shortly thereafter. Accordingly, we request that the Board respond in writing to this Petition no later than Friday April 3, 2020 at 5pm MTN.

In the event the Board denies this request, we ask that the Board provide a written record of the motion presented to the Board, how each member of the Board voted on the motion, and complete legal rationale for the Board's denial of this Petition.

Thank you for your consideration of this Petition.

Sincerely

s/ John Barth

John M. Barth
Representing Save the Poudre

cc: Gary Wockner, Save the Poudre
Larimer County Attorney Jeanine Haag [haagjs@co.larimer.co.us]
Governor Jared Polis

[4] August 1, 2018 Thornton Hearing Transcript, which the County has in its possession, has submitted by the County to the Larimer County District Court, and has been certified as accurate by the County.

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: <No Subject>

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Mon, Mar 30, 2020 at 3:56 PM
To: John Kefalas <kefalajm@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioner Kefalas -- Forwarded for your information and consideration. Commissioners Johnson and Donnelly have requested that messages of this type be included in the public record without forwarding the emails to them as an intermediate step.

Rob -- Please include this message in the public record.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Val** <mcalpine@q.com>
Date: Mon, Mar 30, 2020 at 3:19 PM
Subject: <No Subject>
To: <bocc@larimer.org>

Dear Commissioners,
I would like you to take note that I feel it is unfair to continue permitting that affects our community without hearing that communities input. Please suspend the NISP permitting process during the coronavirus pandemic to ensure that all of our voices are heard. During this pandemic our elected officials should be an advocate of keeping their public safe and abiding of the governors shelter in place order without worrying about permitting being pushed through without their voice being heard. Please wait until the quarantine is lifted and we can resume attending normal public meetings/ hearings.
Thank you,
McAlpine
928 E. Douglas Rd.
Ft. Collins CO 80524
No Pipe Dream Supporter
Sent from my iPhone

Rob Helmick <helmicrp@co.larimer.co.us>

Please Suspend NISP Permitting During COVID-19 Pandemic

1 message

Courtney Blackmer-Raynolds <courtkbr@everyactioncustom.com> Mon, Mar 30, 2020 at 12:21 AM
Reply-To: courtkbr@gmail.com
To: rhelmick@larimer.org

Dear Community Development Rob Helmick,

To whom it may concern,

I am getting in touch to ask you to please suspend the permitting process for NISP until after the coronavirus outbreak has ended. It is not fair to move forward with a public permitting process at a time when the public is unable to participate in the process. This is unjust and manipulative. The free flowing Poudre River is a shared community resource of tremendous value. Do not degrade it without consulting with the public. Allow us to speak for our river.

Thank you for reading my request. Please don't hesitate to reach out if you have any questions.

All the best,
Courtney

Sincerely,
Courtney Blackmer-Raynolds
Loveland, CO 80538
courtkbr@gmail.com

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: Please suspend NISP permitting process

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Mon, Mar 30, 2020 at 1:35 PM
To: John Kefalas <kefalajm@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioner Kefalas -- Forwarded for your information and consideration. Commissioners Johnson and Donnelly have requested that these duplicative messages be included in the public record without forwarding the emails to them as an intermediate step.

Rob -- Please include this message in the public record.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Susan Marshall** <marshall.susan@comcast.net>
Date: Mon, Mar 30, 2020 at 8:52 AM
Subject: Please suspend NISP permitting process
To: <bocc@larimer.org>

Dear Commissioners,
My husband and I have written you once before on this topic via a link provided at the Save the Poudre site. We'd like to reiterate our request once again via these words from the No Pipe Dream site:

We strongly urge you to suspend the NISP permitting process during the coronavirus pandemic to ensure that all of our voices are heard. Please do not push this through during a time of crisis. Please wait until business is back to normal when we can adequately review the materials on NISP and attend open public hearings.

Thank you,
Susan Marshall
Fort Collins, CO
No Pipe Dream Supporter

Sent from my iPad

Rob Helmick <helmicrp@co.larimer.co.us>

Please Suspend NISP Permitting During COVID-19 Pandemic

1 message

Lisa Blackmer-Raynolds <lisablackmerraynolds@everyactioncustom.com> Mon, Mar 30, 2020 at 11:57 AM
Reply-To: lisablackmerraynolds@gmail.com
To: rhelmick@larimer.org

Dear Community Development Rob Helmick,

Colorado is in the midst of a "State of Emergency" and one of the greatest public health crises this nation has ever seen. The COVID-19 pandemic has already had wide sweeping repercussions, paralyzing the economy and government, shutting down countless businesses, and prohibiting public gatherings of any sort. Experts from around the world have made it abundantly clear that this crisis is not going away and will likely continue to worsen over the next several weeks to months. Is now really the time to initiate the 1041 permitting process for the Northern Integrated Supply Project, one of the most controversial developments in the history of Larimer County?

The Northern Integrated Supply Project is incredibly controversial and is expected to generate thousands of comments and have hundreds of people who want to speak at public hearings. However, with the State of Emergency and stay-at-home orders in effect for the foreseeable future, a lot of public input will not be heard. As parents loose access to child care, countless individuals experience incredible financial hardship, and more and more of us find ourselves caring for sick loved ones or falling ill ourselves, we will see a drastic reduction in the public's ability to comment on the 1041 permit. In addition, the inability to hold public gatherings during this time will silence the many voices who would otherwise be heard at public hearings.

With this, I ask you to please consider suspending the Northern Integrated Supply Project permitting process until a full, transparent, and meaningful public permit process can occur. Regardless of what the outcome of this permit process ends up being, the public deserves the opportunity to consider the options during a time when they don't feel like their own lives are at risk and to provide in person testimony if they so choose. I believe that the Governor's declaration of an official "State of Emergency," as well as the County's own emergency powers, gives you broad discretion to suspend the permitting process, and I encourage you to take this action as soon as possible. The public deserves a real and meaningful review process and that simply cannot occur in the midst of a global emergency.

Sincerely,
Lisa Blackmer-Raynolds
Loveland, CO 80538
lisablackmerraynolds@gmail.com

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: Johnson & Donnelly Blocking Email

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Mon, Mar 30, 2020 at 1:44 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information and consideration.

Staff -- Please include this message in the public record.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **K.A. Wagner** <kaswagner@me.com>
Date: Mon, Mar 30, 2020 at 1:27 PM
Subject: Fwd: Johnson & Donnelly Blocking Email
To: Linda Hoffmann <hoffmalc@co.larimer.co.us>

Ms, Hoffmann,

I was hoping that the email I sent an hour ago might be posted in a timely manner, since public comment is not permissible during the work session about to begin. Although that has not happened, please post and include in the NISP 1041 packet.

Perhaps you might have some success in convincing the commissioners that publically denigrating constituents and blocking citizen emails is injurious to the Board's reputation and defies their responsibility to represent all of Larimer County.

Regards,

Karen Wagner
Larimer County

Begin forwarded message:

From: "K.A. Wagner" <kaswagner@me.com>
Date: March 30, 2020 at 12:26:19 PM MDT
To: bocc@larimer.org, Lesli Ellis <ellislk@co.larimer.co.us>, Matthew Lafferty <laffermn@co.larimer.co.us>
Subject: Johnson & Donnelly Blocking Email

Commissioner Johnson was quoted this weekend as saying that "Save The Poudre just wants to make the county look bad." As he well knows, the organization is comprised of 600+ Larimer County constituents, who value the county's only wild and scenic river. Exactly how do those taxpayers make the county look bad in their attempts to communicate with the Board?

I was stunned to see that Commissioner Johnson, soon followed by Commissioner Donnelly, informed the County Manager to stop forwarding citizen emails (requesting suspension of the NISP hearings during the pandemic) to their inboxes, because they were duplicates or "form" letters. As a result of those requests, recent emails from citizens

requesting a suspension of the NISP 1041 hearings during the national pandemic were apparently only downloaded to Commissioner Kefalas.

The emails Johnson and Donnelly blocked were originals—not duplicates—and included concerns expressed by everyday citizens, No Pipe Dream supporters and members of Save Rural NoCo, just to name a few. Sadly, residents who thought the majority of the board would listen, now know two commissioners just don't want to be bothered.

So just who is making the county "look bad?" It appears that Johnson and Donnelly have excelled in damaging the reputation of the Board in their petty dismissal of taxpayer emails and their public contempt for constituents who pay their salaries. Unfortunately, lame duck commissioners must have the luxury of tuning out in a national pandemic.

Karen Wagner
Unincorporated Larimer County

Rob Helmick <helmicrp@co.larimer.co.us>

Please Suspend NISP Permitting During COVID-19 Pandemic

1 message

Bob Vogler <bluewoo23@everyactioncustom.com> Tue, Mar 31, 2020 at 9:21 AM
Reply-To: bluewoo23@msn.com
To: rhelmick@larimer.org

Dear Community Development Rob Helmick,

I am writing in objection to Larimer County's triggering of the 1041 permitting process for the Northern Integrated Supply Project (NISP). It is incredible that despite Larimer County itself declaring a formal emergency and stay-at-home order and the Governor of Colorado declaring a "State of Emergency" due to the COVID-19 pandemic, that the County is choosing to move forward with this permit on a normal timeline. NISP is by far the most controversial project in the history of Larimer County, and it will likely generate thousands of comments and hundreds of people wanting to appear at public hearings that cannot be held at this time. The NISP project has been in some form of the Federal, State, and County permitting process for 17 years and the public deserves a full, transparent, and normal permit process that is not rushed and unduly affected by the current COVID-19 pandemic.

I believe that the Governor's declaration of an official "State of Emergency," as well as the County's own emergency powers, gives you broad discretion to suspend the permitting process, and I encourage you to take this action as soon as possible. Attempting to hold a public permitting process during this pandemic, when the citizens of Larimer County and state of Colorado are under a stay-at-home order and a formally declared emergency is not only one of the most tone-deaf actions this County has taken in its history, it is most likely illegal. No meaningful public process could be completed under these conditions and if County citizens are to believe that its government is acting in good faith, this permit process must be suspended.

This project would significantly affect the Poudre River and it is actively being opposed by river-protection and river-recreation groups, and there is broad opposition to NISP from homeowners around the proposed reservoir, neighbors along Highway 287, and homeowners along proposed pipeline routes. I respectfully request that you "suspend" the 1041 permitting process for NISP during this COVID-19 pandemic and that you conduct a real and meaningful public process once the pandemic has abated.

Sincerely,
Bob Vogler
Fort Collins, CO 80525
bluewoo23@msn.com

Rob Helmick <helmicrp@co.larimer.co.us>

Please Suspend NISP Permitting During COVID-19 Pandemic

1 message

Laura Stout <lbaldwinstout@everyactioncustom.com> Tue, Mar 31, 2020 at 12:45 AM
Reply-To: lbaldwinstout@group.com
To: rhelmick@larimer.org

Dear Community Development Rob Helmick,

I am writing in objection to Larimer County's triggering of the 1041 permitting process for the Northern Integrated Supply Project (NISP). It is incredible that despite Larimer County itself declaring a formal emergency and stay-at-home order and the Governor of Colorado declaring a "State of Emergency" due to the COVID-19 pandemic, that the County is choosing to move forward with this permit on a normal timeline. NISP is by far the most controversial project in the history of Larimer County, and it will likely generate thousands of comments and hundreds of people wanting to appear at public hearings that cannot be held at this time. The NISP project has been in some form of the Federal, State, and County permitting process for 17 years and the public deserves a full, transparent, and normal permit process that is not rushed and unduly affected by the current COVID-19 pandemic.

I believe that the Governor's declaration of an official "State of Emergency," as well as the County's own emergency powers, gives you broad discretion to suspend the permitting process, and I encourage you to take this action as soon as possible. Attempting to hold a public permitting process during this pandemic, when the citizens of Larimer County and state of Colorado are under a stay-at-home order and a formally declared emergency is not only one of the most tone-deaf actions this County has taken in its history, it is most likely illegal. No meaningful public process could be completed under these conditions and if County citizens are to believe that its government is acting in good faith, this permit process must be suspended.

This project would significantly affect the Poudre River and it is actively being opposed by river-protection and river-recreation groups, and there is broad opposition to NISP from homeowners around the proposed reservoir, neighbors along Highway 287, and homeowners along proposed pipeline routes. I respectfully request that you "suspend" the 1041 permitting process for NISP during this COVID-19 pandemic and that you conduct a real and meaningful public process once the pandemic has abated.

Sincerely,
Laura Stout
Fort Collins, CO 80526
lbaldwinstout@group.com

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Please Suspend NISP Permitting During COVID-19 Pandemic

1 message

Mike Vogler <mvogler0@everyactioncustom.com> Tue, Mar 31, 2020 at 8:48 AM
Reply-To: mvogler0@hotmail.com
To: rhelmick@larimer.org

Dear Community Development Rob Helmick,

I am writing to say that Larimer County's decision to continue with 1041 permitting process for the Northern Integrated Supply Project (NISP) is unwarranted at this time. Now is not the time to hear public opinion due to the fact that Larimer County itself has declared a formal emergency and stay-at-home order and the Governor of Colorado has declared a "State of Emergency" due to the COVID-19 pandemic. The fact that the County is choosing to move forward with this permit on a normal timeline to me is completely inappropriate. NISP has been the most controversial project in the County for the last 17 years, and it will likely generate thousands of comments and hundreds of people wanting to appear at public hearings that cannot be held at this time. Personally I am caring for my parents in Montrose during this lock down and will not be able to appear in person to voice my opinion. Due to the state order I know that I am not the only person in a similar position. The public deserves a full, transparent, and normal permit process that is not rushed and unduly affected by the current COVID-19 pandemic. This project would significantly affect the Poudre River and it is actively being opposed by river-protection and river-recreation groups, and there is broad opposition to NISP from homeowners around the proposed reservoir, neighbors along Highway 287, and homeowners along proposed pipeline routes. I respectfully request that you "suspend" the 1041 permitting process for NISP during this COVID-19 pandemic and that you conduct a real and meaningful public process once the pandemic has abated. Thank you for your time.

Sincerely,
Mike Vogler
Montrose, CO 81401
mvogler0@hotmail.com

Rob Helmick <helmicrp@co.larimer.co.us>

Written public comments

24 messages

Karyn Coppinger <kcoppinger31@gmail.com> Thu, Apr 2, 2020 at 11:36 AM
To: rhelmick@larimer.org, ellislk@larimer.org

Good morning Mr. Helmick and Ms. Ellis:

Thank you for your recent attention to the request for an extension of the hearing dates for the NISP 1041 permit application, we appreciate it.

I represent a group of landowners who are interested in submitting written comment on the NISP project and 1041 permit application. Can the county please provide specific guidance on how the public may submit written comments so as to ensure they become part of the record for this important public process.

Thanks, Karyn Coppinger
Save Rural NoCo

Rob Helmick <helmicrp@co.larimer.co.us> Thu, Apr 2, 2020 at 2:22 PM
To: Karyn Coppinger <kcoppinger31@gmail.com>
Cc: Lesli Ellis <ellislk@larimer.org>

Ms. Coppinger,

Comments should be directed to me with project name and or project # in the subject line. Email or USPS bothe work either way they will make it into the record for the file and the decision makers. Most common document formats will work for our purposes.

[Quoted text hidden]

--

Robert Helmick
Senior Planner

Community Development Department
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521
970-498-7682
rhelmick@larimer.org
https://www.larimer.org/planning

Karyn Coppinger <kcoppinger31@gmail.com> Thu, Apr 2, 2020 at 3:12 PM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Thanks, does NISP have a project number?

[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us> Thu, Apr 2, 2020 at 3:16 PM
To: Karyn Coppinger <kcoppinger31@gmail.com>

Yes, it is. 20-ZONE2657

[Quoted text hidden]

Karyn Coppinger <kcoppinger31@gmail.com> Thu, Apr 2, 2020 at 4:55 PM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Thank you very much, and thanks to you and everyone in the county for all the hard work keeping us healthy during this virus emergency!
[Quoted text hidden]

Karyn Coppinger <kcoppinger31@gmail.com> Fri, Apr 3, 2020 at 7:54 AM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Good morning!

Have the new hearing dates been determined, and if so, can you please provide them to me?

Thanks, Karyn
[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us> Fri, Apr 3, 2020 at 8:22 AM
To: Karyn Coppinger <kcoppinger31@gmail.com>

Karyn,

Staff and commissioners will review and confirm a revised schedule for hearing dates on Monday and then publish the dates. For now the website will note that there will be a postponement with dates available next week.
[Quoted text hidden]

Karyn Coppinger <kcoppinger31@gmail.com> Fri, Apr 3, 2020 at 2:15 PM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Hi Rob:

Thanks much!

Where I can I find a list of the referring agencies that will be consulted/reviewing the NISP 1041 permit application?

Thanks, Karyn
[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us> Fri, Apr 3, 2020 at 3:16 PM
To: Karyn Coppinger <kcoppinger31@gmail.com>
Cc: Lesli Ellis <ellislk@larimer.org>, Don Threewitt <threewdl@co.larimer.co.us>

Karyn,
There is not a good way to create a list you can use since the process is mostly e now. If you go to the citizen portal and enter the file # in the land use application tab you can get to the file then scroll down to the attachments tab and I think it is the last document there is a copy of an email with all the email addresses of who we referred to. When I get to the point of preparing a staff report I will have a list as a part of tht report.

[Quoted text hidden]

Karyn Coppinger <kcoppinger31@gmail.com> Tue, Apr 7, 2020 at 7:22 AM
To: Rob Helmick <helmicrp@co.larimer.co.us>
Cc: Lesli Ellis <ellislk@larimer.org>, Don Threewitt <threewdl@co.larimer.co.us>

Morning Rob:

I'm not sure how to find the"citizen portal". I searched for it on the county web but couldn't find it.

We would please like a list of the referring departments and agencies, surely the county must keep close track of this so you have records of which departments and agencies have been consulted. Especially for such a huge project?!

Thanks, Karyn
[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us> Tue, Apr 7, 2020 at 8:30 AM
To: Katie Beilby <beilbykm@co.larimer.co.us>

Is there some way to do this?
[Quoted text hidden]

Katie Beilby <beilbykm@co.larimer.co.us> Tue, Apr 7, 2020 at 8:57 AM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Yes, I have a report that pulls the referral agents.

I will do this and send it to you.

LARIMER COUNTY

Katie Beilby
Office Supervisor

Community Development Department
200 W Oak St, Fort Collins, 80522 | 3rd Floor
W: (970) 498-7719
beilbykm@larimer.org | www.larimer.org/planning

[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us> Tue, Apr 7, 2020 at 9:02 AM
To: Katie Beilby <beilbykm@co.larimer.co.us>

Many thanks

[Quoted text hidden]

Katie Beilby <beilbykm@co.larimer.co.us> Tue, Apr 7, 2020 at 9:10 AM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Here you go. If this is not what you were looking for please let me know.

LARIMER COUNTY

Katie Beilby
Office Supervisor

Community Development Department
200 W Oak St, Fort Collins, 80522 | 3rd Floor
W: (970) 498-7719
beilbykm@larimer.org | www.larimer.org/planning

[Quoted text hidden]

NISP Referral List .doc
52K

Rob Helmick <helmicrp@co.larimer.co.us> Tue, Apr 7, 2020 at 9:16 AM
To: Katie Beilby <beilbykm@co.larimer.co.us>

perfect thanks!
[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us> Tue, Apr 7, 2020 at 11:12 AM
To: Karyn Coppinger <kcoppinger31@gmail.com>
Cc: Lesli Ellis <ellislk@larimer.org>, Don Threewitt <threewdl@co.larimer.co.us>

Karyn,
Attached please find the referral list. I was totally unaware of this capability of our software.
[Quoted text hidden]

NISP 1041 Referral List .doc
52K

Karyn Coppinger <kcoppinger31@gmail.com> Tue, Apr 7, 2020 at 12:27 PM
To: Rob Helmick <helmicrp@co.larimer.co.us>
Cc: Lesli Ellis <ellislk@larimer.org>, Don Threewitt <threewdl@co.larimer.co.us>

Thank you very much!
[Quoted text hidden]

Karyn Coppinger <kcoppinger31@gmail.com> Tue, Apr 7, 2020 at 1:49 PM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Hi Rob:

Where would I find a copy of the letters you provided to each of the referral agencies? I really only wish to see one, if they are all basically the same.

Also, there was an executive session on March 10 during which the commissioners discussed the referral process, and I cannot find the minutes of what was discussed. I see the minutes of them voting to go into exec session, but cannot find any details. I sure wish all this stuff was easier to find, it would save so much time!!

Thanks, Karyn

Thanks, Karyn
[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us> Tue, Apr 7, 2020 at 2:25 PM
To: Lesli Ellis <ellislk@larimer.org>

?????
we can get the letter but exec session?

---------- Forwarded message ---------
From: **Karyn Coppinger** <kcoppinger31@gmail.com>
Date: Tue, Apr 7, 2020 at 1:49 PM
Subject: Re: Written public comments
To: Rob Helmick <helmicrp@co.larimer.co.us>

[Quoted text hidden]
[Quoted text hidden]

Karyn Coppinger <kcoppinger31@gmail.com> Fri, Apr 10, 2020 at 7:45 AM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Morning Rob:

Happy Friday!

With regards to NISP, where would I find a copy of the letters you provided to each of the referral agencies? I really only wish to see one, if they are all basically the same.

Also, there was an executive session on March 10 during which the commissioners discussed the referral process, and I cannot find the minutes of what was discussed. I see the minutes of them voting to go into exec session, but cannot find

any details. Any direction you can provide on how to easily find this information would be greatly appreciated.

Also appreciated is all the work the county is doing during this emergency!
Thanks, Karyn

[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us> Fri, Apr 10, 2020 at 10:54 AM
To: Karyn Coppinger <kcoppinger31@gmail.com>
Cc: Lesli Ellis <ellislk@larimer.org>, Don Threewitt <threewdl@co.larimer.co.us>, "Ressue, William" <ressuewg@co.larimer.co.us>

Karyn,
I am attaching a copy of the email cover that was the referral letter for NISP. As far as the executive session goes I have copies Bill Ressue in the County Attorney's office. You need to work with him on that question.

referral letter below

You are receiving this notice as a followup to the referral you received recently regarding the 1041 permit application made for the NISP project.
Because of the timing of the process and the current guidance from the Health Department, as well as the various emergency declarations, we want to be sure that you let us know as soon as possible if your agency anticipates a delay or inability in responding or commenting on the referral within the time period and will need to request an extension.

We understand that you may have competing priorities and or are devoting resources to addressing this current situation.

Plan #: 20-ZONE2657

Request:

Northern Integrated Supply Project (NISP) is a 1041 Permit under the Larimer County Land Use Code Secon 14.4.J,

approval for Northern Tier, Poudre Delivery/Intake And County Line raw water lines, and Secon 14.4.K water

storage reservoir (Glade Reservoir) including recreaon f acilies and other appurt enant facilies t o both the pipelines and reservoir.

Pipelines -- From northwest of Fort Collins east to the Weld County line and from the Poudre River at Hwy 14 in Fort

Collins then east roughly following CR40/Prospect to the Weld County Line then south to the south county line at

Johnstown.

Link to view Documents: https://onlineportal.larimer.org/EnerGov_Prod/CitizenAccess/Site/Plan/View/ByPlanNumber/20-ZONE2657

If you will need more time to comment or respond so that we may take appropriate steps regarding the processing of this application please advise, Rob Helmick, Senior Planner, by phone at (970) 498-7682 or by email at, rhelmick@larimer.org.

Kind regards,

[Quoted text hidden]

Karyn Coppinger <kcoppinger31@gmail.com> Fri, Apr 10, 2020 at 11:08 AM
To: Rob Helmick <helmicrp@co.larimer.co.us>
Cc: Lesli Ellis <ellislk@larimer.org>, Don Threewitt <threewdl@co.larimer.co.us>, "Ressue, William" <ressuewg@co.larimer.co.us>

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 Permit Application; Project No. 20-ZONE 2657

2 messages

Scott Geurin <sgeurin@gmail.com> Tue, Apr 14, 2020 at 8:18 PM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>

Rob Helmick
Larimer County Senior Planner

Dear Mr. Helmick:

I am writing to you to express my absolute opposition to the NISP/Glade Reservoir project. I live in Bonner Peak Ranch and I am appalled that this project is even being considered. I can see no benefit for the City of Fort Collins, Larimer County or Colorado.

This project would result in years of disruptive construction activity for all of us living north of Fort Collins. This construction activity will result in blinding dust, traffic congestion, noise pollution, air pollution and an eyesore on our beautiful valley.

Let's be realistic and admit that Glade Reservoir will never be a beautiful lake for us to enjoy. NISP does not have enough water to fill the reservoir and their junior rights will only add water in abundant years. Whatever water it collects will be sucked out and sent away faster than it will fill up. Glade Reservoir will be an ugly mud pit cursed by residents of Larimer County.

Please let me know that you understand and share my concerns and plan to stop the NISP/Glade project with all of your power.

Thank you,
Gary Scott Geurin

5919 Obenchain Road
Laporte, CO 80535
--
"Therefore if anyone is in Christ he is a new creation: the old has gone, the new has come"
2 Corinthians 5:17

Rob Helmick <helmicrp@co.larimer.co.us> Wed, Apr 15, 2020 at 8:12 AM
To: Scott Geurin <sgeurin@gmail.com>

Mr. Geurin,
We have your comments and they will made a part of the record. Which will be presented to the Planning Commission and the Board of County Commissioners.
[Quoted text hidden]
--

Robert Helmick
Senior Planner

Community Development Department
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521

Thanks Rob:

I appreciate this, but the email is apparently a *follow-up to a referral,* so I'd like the actual referral: I'm interested in what the county has asked the referral agencies to do. While I've looked at the 1041 regulations and the land use code section that discusses referrals, there's nothing that I can find that explains what information you seek from the referral agencies. I'm trying very hard to find this information on my own, but it doesn't seem to be publicly available on-line. Specifically what has the county requested from the referral agencies?

I'm also interested in what was discussed regarding referrals during the BOCC executive session.

Thanks, Karyn
[Quoted text hidden]

William Ressue <ressuewg@co.larimer.co.us> Fri, Apr 10, 2020 at 11:12 AM
To: Rob Helmick <helmicrp@co.larimer.co.us>
Cc: Karyn Coppinger <kcoppinger31@gmail.com>, Lesli Ellis <ellislk@larimer.org>, Don Threewitt <threewdl@co.larimer.co.us>

Hello All,

Executive sessions are confidential meetings and do not have public minutes available for review.

Best,
Bill

LARIMER COUNTY

William Ressue
Deputy County Attorney

Larimer County Attorney's Office
Office: 970-498-7450
Fax: 970-498-7430
ressuewg@co.larimer.co.us

[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us> Fri, Apr 10, 2020 at 1:28 PM
To: Karyn Coppinger <kcoppinger31@gmail.com>
Cc: Lesli Ellis <ellislk@larimer.org>, Don Threewitt <threewdl@co.larimer.co.us>, "Ressue, William" <ressuewg@co.larimer.co.us>

Karyn,
There is not anything substantially different between the two except to note in the first is notes that we are asking for their comments. We work with these referral agencies regularly and they know what they do and how a project may affect them. We do not give guidance on what to comment on.
[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: Thank You for Delaying NISP Hearings

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Mon, Apr 13, 2020 at 7:06 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information.

Rob -- Please include this message in the public record.

---------- Forwarded message ---------
From: **Larimer.org** <noreply@larimer.org>
Date: Mon, Apr 13, 2020, 6:33 PM
Subject: Thank You for Delaying NISP Hearings
To: <bocc@larimer.org>

Submitted on Monday, April 13, 2020 - 6:33pm

Submitted by user: Anonymous

Submitted values are:

Emailing (to) bocc@larimer.org
Subject Thank You for Delaying NISP Hearings
Your Name Elizabeth Pruessner
Phone 9704844371
Your Email soilresearch13@gmail.com
Confirm Email soilresearch13@gmail.com
Message
Thank you very much for delaying the NISP hearings! Now is not the time to take on this issue and I so appreciate that the concerns of citizens were heard and respected.
Privacy Setting

This form was submitted from a /contact email link on larimer.org.

Rob Helmick <helmicrp@co.larimer.co.us>

Question about NISP-1041

4 messages

John Mayfield <John@jmayfield.com> Wed, Apr 22, 2020 at 6:10 PM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>

Good Afternoon Mr. Helmick-
I am a homeowner on CR-13 south of US392 and received a noce about NISP -1041 hearing coming up in June. Looking at the project, I am trying to determine if the pipeline going from Glade Reservoir to Johnstown is an above-ground pipeline or a buried pipeline. I'm having some trouble finding this detail in the project documents at: https://www.larimer.org/planning/NISP-1041.

Could you please clarify whether this is an above ground pipeline or a below-ground pipeline or point me to the document that contains that detail?

Thank you,

John Mayfield

John Mayfield <John@jmayfield.com> Wed, Apr 22, 2020 at 6:57 PM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>

Hello again-
I realized about 5min a. er I sent this that it could easily be interpreted as a stupid queson due t o the fact that the project is in northern colorado where above-ground water could freeze. :) However, I wanted to ask the queson an yway as I have very lile kno wledge about water projects like this and don't know if piping material uliz ed would be resistant to freezing (I've seen other above ground pipes). So I thought I would ask instead of making an assumpon.

Thank you,
John

From: John Mayfield on behalf of John Mayfield <John@jmayfield.com>
Sent: Wednesday, April 22, 2020 6:10 PM
To: rhelmick@larimer.org <rhelmick@larimer.org>
Subject: Queson about NISP -1041

[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us> Thu, Apr 23, 2020 at 8:41 AM
To: John Mayfield <John@jmayfield.com>

Mr. Mayfield,

All of the pipelines will be underground. I believe there is a "representational" cross section in the project description document on the web site.

[Quoted text hidden]
--

Robert Helmick
Senior Planner

Community Development Department
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521
970-498-7682
rhelmick@larimer.org
https://www.larimer.org/planning

John Mayfield <john@jmayfield.com> Thu, Apr 23, 2020 at 9:19 AM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Excellent. Thank you very much for the quick response Mr. Helmick!

John

[Quoted text hidden]

1746

Rob Helmick <helmicrp@co.larimer.co.us>

NISP

1 message

Kay Mikesky <factualfitness@yahoo.com> Thu, Apr 23, 2020 at 10:41 AM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>

Dear Mr. Helmick,
I am writing to you as a concerned citizen regarding NISP. Full information outlining the proposed Glade Reservoir has been incomplete and more than a little scarce for those citizens living close to the proposed site. My husband and I moved to Bellvue in March 2016 and reside approximately one mile west of the projected site. We had never heard about this proposed dam until a concerned neighbor held a meeting at her home in November 2019 where she shared the troubling news of the potential dam. As the nearby Poudre River would provide the water for this project, a small but growing group of neighbors has subsequently researched the many destructive environmental impacts of this outdated and costly "solution" for water scarcity.

NISP began presenting information to various groups in 2007, yet there has been only ONE informational presentation to the neighboring properties that would be affected by the Glade Reservoir. It wasn't until last December that NISP mailed postcards inviting "Neighbors of Glade Reservoir" to an informational meeting at the Livermore Community Center on December 18, 2019. Many of us attended the December NISP Open House and were stunned at the attempt to sell this as the optimal answer to water scarcity in towns along the I-25 corridor as well as "recreational opportunities" for the public. If this proposed dam/reservoir held such true benefits to those of us residing in the northern portion of Larimer County, wouldn't our realtor back in 2016 have touted the wonderful possibilities of living this close to such "amenities"? Guess what? Absolutely no mention of the proposed reservoir and recreational plans was made. Perhaps realtors simply avoid the subject, being aware of the many drawbacks of the project that would be foisted upon wildlife and the residents, both during and following construction of the nearly 28-story dam.

We are frankly amazed that any government official would consider manipulating the Poudre River, the sole Wild and Scenic River in the state of Colorado. The various governmental agencies charged with evaluating the environmental effects of the NISP proposed dam have revealed conflicting data. EPA and Army Corps of Engineers conclusions are still to be determined.

On the bright side, my fellow concerned citizens for responsible water use are realistic regarding the dilemma of water scarcity along the Front Range. We have been pleased to discover some strikingly simple, common-sense, updated techniques that will cost far less than this outdated 20th century behemoth called a dam. Most notably, AQUIFER STORAGE AND RECOVERY is not a new concept, yet is seems to have been ignored by decision-makers for years.

Let's explore less ruinous, less costly, and more modern yet simple solutions to a potentially destructive dinosaur. Our small group of neighbors who have experienced the seemingly sudden push to get this project to be a "done deal" are working strenuously to research viable options. The facts are quite easy to see when brought to light. While we appreciate the opportunity to present our viewpoints and offer alternative solutions at the Public Hearing on June 24, it seems that the 2-minute limit for expressions is restrictive. It may actually increase the length of the hearing if more speakers are required to present the information instead of a concise 3-minute presentation.

Thank you for your consideration in these extremely important matters,
Kay Mikesky

1747

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project (NISP) 1041; Plan Number 20-ZONE2657

1 message

Patrick Mooney <pbmooney@me.com> Fri, Apr 24, 2020 at 2:53 PM
To: rhelmick@larimer.org

I am the owner of a fifty acre parcel at 5611 Kremers Lane, La Porte, CO 80535, Larimer County Parcel Number 9818000011. I received a notice of the above-referenced land use application, which invites me to submit comments on the application to you.

I wish to state my support for the project, which will both meet anticipated water needs in the area and be a valuable community amenity. The location takes advantage of natural features to create needed water storage with minimal new infrastructure development and should have less environmental impact than many other water storage projects. The project should be approved.

Jan Peterson Rothe, Ph.D.

6521 Placer Ct.
Bellvue, Co 80521
(970) 467-1415
lemmule@gmail.com

April 21, 2020

Commissioner John Kefalas
Larimer County Board of County Commissioners
200 West Oak Street
Fort Collins, CO 80521

Dear Commissioner Kefalas,

I am writing to ask you to very carefully consider the NISP 1041 permit application; Project No. 20-ZONE 2657. I am a retired wildlife ecologist who lives quite close to the proposed site of the Glade Reservoir dam. I spent my career conducting habitat assessments and trapping surveys for the Preble's Meadow Jumping Mouse, a federally-threatened species of mouse that occurs only in Colorado and Wyoming. I worked as an independent contractor for the City of Fort Collins and also for Larimer County for 13 years.

Although I would, of course, prefer not to have a dam built in my back yard, that is not why I'm writing. Instead, I'm asking you to please think long and hard about all the possible ramifications this project will have on some of the amazing natural resources in our county - public resources that you, as a county commissioner, have been elected to protect.

I understand that many people lack the background needed to appreciate the importance of all individual species, especially mice, even threatened ones like the Preble's mouse. However, as an ecologist, I understand the delicate balance between every animal species, both large and small, and their relation to their habitat. **We are all interconnected and interdependent.** And when one species gets shoved aside, or removed all together from a particular environment, the entire ecosystem can start to collapse, **which is detrimental to all of us!**

The black-tailed prairie dog, which inhabits the north end of the Glade reservoir site, is a good example. Prairie dogs are known as a 'keystone' or 'foundation' species. What this means is that many other birds and animals are dependent on them: they serve as prey for many species of predators, their burrows

provide shelter for many other species of birds, mammals, and reptiles, and they create open habitats preferred by many grassland species of birds. Burrowing owls, which are a state-listed threatened species, use their burrows for nesting and Black-footed ferrets, one of the most endangered mammals in North America, are almost entirely dependent on them.

Many people, especially those working in agriculture, tend to view prairie dogs as pests or vermin. Prairie dogs have been poisoned, used as target practice, and generally eliminated as quickly as possible to make more room for human beings. About 200 years ago, the number of prairie dogs living in North America probably exceeded 5 billion. The current number is less than 2% of the number described by Meriwether Lewis as "infinite", some 200 years ago.

Black-tailed prairie dogs, which are now a state-listed species, exist on the northeastern side of the proposed Glade Reservoir site and also in numerous areas along the proposed conveyance system. In their 1041 permit application, NISP claims they will, if possible, relocate any prairie dogs that will be potentially impacted by the project. However, if they are unable to do that, they will just euthanize (or poison) them. So what? Who cares?

It's imperative for all of us to start caring, now! If we keep pushing wildlife, such as mule deer, white-tailed deer, pronghorn antelope, elk, bald eagles, golden eagles, burrowing owls, coyotes, mountain lions, prairie dogs, and the federally-threatened Preble's mice aside and destroying their habitat because of huge projects like Glade Reservoir, we will be the losers. No amount of "mitigation" will make up for the losses we will all suffer. No amount of well-designed 'recreation' around a man-made reservoir with a visitor center, campgrounds, man-made hiking trails, and parking lots will ever be able to compete with having truly wild places in our midst, where we can occasionally catch a glimpse of wildlife in their native habitats.

What makes the proposed impacts to wildlife even more upsetting is that they are completely unnecessary. There are viable alternatives to NISP that are more sustainable, far less expensive, faster to build, and more in line with protecting our public natural resources.

Please make the right choice for the future of all of us, including our grandchildren and their progeny. Glade Reservoir is the wrong choice. Please deny NISP's 1041 permit for Glade Reservoir.

Thank you for considering my request, for your public service, and for your courage and foresight.

Respectfully,

Jan Peterson Rothe

Jan Peterson Rothe

1750

Rob Helmick <helmicrp@co.larimer.co.us>

Please Suspend NISP Permitting During COVID-19 Pandemic

1 message

Hunter Kerr <nhk@everyactioncustom.com> Sat, Apr 25, 2020 at 11:00 PM
Reply-To: nhk@standingupright.com
To: rhelmick@larimer.org

Dear Community Development Rob Helmick,

I am writing in objection to Larimer County's triggering of the 1041 permitting process for the Northern Integrated Supply Project (NISP). It is incredible that despite Larimer County itself declaring a formal emergency and stay-at-home order and the Governor of Colorado declaring a "State of Emergency" due to the COVID-19 pandemic, that the County is choosing to move forward with this permit on a normal timeline. NISP is by far the most controversial project in the history of Larimer County, and it will likely generate thousands of comments and hundreds of people wanting to appear at public hearings that cannot be held at this time. The NISP project has been in some form of the Federal, State, and County permitting process for 17 years and the public deserves a full, transparent, and normal permit process that is not rushed and unduly affected by the current COVID-19 pandemic.

I believe that the Governor's declaration of an official "State of Emergency," as well as the County's own emergency powers, gives you broad discretion to suspend the permitting process, and I encourage you to take this action as soon as possible. Attempting to hold a public permitting process during this pandemic, when the citizens of Larimer County and state of Colorado are under a stay-at-home order and a formally declared emergency is not only one of the most tone-deaf actions this County has taken in its history, it is most likely illegal. No meaningful public process could be completed under these conditions and if County citizens are to believe that its government is acting in good faith, this permit process must be suspended.

This project would significantly affect the Poudre River and it is actively being opposed by river-protection and river-recreation groups, and there is broad opposition to NISP from homeowners around the proposed reservoir, neighbors along Highway 287, and homeowners along proposed pipeline routes. I respectfully request that you "suspend" the 1041 permitting process for NISP during this COVID-19 pandemic and that you conduct a real and meaningful public process once the pandemic has abated.

Sincerely,
Hunter Kerr
Fort Collins, CO 80525
nhk@standingupright.com

1751

Rob Helmick <helmicrp@co.larimer.co.us>

Nisp/ rocky ridge

1 message

Charles Meserlian <ftctrucks@yahoo.com> Sun, Apr 26, 2020 at 4:30 PM
To: rhelmick@larimer.org

Rob, Read through the study fairly close today. I noticed the preferred route is n-2.1. On page 24; the segment 1 description doesn't make sense to me. Also, for what it's worth I would go along with n-2.2 as that works best for us. The other angle to put in front of these guys is if they went with n-2.2, I would be open to renting a staging area on my property along Hwy.1

The other thing I want to bring up is if the Thornton pipeline is still in the works, I'd like to see them go In at the same time as we previously discussed.

I'd be happy to meet with you or talk on the phone to see what can get worked out.

Thanks and stay well
Charlie Meserlian
970-227-4277. Cell
490-1251. Work

Sent from my iPhone

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 public hearing

6 messages

LARRY SMITH <lsmith2051@aol.com> Fri, Apr 24, 2020 at 11:02 AM
To: rhelmick@larimer.org
Cc: Larry Smith <lsmith2051@aol.com>

Thanks for the notification of the hearing at 6:00pm June 24, 2020, but your post card doesn't say where this hearing will be held. Can you please advise?

Thank you,
Larry Smith
Bonner Peak resident

Rob Helmick <helmicrp@co.larimer.co.us> Fri, Apr 24, 2020 at 11:11 AM
To: Katie Beilby <beilbykm@co.larimer.co.us>

?
[Quoted text hidden]
--

Robert Helmick
Senior Planner

Community Development Department
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521
970-498-7682
rhelmick@larimer.org
https://www.larimer.org/planning

Katie Beilby <beilbykm@co.larimer.co.us> Fri, Apr 24, 2020 at 11:17 AM
To: Rob Helmick <helmicrp@co.larimer.co.us>

No It doesn't... it directs them to the webpage. There was not room, also the webpage states that august 10th has been removed.

Katie Beilby
Office Supervisor

Community Development Department
200 W Oak St, Fort Collins, 80522 | 3rd Floor
W: (970) 498-7719
beilbykm@larimer.org | www.larimer.org/planning

[Quoted text hidden]

Katie Beilby <beilbykm@co.larimer.co.us> Fri, Apr 24, 2020 at 11:17 AM
To: Rob Helmick <helmicrp@co.larimer.co.us>

And I am waiting to see where we are going to have it since it is only presentations.

Katie Beilby
Office Supervisor

Community Development Department
200 W Oak St, Fort Collins, 80522 | 3rd Floor
W: (970) 498-7719
beilbykm@larimer.org | www.larimer.org/planning

[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us> Fri, Apr 24, 2020 at 11:27 AM
To: LARRY SMITH <lsmith2051@aol.com>
Cc: Katie Beilby <beilbykm@co.larimer.co.us>

Mr. Smith,
Thank you for your email.
The card directs you to the web page which will have updated information as we get closer to the hearings. We are still working on how and where hearings will occur based on facility availability and the status of whatever social distancing requirements are in place.
Also the first hearing date will be only for presentations from staff and applicants.
[Quoted text hidden]
[Quoted text hidden]

LARRY SMITH <lsmith2051@aol.com> Fri, Apr 24, 2020 at 12:09 PM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Sorry, I thought website was for more information on the NISP project.
Thank you!
Larry Smith

> On Apr 24, 2020, at 11:28 AM, Rob Helmick <helmicrp@co.larimer.co.us> wrote:
>
> [Quoted text hidden]

1754

Rob Helmick <helmicrp@co.larimer.co.us>

Reservoir

1 message

Lisa Bright <lisajulianne@gmail.com> Sat, Apr 25, 2020 at 8:41 PM
To: RON BRIGHT <rnjbright@msn.com>, "rhelmick@larimer.org" <rhelmick@larimer.org>

Dear Rob, I am writing to let you know that I fiercely oppose construction of the new reservoir. There will be many detrimental impacts to our environment and community for many years to come. Please make sure you stop the forward movement of this plan. It will have devastating consequences for all.

Thanks,
Lisa Bright
Laporte, CO
--
"I think I could turn and live with the animals." Walt Whitman

1755

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: NISP

1 message

John Kefalas <kefalajm@co.larimer.co.us> Sun, Apr 26, 2020 at 11:35 AM
To: Rob Helmick <helmicrp@co.larimer.co.us>, Lesli Ellis <ellislk@larimer.org>, Laurie Kadrich <kadriclm@co.larimer.co.us>

Rob,

Please include this email in the NISP 1041 permitting process public record. Thank you and hope you folks are well.

John Kefalas
County Commissioner, District 1

Commissioners' Office
200 W Oak St | 2nd Floor
PO Box 1190, Fort Collins, CO 80522-1190
W: (970) 498-7001
Cell: (720) 254-7598
jkefalas@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Kay Mikesky** <factualfitness@yahoo.com>
Date: Thu, Apr 23, 2020 at 10:59 AM
Subject: NISP
To: jkefalas@larimer.org <jkefalas@larimer.org>

Dear Mr. Kefalas,
I am writing to you as a concerned citizen regarding NISP. Full information outlining the proposed Glade Reservoir has been incomplete and more than a little scarce for those citizens living close to the proposed site. My husband and I moved to Bellvue in March 2016 and reside approximately one mile west of the projected site. We had never heard about this proposed dam until a concerned neighbor held a meeting at her home in November 2019 where she shared the troubling news of the potential dam. As the nearby Poudre River would provide the water for this project, a small but growing group of neighbors has subsequently researched the many destructive environmental impacts of this outdated and costly "solution" for water scarcity.

NISP began presenting information to various groups in 2007, yet there has been only ONE informational presentation to the neighboring properties that would be affected by the Glade Reservoir. It wasn't until last December that NISP mailed postcards inviting "Neighbors of Glade Reservoir" to an informational meeting at the Livermore Community Center on December 18, 2019. Many of us attended the December NISP Open House and were stunned at the attempt to sell this as the optimal answer to water scarcity in towns along the I-25 corridor as well as "recreational opportunities" for the public. If this proposed dam/reservoir held such true benefits to those of us residing in the northern portion of Larimer County, wouldn't our realtor back in 2016 have touted the wonderful possibilities of living this close to such "amenities"? Guess what? Absolutely no mention of the proposed reservoir and recreational plans was made. Perhaps realtors simply avoid the subject, being aware of the many drawbacks of the project that would be foisted upon wildlife and the residents, both during and following construction of the nearly 28-story dam.

We are frankly amazed that any government official would consider manipulating the Poudre River, the sole Wild and Scenic River in the state of Colorado. The various governmental agencies charged with evaluating the environmental effects of the NISP proposed dam have revealed conflicting data. EPA and Army Corps of Engineers conclusions are still to be determined.

On the bright side, my fellow concerned citizens for responsible water use are realistic regarding the dilemma of water scarcity along the Front Range. We have been pleased to discover some strikingly simple, common-sense, updated techniques that will cost far less than this outdated 20th century behemoth called a dam. Most notably, AQUIFER STORAGE AND RECOVERY is not a new concept, yet is seems to have been ignored by decision-makers for years.

Let's explore less ruinous, less costly, and more modern yet simple solutions to a potentially destructive dinosaur. Our small group of neighbors who have experienced the seemingly sudden push to get this project to be a "done deal" are working strenuously to research viable options. The facts are quite easy to see when brought to light. While we appreciate the opportunity to present our viewpoints and offer alternative solutions at the Public Hearing on June 24, it seems that the 2-minute limit for expressions is restrictive. It may actually increase the length of the hearing if more speakers are required to present the information instead of a concise 3-minute presentation.

Thank you for your consideration in these extremely important matters,
Kay Mikesky

Saturday, April 25, 2020

Dear Mr. Johnson,

I am writing to you as a concerned citizen regarding NISP. Full information outlining the proposed Glade Reservoir has been incomplete and more than a little scarce for those citizens living close to the proposed site. My husband and I moved to Bellvue in March 2016 and reside approximately one mile west of the projected site. We had never heard about this proposed dam until a concerned neighbor held a meeting at her home in November 2019 where she shared the troubling news of the potential dam. As the nearby Poudre River would provide the water for this project, a small but growing group of neighbors has subsequently researched the many destructive environmental impacts of this outdated and costly "solution" for water scarcity.

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Thank you for your consideration in these extremely important matters,

Kay Mikesky

Kay Mikesky

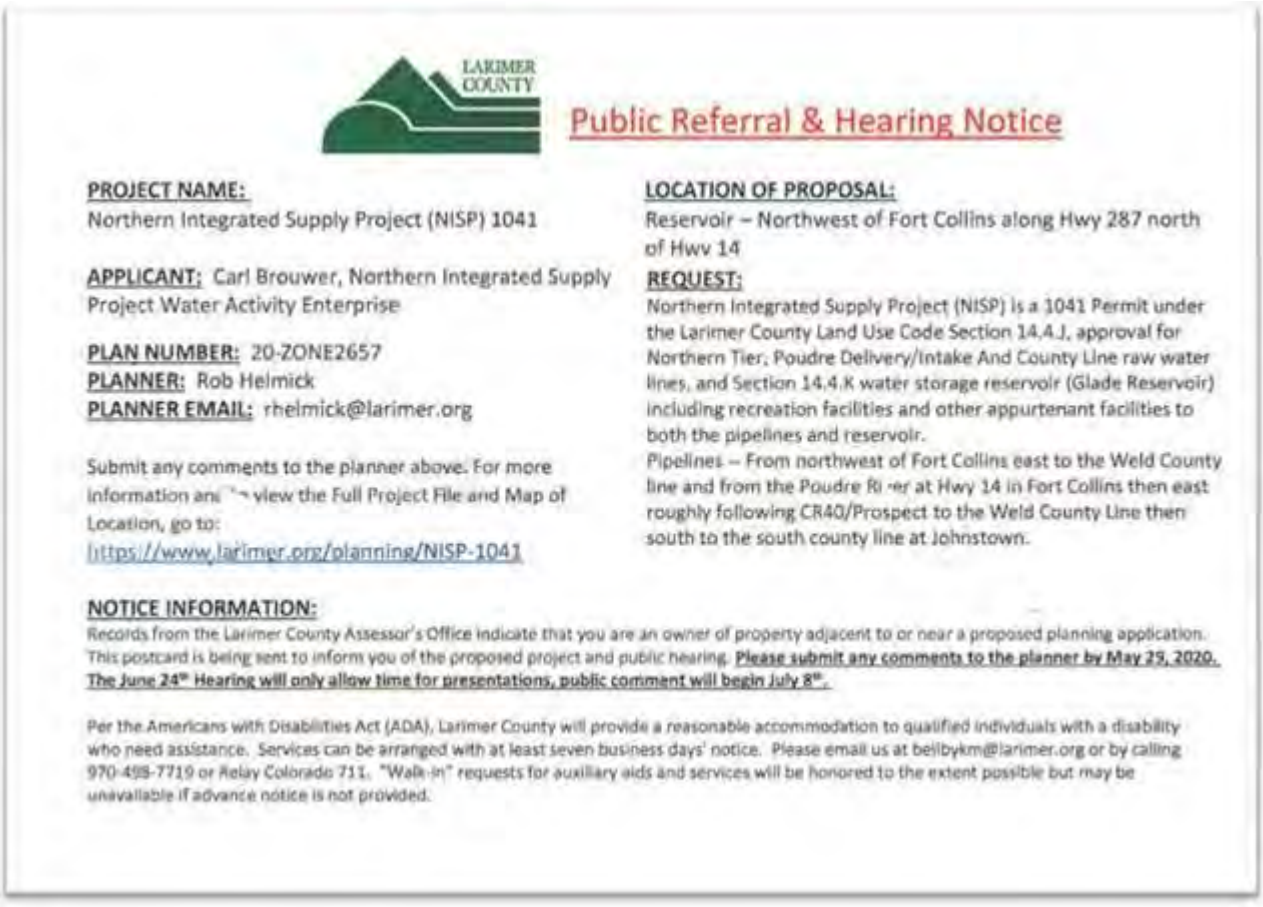
1758

Rob Helmick <helmicrp@co.larimer.co.us>

Pipeline Through My Property

2 messages

Staudinger, Nicole <Nicole.Staudinger@efirstbank.com> Mon, Apr 27, 2020 at 12:03 PM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>



LARIMER COUNTY

Public Referral & Hearing Notice

PROJECT NAME:
Northern Integrated Supply Project (NISP) 1041

APPLICANT: Carl Brouwer, Northern Integrated Supply Project Water Activity Enterprise

PLAN NUMBER: 20-ZONE2657
PLANNER: Rob Helmick
PLANNER EMAIL: rhelmick@larimer.org

Submit any comments to the planner above. For more information and to view the Full Project File and Map of Location, go to:
https://www.larimer.org/planning/NISP-1041

LOCATION OF PROPOSAL:
Reservoir – Northwest of Fort Collins along Hwy 287 north of Hwy 14

REQUEST:
Northern Integrated Supply Project (NISP) is a 1041 Permit under the Larimer County Land Use Code Section 14.4.J, approval for Northern Tier, Poudre Delivery/Intake And County Line raw water lines, and Section 14.4.K water storage reservoir (Glade Reservoir) including recreation facilities and other appurtenant facilities to both the pipelines and reservoir.
Pipelines – From northwest of Fort Collins east to the Weld County line and from the Poudre River at Hwy 14 in Fort Collins then east roughly following CR40/Prospect to the Weld County Line then south to the south county line at Johnstown.

NOTICE INFORMATION:
Records from the Larimer County Assessor's Office indicate that you are an owner of property adjacent to or near a proposed planning application. This postcard is being sent to inform you of the proposed project and public hearing. **Please submit any comments to the planner by May 29, 2020. The June 24th Hearing will only allow time for presentations, public comment will begin July 8th.**

Per the Americans with Disabilities Act (ADA), Larimer County will provide a reasonable accommodation to qualified individuals with a disability who need assistance. Services can be arranged with at least seven business days' notice. Please email us at beilbykm@larimer.org or by calling 970-498-7719 or Relay Colorado 711. "Walk-in" requests for auxiliary aids and services will be honored to the extent possible but may be unavailable if advance notice is not provided.

Hi Rob:

I just received this postcard. It looks like the amended pipeline plan has it coming directly through my property. I would like to educate myself on my options. Sure seems like the south side of the road, where there are no houses close or improvements yet would be a better options. Could we have time to speak about the plan? Thanks.

Nicole Staudinger

Nicole Staudinger

President – Northern Colorado

1759

Rob Helmick <helmicrp@co.larimer.co.us>

TSale Comments on the NISP 1041 w 3 dropped Figs.

2 messages

Tom Sale <tsale@colostate.edu> Sat, May 2, 2020 at 3:32 PM
To: rhelmick@larimer.org, jkefalas@larimer.org, swjohnson@larimer.org, tdonnelly@larimer.org

Hello Rob Helmic, John Kefalas, Steve Johnson and Tom Donnelly:

In my rush to meet the postal date for submitting comments on the NISP 1041, I failed to check all of the PDF converted figures. I just realized the PDF sent on 4/29/20 is missing:

- Figure 9 - Required peak power...
- Figure 10 - Power lines required ... and
- Text in Text in Figure 11 - Local subsurface water storage...

Please see a revised PDF with all figures.

Your short schedule was a challenge. These are busy times for me.

If convenient, an acknowledgement receipt of my comments would be greatly appreciated.

Best Regards, Tom Sale

On 4/30/2020 12:03 AM, Tom Sale wrote:

> Hello Rob Helmic, John Kefalas, Steve Johnson and Tom Donnelly:
>
> Attached please find comments on the NISP 1041
>
> I hope all is good with you
>
> Thanks for support
>
> Best Regards, Tom Sale
>
> --
> Professor
> Colorado State University
> Civil and Environmental Engineering
> 970-491-8413 w 970-232-5739 c

--
Professor
Colorado State University
Civil and Environmental Engineering
970-491-8413 w 970-232-5739 c

2 attachments

TSale Comments on NISP 1041 4.29.20R.pdf
2088K

tsale.vcf
1K

Rob Helmick <helmicrp@co.larimer.co.us> Mon, May 4, 2020 at 7:45 AM
To: Tom Sale <tsale@colostate.edu>

Mr. Sale,
We have received your comments and they will be placed inthe file record of public comments on this application.
[Quoted text hidden]
--

Robert Helmick
Senior Planner

Community Development Department
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521
970-498-7682
rhelmick@larimer.org
https://www.larimer.org/planning

To: Rob Helmick / Larimer County

CC:

John Kefalas - District I, Chair Pro tem - jkefalas@larimer.org

Steve Johnson- District II, Chairman- swjohnson@larimer.org

Tom Donnelly - District III tdonnelly@larimer.org

From: Dr. Tom Sale

Date: April 29, 2020

Regarding: Comments on Northern Integrated Supply Project (NISP) 1041 Permit

Overview

The following is provided in response to postal notification received on 4/24/20 regarding an opportunity to provide comments on the Northern Integrated Supply Project (NISP) 1041 no later than May 29, 2020. I appreciate the opportunity to participate in the NISP 1041 and everyone's efforts to advance sustainable communities in Larimer County.

Given all our busy schedules I'm endeavoring to be as brief as possible. Herein I'm advancing questions that you might pose to Northern. My hope is that you will find my input helpful in reaching a decision on the NISP 1041.

My current position is Full Professor, Civil and Environmental Engineering, Colorado State University, Fort Collins, CO. My qualifications include BA degrees in Chemistry and Geology, an MS degree in Watershed Hydrology, and a PhD degree in Agricultural Engineering. I'm a registered professional Geologist (+25 years WY-1954). My employment history includes 20 years of water resource consulting engineering and 20 years of experience in academia including in excess of $30 million in research funding. I live 1 mile west of the proposed site of the Glade Reservoir and have intimate knowledge of the space associated with Glade. Furthermore, I have been an active kayaker on the Cache La Poudre River for the last quarter century. Given my education, professional experience, and knowledge of the NISP space, I feel uniquely qualified to support you in your decision on NISP 1041. Please feel free to contact me at any time if I can be of assistance.

Tom Sale
6700 North County Rd 29C
Bellvue, Colorado 80512
970-232-5739
TSale@Engr.ColoState.Edu

Siting

The following describes adverse aspects of the site selected for NISP's Glade Reservoir.

Faults

Two large faults pass under the proposed Glade Dam site as shown oin the USGS map below (Figure 1). This includes the North Fork Fault with over a 1-mile of E-W displacement and the Bellvue Fault with +100s of feet of vertical displacement. As 1) the faults represent vertical intervals of broken rock and 2) that they pass directly under the proposed dam site (that will have up to 400 feet of differential water level) it seems highly likely that leakage under the dam along the faults will be severe. This leakage would be far more severe than what Northern has already experienced at the North Dam on Horsetooth Reservoir. Gypsum and limestone beds in the formations that underlie the Glade site are widely recognized as being prone to dissolution and wash out as identified in annual North Poudre Irrigating Company meetings, experience with the North Dam on Horsetooth, and random anomalous high capacity wells in the Glade Area.

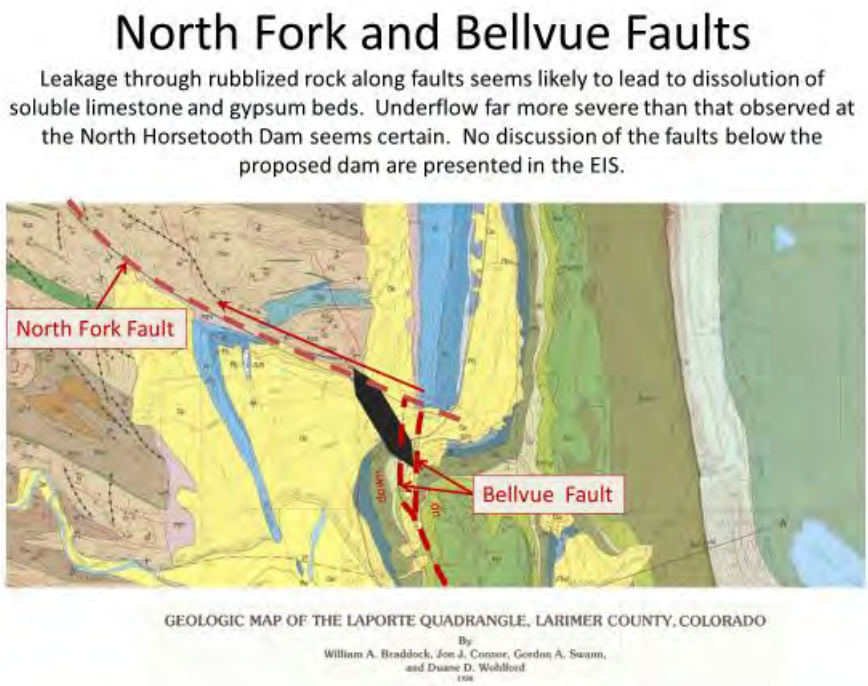


Figure 1 – North Fork and Bellvue Faults

Fault Questions:

- Why is it that neither the North Fork or Bellvue Faults have ever been mentioned in public NISP documents to date?

- What contingency plans are available to address fault-controlled leakage under the dams, what are the associated costs (e.g. following work on the North Dam on Horsetooth), and are the related costs being shared with participants and lending agencies?
- In your recent multiple year (undocumented?) drilling programs were “subsurface voids” encountered that could lead to severe seepage losses and/or washout under the Glade Dam? Have the results from recent subsurface investigations been shared with the public?

Seepage losses

Per the USGS report on geology in the vicinity of Glade, the principle rock type underlying the Glade Reservoir is porous sandstone (Figure 2). Much of the sandstone and other rock has been broken by deformation associated with uplift of the Rocky Mountains. Resulting from deformation, the underlying rock also conducts water along networks of joints and fractures (Figure 3).

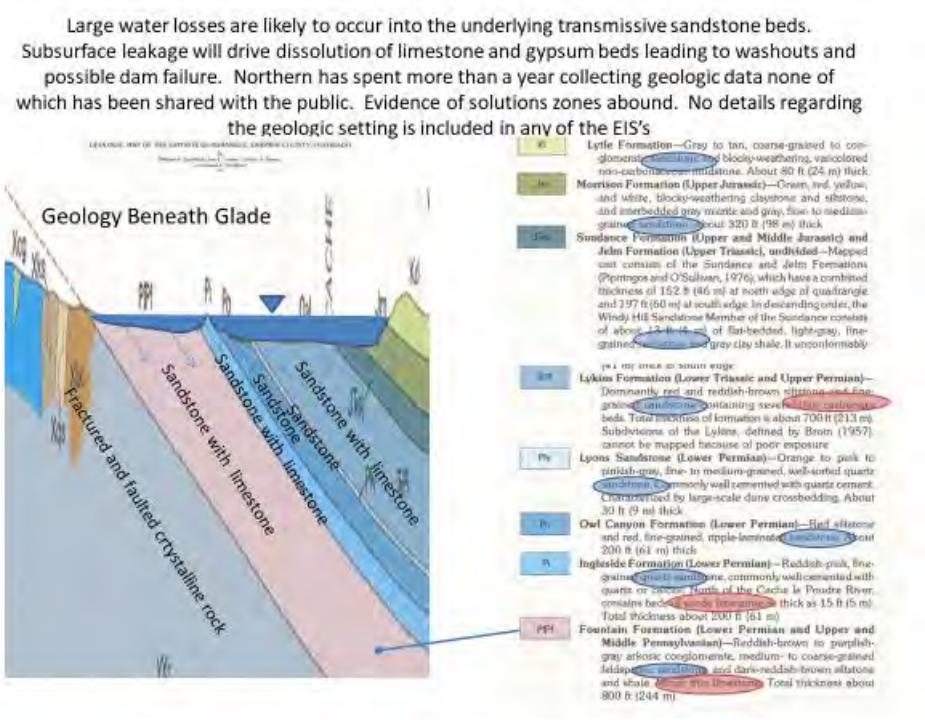


Figure 2- Excerpt from USGS report documenting sandstone below Glade

Figure 3 - Joints and Fractures in the Ingleside Formation near Glade

Seepage Loss Questions:

- Given up to 400 feet of water over the conductive sandstone beds, and the likelihood of large seepage losses, how can you advocate that Glade is a suitable site for a reservoir?
- The county requires groundwater models for projects where groundwater issues exist. What types of groundwater modeling has been conducted for Glade and have the results been shared with the public?
- Per Northern's recent public open house on NISP, there are NO plans to place a seepage control liner in Glade (as was ultimately required at the North Dam on Horsetooth). If a liner were required how would it effect the costs for NISP and are the parties that will cover the cost aware of the associated risks?
- Given effective subsurface water storage alternatives how much money could be saved by eliminating seepage losses?

Munroe Ditch

The Munroe Ditch (North Poudre Irrigation Company (NPIC) – Primary share holder Northern annually conducts tens of thousands of acre feet of water to extensive agricultural lands in eastern Larimer County. The Munroe Ditch passes through Glade including two unlined rock tunnels (Figure 4 - Figure 6). At Northern's recent NISP open house it was explained that a large +100 inch submerged steel pipeline would run through Glade and that the pipeline would be plugged into the unlined tunnels (Figure 5). Water would flow through the submerged pipeline at atmospheric pressure by gravity. Recognizing that this wouldn't work, because at atmospheric pressure the pipeline would float, Northern added cement to the pipeline in their recent submittals to Larimer County. Unfortunately, the most recent plan is still an implausible design due to:

- Dynamic loading on the concrete-weighted steel pipe will require unplanned submerged massive foundations that are likely to fail given the stresses
- There will be no practical way to remove the sediment that accumulates annually in the Munroe Ditch. NPIC spent months removing sediment from the Munroe ditch in 2014. Routine

sediment removal is a standard practice due to high spring sediment load on the Cache La Poudre.

- Problematic seepage losses from Glade will result in 1) raised water levels in the rock above the conveyance tunnels, 2) the tunnels becoming unstoppable submerged drains, and 3) the tunnels ultimately collapsing as the soluble beds fail.

As planned Northern does not have a viable plan for the Munroe Ditch or any idea what it will ultimately take to route the Munroe Ditch through Glade. Having been assured by two people from Northern at a recent NISP open house that Northern "owns" NPIC, I'm left wondering if Northern might have other plans for the water in the Munroe Ditch that they aren't quite ready to talk about.

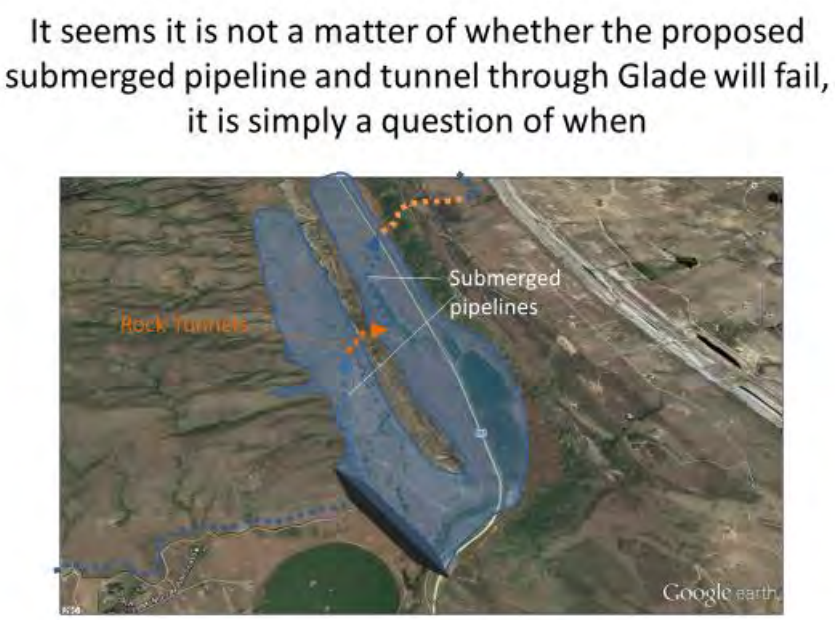
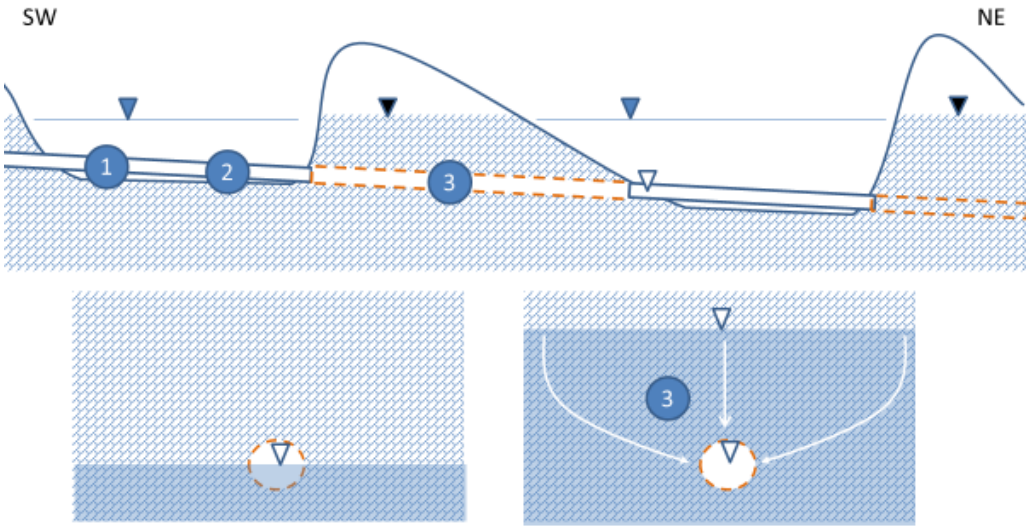


Figure 4 NISP plan for Munroe Ditch transmission through Glade



1) Per 2012 fire and 2013 flood, sediments will fill the submerged pipeline – Removal of sediment from a submerged pipeline may be impractical simply due to safety alone.
2) Sooner of later the submerged pipeline will fail (corrosion or earth movements) and the entire lake will want to drain through the pipe with the only potential solution being plugging the tunnels.
3) The unlined tunnel sections will be like a submerged drain potentially collecting 1-10 gpm/foot. In time soluble limestone and gypsum beds will dissolve and the tunnels will collapse.
4) It is not a matter of if the submerged pipeline or unlined tunnels through glade will fail, it is simply a question of how long it will take for the submerged pipeline and/or unlined tunnels through Glade to fail.

Figure 5- Transformation of Munroe conveyance tunnel into submerged drain that will collapse

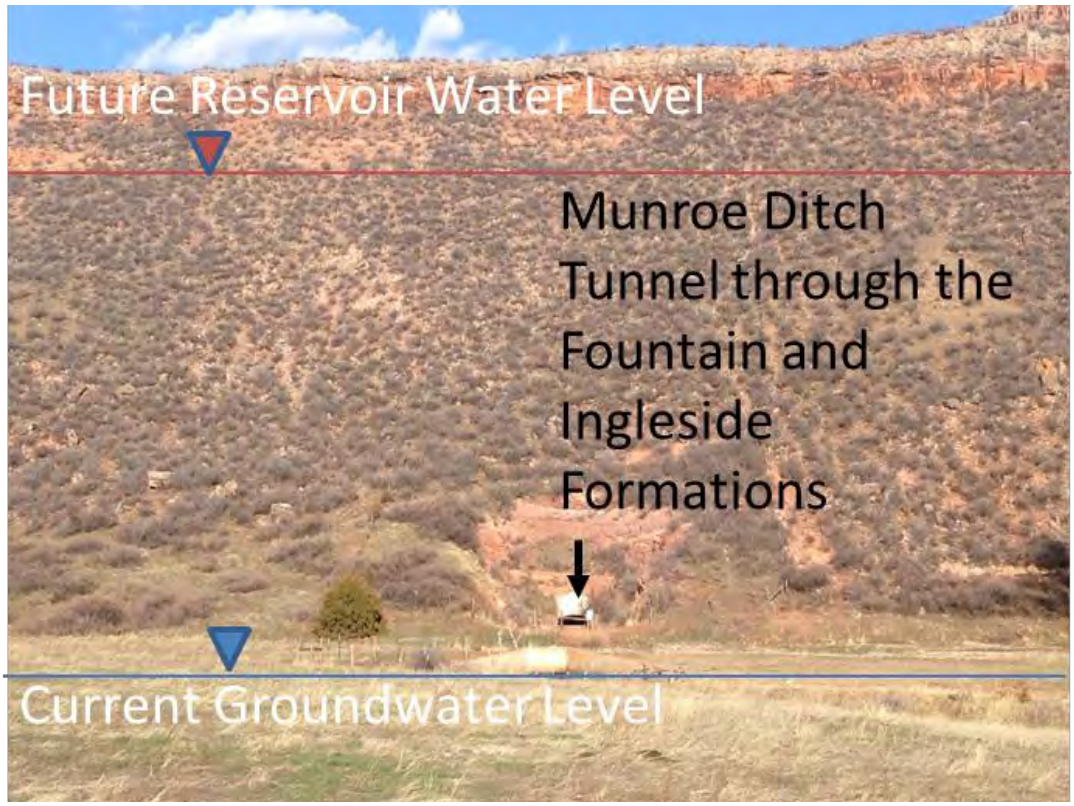


Figure 6 -Reservoir submergence of the Munroe Ditch tunnels leading to collapse

Questions: Munroe Ditch

- The proposed steel pipeline in cement will see dynamic vertical stresses. What kind of foundations are required, what are the costs for the submerged conveyance, are the costs currently included in the estimates provided to the participants?
- How do you plan on dealing with large volumes of water flowing into the submerged tunnels when they become submerged drains?
- Given prior experience with collapsing formations due to exposure to fresh water in the vicinity of Glade, why would the Munroe Ditch Tunnels not collapse when they become submerged drains?
- Are there any successful engineering precedents for the proposed submerged conveyance of the Munroe Ditch through Glade?
- How will you safely remove sediments that will inevitably fill the submerged pipeline?
- What are the anticipated costs of the submerged conveyance, its maintenance, and its periodic replacement?
- Are the costs for the submerged Munroe Ditch conveyance through Glade included in current estimates of the cost for NISP and are the related cost/concerns being shared with participants and lending agencies?
- What is Northern's contingency plan given the likelihood of the Munroe Ditch conveyance failing?

Pushing the Missile Site Chlorinated Solvent Plume into Domestic Drinking Water Wells

Historical operations at a DoD Nuclear Missile Site at the base of the Glade Dam created a large plume of carcinogenic chlorinated solvents in groundwater that currently passes out beneath the proposed forebay for Glade. Plumes of this nature last many lifetimes and it is implausible that site specific efforts to clean up the plume have been effective. It is odd and concerning that public documents do not identify critical wells and show implausibly short time intervals between when wells were sampled. Even odder is that based on Colorado Division of Natural Resources permit records (Figure 7), Northern installed more than 20 monitoring wells in 2019 located through the plume, but no public records are available regarding data from the Northern 2019 monitoring well network.

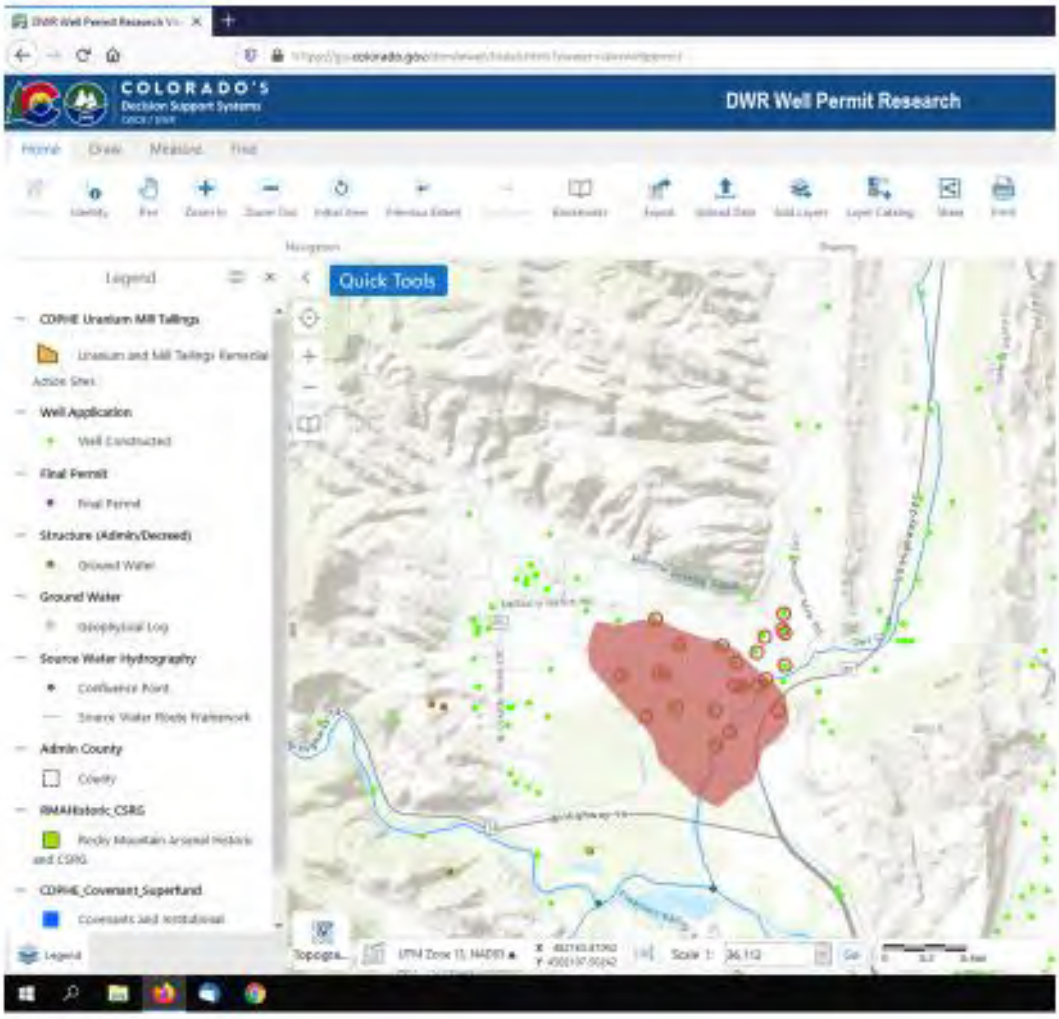


Figure 7 -Permitted wells in the vicinity of Glade. Brown circles are 2019 Northern monitoring wells for which no monitoring data has been reported. Red area is the potential extent of chlorinated solvent in groundwater based on information prior to 2019.

With leakage of water beneath the proposed dam and from the forebay, is seems likely the chlorinated solvent plume will be pushed into domestic water supply wells along County Road 29C as shown in Figure 8. Furthermore, it is anticipated that select portions of the material in the forebay may be hazardous, creating numerous issues including air quality impact and appropriate disposal of excavated materials.

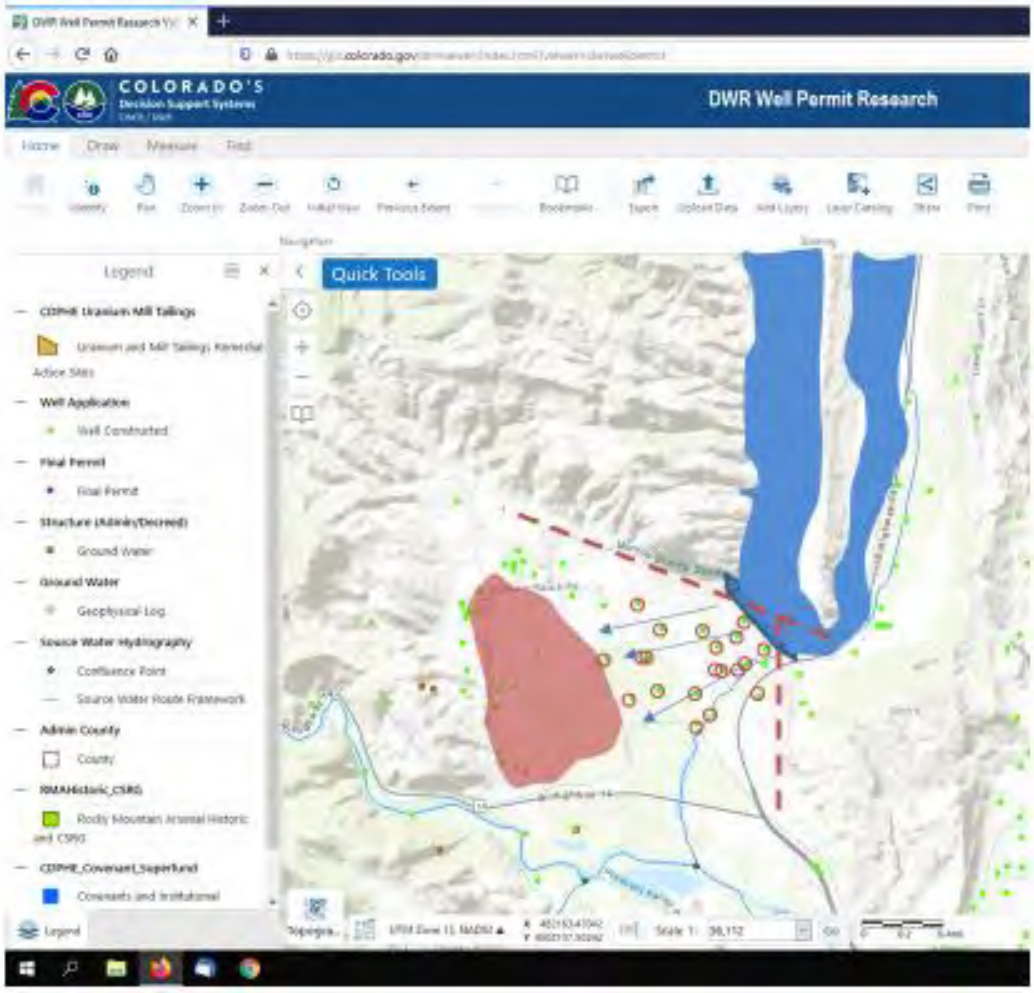


Figure 8 Anticipated movement of the chlorinated solvent plume to domestic water supply wells.

Question - Pushing the Missile Site Chlorinated Solvent Plume into Domestic Drinking Water Wells

- Why did Northern install 20 plus monitor wells in the missile site plume?

- Were water samples collected from the wells?
    - If yes, when will the data be made available? One might think that if the news was good, we would already know the results.
    - If no, isn't it in the best interest of protection to human health and to the environment, to accurately sample the wells and share the results prior to any approval of the NISP 1041 Permit?

- What are the contingency plans for adverse impact to domestic water supplies?

- Is it appropriate to proceed with a decision on the NISP 1041 Permit absent public documentation of the water quality in Northern's 20+ monitoring wells in the vicinity of the missile plume?

Located Off the Main Stem of the Cache La Poudre

The selected site for Glade Reservoir is off the main stems of the Cache La Poudre River. The implications are profound including:

- The maximum rates of diversion off the Cache La Poudre River will be limited by the capacity of diversion ditch (100s vs 1000s of CFS?). NISP will be incapable of consequentially capturing "peak flows" as claimed. Capturing unclaimed peak flows on the Cache La Poudre River with NISP (e.g. September 2013) is a **myth**.

- The proposed peak pumping rate in Northern's application to Larimer County, from the forebay, is 1,200 cubic feet per second. Water will be pumped upwards 400 feet. Following the calculations in **Error! Reference source not found.**, 81 MW (megawatt) of power will be required. To put 81 MW in context, it is equivalent to the power required by Fort Collins' approximately 62,000 residences and 90% of the reported generation capacity of Glen Canyon Dam. The power lines associated with Glen Canyon's 90 MW output are massive and presented in Figure 10.

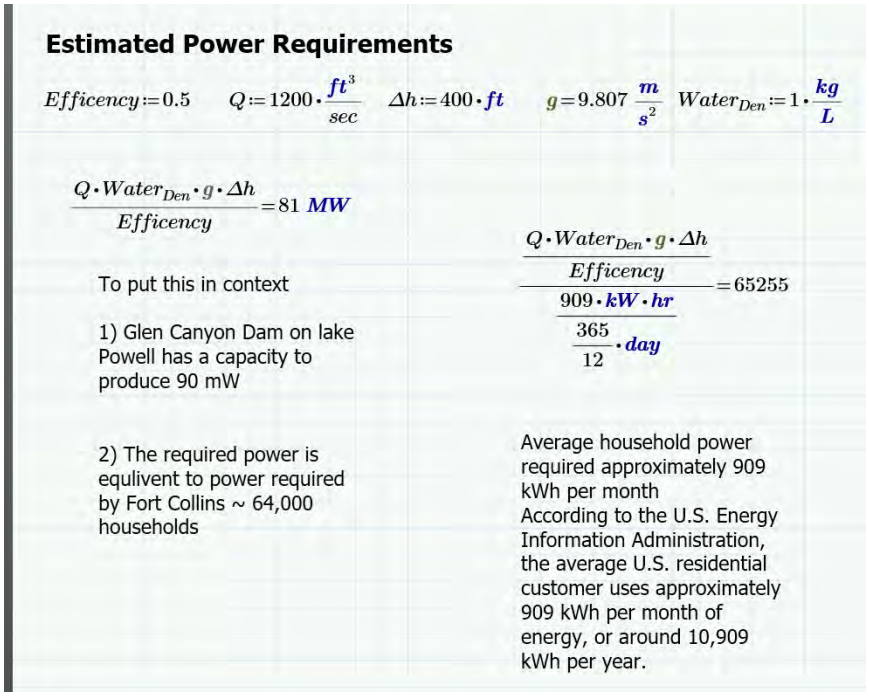
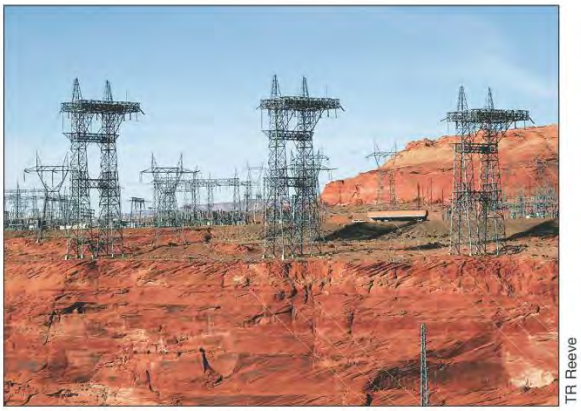


Figure 9 - Required peak power based on Northern's reported 1200 cfs and 400 foot lift.



Transmission towers and switchyard on canyon rim

Figure 10 - Power lines required for 90 MW at Glen Canyon Dam

Notably, competing main stem surface water storage projects on the North Fork of the Poudre River (Seaman and Halligan) **have zero electrical inputs**, have far lower costs (in addition to no electrical power, they had no need to move a federal highway or run a large water conveyance through a reservoir), and have dramatically reduced carbon footprints. While Seaman and Halligan are far better projects than Glade, there also other noteworthy alternatives involving harvesting vast water losses off antiquated water transmission and storage systems, Subsurface Water Storage, and conservation. The label "Northern Integrated Supply" is an erroneous misnomer… if NISP were an integrated project, interested parties would work together to find the best project(s) with NISP almost certainly at the bottom of their list.

Questions - Off the Main Stem of the Cache La Poudre

- How will NISP capture peak flows if the diversion from the Cache La Poudre River is constrained by the hydraulic capacity of the diversion?
- Why should NISP be approved if there are lower cost/less harmful alternatives for surface water storage projects that the project proponents can participate in?
- How will NISP get the required electrical power to the pumps at the forebay?
- Has Northern provided the required information for approval of an 80 MW power line?
- How will required power lines impact the aesthetic of the views in Pleasant Valley and the new recreational facilities?
- Will the campers and residents of Pleasant Valley appreciate the crackle of power lines and/or the drone of nighttime boaters when they drift off to sleep?
- Is NISP OUR vision of the future?

Alternatives

The driving vision of the NEPA process is to find the Least Damaging Alternative that is Practical (LDAP). This vision is reflected in Larimer County Rules and Guidelines that form the basis for approving or disapproving the NISP 1041 Permit.

A most distressing aspect of NISP is the coarse dismissal of alternatives that are far less harmful, lower cost, and faster than NISP. It seems that Northern is unable to fairly consider alternatives that compete with their last century toolbox and commitments to see NISP through regardless of the cost. It seems the participants are being told that NISP is their only option which is so far from the truth. It seems the participants are being told to stick to the process or else… all the while that the participants are struggling with a future of staggering taps fee, enormous monthly water bills, and debt in times of unprecedented economic uncertainty.

The proof of the viability of alternatives to momentum water driven project like NISP is the Two Forks Dam on the South Platte River. Two Forks was not approved and the communities of Highlands Ranch, Castlerock, Parker, … have managed to grow, dramatically. The south metro communities found better ways that were less damaging, lower costs, and faster.

The bottom line is the consequential damages associated with NISP are avoidable given an openness to do things that are lower cost and faster. Who's against less damage, lower cost and sooner? Who is for more damage, higher cost, and decades to delivery?

Mining Water Losses from Antiquated Water Storage and Transmission Infrastructure

The majority of the water in Colorado's Front Range is diverted into gravity flow ditches and unlined reservoirs via systems that are often 100 years old. Given the economics of agriculture, little money has been invested in modernization of the Front Range's water conveyance and water storage reservoirs. The North Poudre Irrigation Company (NPIC), with Northern as a primary share holder, is a useful example. In 2019 NPIC, doing a remarkable job with annual charges of $180 per share (10,000 shares = $1.8M) lost 40,000 acre feet of water to "shrinkage" (primarily seepage and evaporation losses).

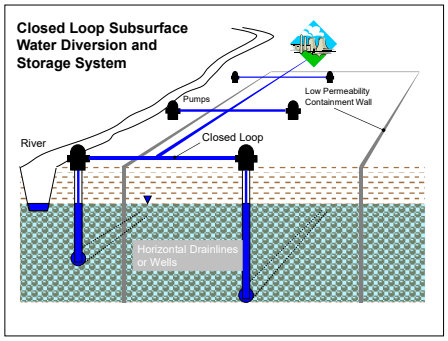
NPIC's losses beg the question of how much of the lost 40,000 acre feet could be saved by investments that are a fraction of the cost of NISP. For example, giving NPIC a tenth of the assumed $2B cost for NISP, one can envision lining ditches and locally storing water in alluvium. Figure 11 advances the concept of subsurface water storage. Per ongoing projects, it is easy to think that investing $200M in NPIC could yield savings on the order of 20,000 acre feet of water, AND, there are hundreds of similar water conveyance storage systems throughout the project participants' domains. In fact, it is easy to argue that all the water that Colorado needs for the next 50 years can be found in the modernization of Colorado's antiquated systems of surface water conveyances and storage systems.

The potential is huge for all (WIN-WIN):

- The costs are likely to be small relative to NISP
- The potential for mining losses can be proven in short order via demonstration projects funded by project participants at costs that are a fraction of what is being spent on Glade.
- The alternative could be implemented modularly through time as warranted by the economy (just in time delivery)
- You can start today and provide water in a year
- The investments would meet the need of NISP project participants and strengthen Colorado's agricultural backbone
- No additional water would need to be diverted from the Cache La Poudre or any of Colorado's already over allocated streams

- The tragic destruction of the truly remarkable wild spaces that is Glade would be averted
- And so much more…

Closed Loop Subsurface Water Diversion, Storage, and Recovery System



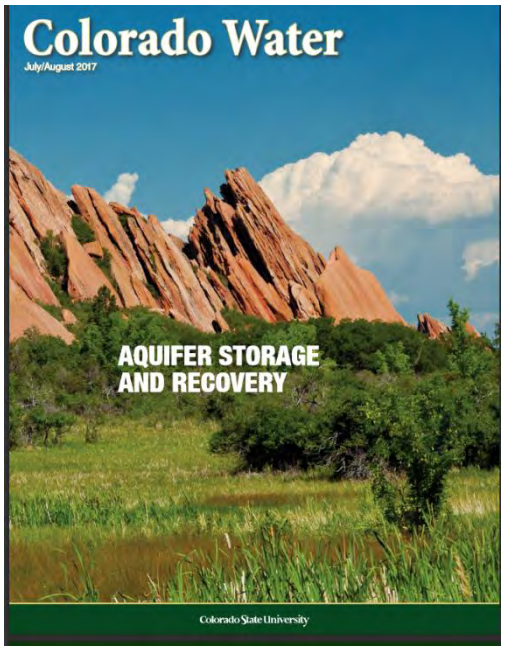
1. The source of water is diverted from a surface water body wherein the porous media between the surface water body and the wells or drainlines provides filtration.
2. Recharge source water is produced from a subsurface well or drain line yielding water with low Total Suspended Solids (TSS) that has similar geochemical conditions as that of the subsurface water storage body.
3. Produced water is conveyed into an isolated subsurface water storage body via closed conveyance with limited contact with atmospheric air or other agents that would altering the geochemical attributes of the recharge water.
4. Recharge water is introduced into the subsurface water body via wells or drain lines that minimize exposure of delivered water to agents that would altering the geochemical attributes of the recharge water.
5. In combination, 1-4 provides a system for subsurface water storage with minimal potential for adverse plugging of the recharge drainlines or wells.

Figure 11- Local Subsurface water storage walls horizontal drains installed with continuous trencher

Question: Mining Water Losses from Antiquated Water Storage and Transmission Infrastructure

- Given a viable alternative that is less damaging, low risk and suited to uncertain times – why should the (NISP) 1041 Permit be approved if it is, in contrast, severe in its impacts, more costly, and poorly suited to the State's current conditions?

Subsurface Water Storage



Subsurface water storage projects offer the promise of minimal seepage and evaporation losses, greater resiliency in times of drought, costs that are 10 to 50% of surface water storage, and synergistic complementary to Colorado's existing surface water storage systems. The basis for the preceding statement is outlined in the Colorado Water Center 2017 publication on Aquifer Storage and Recovery and Colorado State University's 2016 Subsurface Water Storage Symposium.

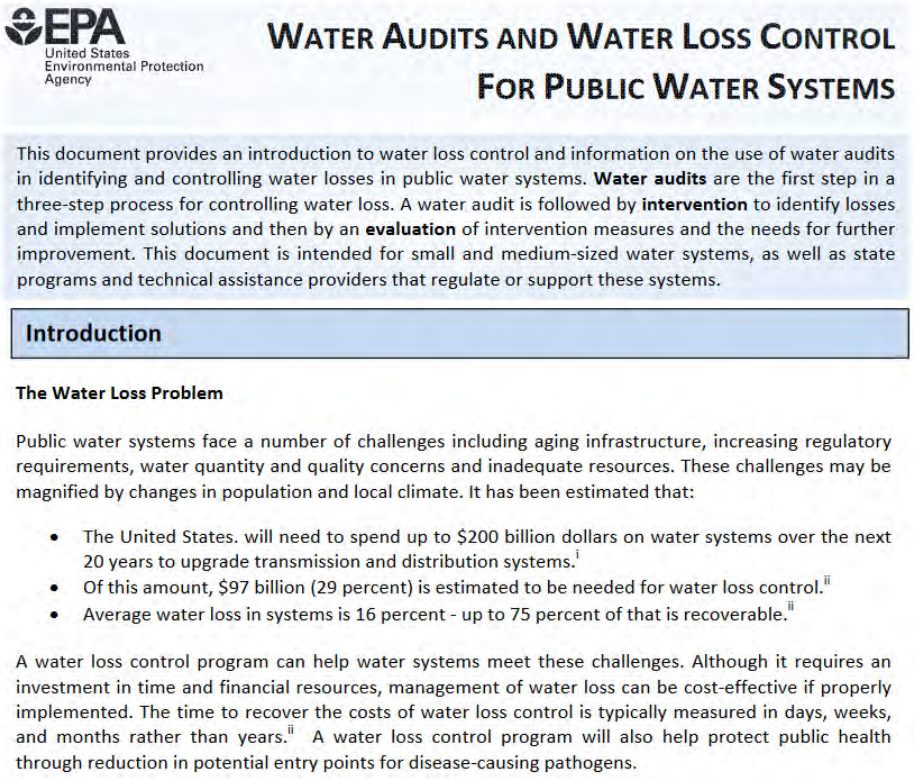
Since 2016, CSU has held a second Subsurface Water Storage Symposium. In 2016 there were 5 Subsurface Water Storage projects in Colorado. Today the number of Water Storage projects in Colorado is approaching 20 including the City of Morgan, a NISP participant. Dr. Sale's comments on the Final NISP EIS are attached for the record. Notably, responses to Dr. Sale's comments on the Subsurface Water Storage as an alternative have been dismissed by terse, false statements that only illustrate the NISP proponent's belief that they are not bound to consider NEPA's and County's commitments pursuing the Least Damaging Alternative that is Practical.

Question: Subsurface Water Storage

- Given all that is happening with Subsurface Water Storage in Colorado, and Dr. Sale's comments, why would you dismiss Subsurface Water Storage?

Conservations

So much of the water that is used by communities is wasted. One of the biggest found alternatives for Two Forks was conservation. And yet conservation has been missed by many of the project participants. As an example, one of the participants forbids xeriscaping by ordinance as an alternative to conventional lawns. Going further, municipal water conveyance can lose up to a third of source water through leaks. Long before communities spend vast sums on NISP they should invest in water loss control programs as outlined in Figure 12.



EPA United States Environmental Protection Agency

WATER AUDITS AND WATER LOSS CONTROL FOR PUBLIC WATER SYSTEMS

This document provides an introduction to water loss control and information on the use of water audits in identifying and controlling water losses in public water systems. **Water audits** are the first step in a three-step process for controlling water loss. A water audit is followed by **intervention** to identify losses and implement solutions and then by an **evaluation** of intervention measures and the needs for further improvement. This document is intended for small and medium-sized water systems, as well as state programs and technical assistance providers that regulate or support these systems.

Introduction

The Water Loss Problem

Public water systems face a number of challenges including aging infrastructure, increasing regulatory requirements, water quantity and quality concerns and inadequate resources. These challenges may be magnified by changes in population and local climate. It has been estimated that:

- The United States. will need to spend up to $200 billion dollars on water systems over the next 20 years to upgrade transmission and distribution systems.[i]
- Of this amount, $97 billion (29 percent) is estimated to be needed for water loss control.[ii]
- Average water loss in systems is 16 percent - up to 75 percent of that is recoverable.[ii]

A water loss control program can help water systems meet these challenges. Although it requires an investment in time and financial resources, management of water loss can be cost-effective if properly implemented. The time to recover the costs of water loss control is typically measured in days, weeks, and months rather than years.[ii] A water loss control program will also help protect public health through reduction in potential entry points for disease-causing pathogens.

Figure 12- EPA Guidance on water audits and water loss controls

Question on Conservation

- How can Northern justify requesting further surface water diversions, billions of dollars from Colorado's residents, and destruction of Larimer's County's limited wild lands when so much can still be done with conservation?

Attachment – Dr. Sale Comment on the Finals NISP EIS

Dr. Tom Sale

6700 North County Road 29C

Bellvue, Colorado 80512

970-232-5739

TSale@Engr.Colostate.Edu

Thursday, October 4, 2018

John Urbanic, NISP EIS Project Manager

U.S. Army Corps of Engineers, Omaha District

Denver Regulatory Office

9307 S. Wadsworth Blvd.

Littleton, CO 80128

E-mail: nisp.eis@usace.army.mil

RE: NISP - Comments on NISP Final Environmental Impact Statement

Attention: John Urbanic, NISP EIS Project Manager

The following comments are offered in support of the U.S. Army Corps of Engineers review of the Northern Integrated Supply Project (NISP) Final Environmental Impact Statement (FEIS).

My current position is Professor, Civil and Environmental Engineering, Colorado State University, Fort Collins, CO. My comments are my own. My qualifications include BA degrees in Chemistry and Geology (1980), an MS degree in Watershed Hydrology (1995), and a PhD degree in Agricultural Engineering (1998). My employment history includes experience in consulting engineering and academia spanning 38 year. The focus of my career has been groundwater. Currently, I have over 60 groundwater-related publications.

Comment

Subsurface water storage, specifically Aquifer Storage and Recovery (ASR), is a viable alternative that has not received adequate consideration in the Northern Integrated Supply Project (NISP) Final Environmental Impact Statement (FEIS). Evaluations of ASR in the DEIS, SEIS, and FEIS are inaccurate, and important new public information has not been considered. The significance of inadequate consideration of ASR as an alternative are highlighted by the likelihood that ASR can achieve the participant's needs:

- At significantly lower costs
- Without the non-beneficial consumptive water loses through evaporation and seepage
- With far lessened environmental impacts
- With enhanced resiliency with respect to drought, climate change, and water security

Based on the following factors, the NISP FES should not be approved:

- Failure to comply with the NEPA regulatory requirements that require an EIS to rigorously explore and objectively evaluate all reasonable alternatives
- Existence of a viable alternative that avoids many of the damaging aspect of NISP advanced in extensive comments by others

The following information provides the basis for the above arguments for not approving the NISP FEIS position including:

- Comments on flaws in the applicant's response to my subsurface water storage comments relating to the DEIS and SEIS
- Relevant public information that has not been considered
- A pragmatic path forward exists for adequate consideration of ASR

Comments on flaws in the applicant's response

Prior comment on DEIS and SDEIS

My primary prior comment on the DEIS and SDEIS was that "The DEIS and SDEIS fail to accurately recognize alternatives based on subsurface water storage…" My complete comment is provided in Attachment A. As argued in the following text, the applicant's response to my comment fails to meet the standard of rigorously exploring and objectively evaluating ASR – a reasonable alternative. Based on failure to rigorously explore and objectively a reasonable alternative, I stand by the position that the FEIS is not in compliance with NEPA regulations and cannot be approved.

Response to my comments

Response to my above comments on the on the DEIS and SDEIS are provided in FEIS Vol 4 of 4 Appendix A under the header of Comment 2007, 2304, 2305, and 5007. For convenience the noted responses are provided in Attachment B.

Issues with the applicant's response

1) I appreciate the applicant's acknowledgment that subsurface water storage is a proven technology with successful projects in Colorado. A complete list of Denver Basin ASR projects based on (CDM Smith (2017) is provided in the slide below. Impressively, interest in ASR in Colorado continues to grow.

Table ES-2 Overview of Existing and Planned ASR Systems in SMWSA

Member	Status	Source Water	Number of ASR Wells
CWSD	existing system	South Platte River	33
East Cherry Creek Valley Water and Sanitation District (W&SD)	existing pilot system and planned expansion	Northern Water Supply Project	1 (pilot)
Rangeview	existing pilot system and planned expansion	WISE	1 (pilot)
Town of Castle Rock	existing pilot system and planned expansion	WISE, Plum Creek surface water and alluvial water, treated reuse water	2 (pilot)
Cottonwood W&SD	Permitting for ASR	Cherry Creek, WISE, and Denver Basin groundwater	3
Dominion W&SD	Planning for ASR and partnering with Castle Rock	WISE	Currently unknown
Inverness W&SD	Permitting for ASR	Denver Water, Denver Basin groundwater, WISE, and Cherry Creek (when developed)	4
Meridian Metropolitan District	Permitting for ASR	Denver Basin groundwater and WISE	1 to 2
Pinery Water and Wastewater District	Planning for ASR	WISE and Cherry Creek alluvial well water	Up to 9

2) A primary component of the applicant's response to my comment is, "**The Denver Basin aquifers do not extend into Larimer County**." For the following reasons, the extent of the Denver Basin Aquifer has little bearing on the viability of ASR in northern Colorado:

   a. ASR has been conducted around the world in many places where the Denver Basin Aquifers are not present. Being able to work in the Denver Basin Aquifer is not prerequisite for ASR. FYI, per 3) below, there are many bedrock aquifers that are well-suited for ASR in Northern Colorado.
   b. Passage of **HB17-1076 -** Artificial Recharge Nontributary Aquifer Rules has created a legal frame work for ASR in non-tributary aquifers outside of the Denver Basin Aquifers (concerning rule-making by the state engineer regarding permits for the use of water artificially recharged into non-tributary groundwater aquifers. LAST ACTION: 03/30/2017 | Governor Signed SPONSORS: Rep. J. Arndt.
   c. NISP participants south of Greeley are in fact underlain by the Denver Basin Aquifers. Local ASR systems could be deployed to store water at the points of use in the Denver Basin Aquifers.

3) An additional component of the responses to my comments is, "**The primary groundwater resources in the NISP study area are alluvial aquifers which are shallow and heavily used for agriculture**." This response leads to dismissal of the bedrock

aquifer as an opportunity for ASR. As demonstrated by public documents, described in the following text, the applicant's dismissal of bedrock aquifers in Northern Colorado is invalid. Specifically:

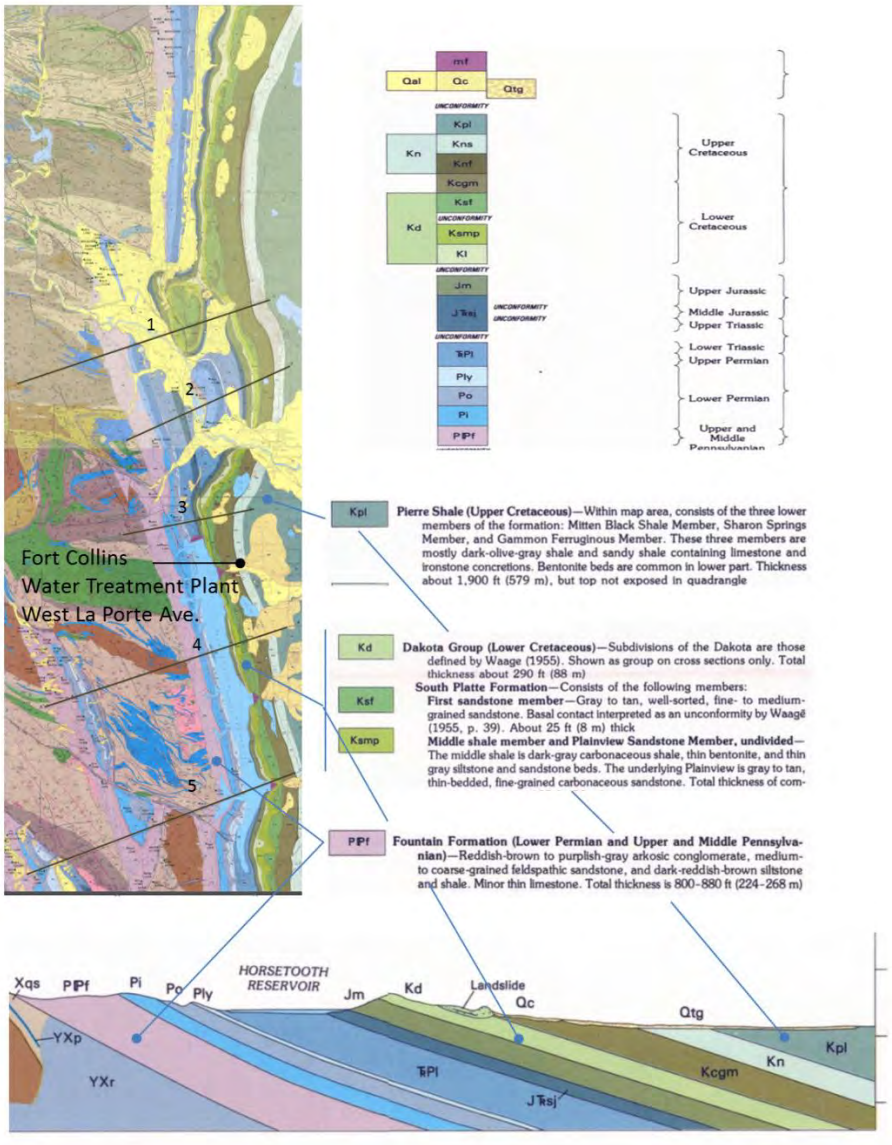
a) As outlined in Waskom and Sale (2017) , Sutton et al. (2017), Adam (2017), Hemenway and Sale (2017), and Collazo (2018) bedrock aquifers are widely used in northern Colorado for domestic water supply (thousands of wells). In addition, bedrock aquifers in northern Colorado are occasionally used in higher capacity applications. Limited use of bedrock aquifers in Northern Colorado for high-capacity applications reflects the availability of surface water but not the potential of bedrock aquifer. Following Sutton et al. (2017), Adam (2017), Hemenway and Sale (2017), and Collazo (2018), promising bedrock aquifers in Northern Colorado include the Fountain, Ingleside, Dakota, and Pierre Sand Formations, to name a few. Furthermore, unique structural features of the bedrock aquifers in Northern Colorado create promising opportunities to store water in non-tributary settings, where damage to others would not be significant.

b) Over much the past year, the applicants have been drilling bedrock aquifer and collecting cores below the proposed Glade Reservoir site. As the applicant must know by now, the western bay of the proposed reservoir is underlain by the Fountain Formation. The Fountain Formation consists of ~800 feet of interbedded sandstone and shales. The formation dips to the east providing a unique opportunity to store water in a non-tributary setting that is largely unused. Interestingly, with 400 feet of head in Glade Reservoir, seepage losses through the Fountain Formation are likely to be significant. To my knowledge, none of the data from drilling at the proposed Glade Reservoir site has been made available to the public. Public information addressing the feasibility of ASR in the Fountain Formation includes:

    a. Alqahtani (2015) presents a comprehensive analysis of ASR in the Glade Reservoir including designs and estimates of cost. Cost estimates indicate the opportunity to store water at a fraction of the costs of NISP without the consumptive water demand associated with evaporation and seepage loses. As footnotes:
        i. Given potential storage in Northern Colorado Aquifer, described in Topper et al. (2004), ASR can be scaled up for any reasonable future water storage volume.
        ii. Alqahtani (2015) was provided with my comments on the SEIS but was not acknowledged.

    b. Sutton et al. (2017) and Collazo (2018) provide extensive descriptions of the Fountain Formation with the expressed intent of resolving the potential of

the Fountain Formation for ASR. Both reports conclude that the Fountain Formation is a promising candidate for ASR in Northern Colorado.



Hemenway and Sale (2017)- Potential Fort Collins aquifers that can be used for ASR (Braddock et al. 1988 and Braddock et al. 1989).

Relevant public information that has not been considered

Building on concerns regarding roadblocks to advancing ASR as a synergistic complement to existing water supplies in Northern Colorado, extensive work has gone into 1) collecting and disseminating information relevant to ASR in Northern Colorado. The following synopsis provides critical information that is **not** considered in the NISP FEIS.

Colorado Water Conservation Board

Sutton, S.J., Collazo, D., and Sale, T., 2017. Fountain Formation: Potential for Subsurface Water Storage, report for Colorado Water Conservation Board.

Overview

"*Water storage capacity along the Colorado Front Range may be augmented by increased utilization of Aquifer Storage Recovery (ASR) projects in which excess water pumped into an aquifer for temporary storage and then pumped back to the surface when needed. One key aspect of successful ASR is selection of a suitable target aquifer and another is the geographic location of the ASR wells. The Pennsylvanian Fountain Formation, part of the sedimentary succession filling the Denver-Julesburg Basin and cropping out along the Front Range, has properties that suggest that it may be a suitable target aquifer. The geographic extent of near-surface occurrence of the Fountain Formation along the urban corridor of the Front Range may enable it to contribute to water storage needs as the population of this area continues to grow.*

Previous work on the Fountain (e.g. Howard, 1966; Maple and Suttner, 1990; Sweet and Soreghan, 2010; Hogan and Sutton, 2014) has shown that much of the formation comprises ancient braided stream deposits, including now lithified gravels, sands, silts, and clay-rich ancient soil horizons (paleosols). Some of this work has shown that these deposits may be compartmentalized, with zones of high permeability isolated from one another by low permeability horizons (e.g. Hogan and Sutton, 2014). The floodplain paleosols, now preserved as mudrock layers within the rock strata, appear to provide low permeability barriers that separate permeable zones. Similarly, the natural lateral discontinuities and variable permeability of the ancient river channel deposits likely provide additional barriers to flow between compartments. Anecdotal information about highly variable yields from neighboring domestic water wells further suggests that the Fountain Formation is compartmentalized. The probable permeability

compartments within the formation may form excellent targets for ASR. The structural dip of the Fountain Formation beds suggests that dipping permeable compartments could generate high yields because of the potential for applying large drawdowns or mounding. The proximity of the belt in which the Fountain Formation is found at depths suitable for ASR to existing infrastructure and to Front Range cities further supports consideration of the Fountain Formation as an ASR target. The goal of this work is to utilize existing hydrogeologic data to better evaluate the overall potential of the Fountain Formation as an ASR target and to evaluate the geographic variability of the formation's hydrogeologic and geochemical properties along the Colorado Front Range."

CDM Smith (2018). South Metro Water Supply Authority Aquifer Storage and Recovery Feasibility Study Final Report, Prepared for the Colorado Water Conservation Board.

This report documents the feasibility assessment of aquifer storage and recovery (ASR) at both local and regional scale of implementation in the Denver Basin as a water management strategy to meet the South Metro Water Supply Authority (SMWSA) member's future demands. This report was prepared through a Water Supply Reserve Account grant from the Colorado Water Conservation Board (CWCB) via the Metro Basin Roundtable. Inclusive to this report are tools developed by Colorado State University for evaluation of hydrogeologic setting for ASR wellfields, hydraulic modeling tools for ASR programs, and tools to estimate capital and operational accost associated with ASR programs.

City of Fort Collins

Hemenway, C. and T. Sale (2017), Final Draft Assessment of Fort Collins Aquifer Storage and Recovery (ASR) Opportunities, Project Report to the City of Fort Collins, Colorado.

Executive Summary

"This report explores the feasibility of storing water in bedrock aquifers through Aquifer Storage and Recovery (ASR) for the City of Fort Collins. ASR provides a promising complement to the City of Fort Collins' current water supply systems. Potential benefits include simplifying permitting of new storage, providing an economical alternative to surface storage, conserving water through reduction in seepage and evaporative losses,

and enhancing the resiliency of the City's water supply during fire, drought, or other periods requiring emergency water supplies.

Herein, the Fountain Formation, Dakota Group, and Pierre Formation are identified as promising options for subsurface water storage. Building on these options, a conceptual design for an ASR well field located at the City's Foothill Water Treatment Plant (WTP) is advanced. A total of 27 Aquifer Storage and Recovery (ASR) wells would be developed and used to store water over a 50-year planning period. The ASR well field would provide 15,000 acre-feet of new water storage and have a capacity to produce up to 30 cubic feet per second (cfs) or 13,465 gallons per minute (gpm).

Preliminary present-value cost estimates of $31 to $38 million are developed. Approximately one third of the estimated ASR cost could be covered by funds currently committed to adding new storage for treated water at the City's WTP. Our estimates of cost are qualified by the statements that:

- *This is only a screening-level study*
- *The capacities of wells (a key cost driver) is unproven*
- *Absent test data from the aquifers of interest, permitting, and water-rights issues cannot be rigorously resolved at this time*

Given the potential of ASR and critical data gaps advanced in this report, a sequential test well program is advanced. Phase 1 ($500k) involves drilling a test hole at the City's WTP on West Laporte Avenue. Formation capacities and water quality would be resolved in the Dakota Group and Fountain Formation. Phase 2 ($700k), if warranted would involve completion of a fully-equipped ASR well at the test location. The completed ASR well would be tested, and results would provide the basis for more rigorous analysis of ASR as an option and refinement of the design of future ASR wells. In addition, the test well could serve as the first well in the City's ASR well field. Phase 3 ($400k), if warranted, would involve drilling an additional test hole to resolve the performance of wells located east of the WTP.

In summary, this report indicates that ASR is a promising option for the City of Fort Collins. Costs are similar to current alternatives, a broad set of benefits can be achieved, and no critical impediments have been identified. The biggest challenge is that

proceeding with development of ASR will require a phased test well program that would require up to one year to complete and would cost up to $1.6M."

Colorado Water Center

Waskom, R. and T. Sale (2017), Aquifer Storage and Recovery Colorado Water Feature Issue, Colorado State University. July/August 2017.

Summaries of presentation at the 2016 Subsurface Water Storage Symposium are advanced in written format in a special issue of *Colorado Water* including:

- Tom Sale - Subsurface Water Storage Symposium Overview
- R. David G. Pyne - Subsurface Water Storage: Past, Present, and Future
- Ralf Topper - Opportunities and Hurdles for Aquifer Storage in Colorado
- Eric Potyondy - Introduction to Water Use Legal Issues for Subsurface Water Storage Projects in Colorado
- Abdulaziz Alqahtani et al. - Estimation of Costs for Subsurface Water Storage
- Fred Rothauge - Drilling and Completion of ASR Wells
- Sally J. Sutton et al. - Potential Bedrock Opportunities for Aquifer Storage and Recovery in Northern Colorado
- Michael Ronayne et al. - Analytical Modeling of ASR Wellfields
- Courtney Hemenway - Aquifer Storage and Recovery Program: Centennial Water & Sanitation District Highlands Ranch, Colorado

State of Colorado

Topper, R., P. E. Barkmann, D. A. Bird, and M. A. Sares. "EG-13 Artificial Recharge of Ground Water in Colorado – A Statewide Assessment." Artificial Recharge. Environmental Geology. Denver, CO: Colorado Geological Survey, Division of Minerals and Geology, Department of Natural Resources, 2004.

The CGS has completed an analysis of storing water underground through "artificial recharge." Artificial recharge is defined as any engineered system designed to introduce water to, and

store water in, underlying aquifers. The study, titled "EG-13 Artificial Recharge of Ground Water in Colorado: A Statewide Analysis," explores various geological and technical aspects of artificial recharge in Colorado.

CSU Master's Theses

Alqahtani, A. A. (2015). Subsurface water storage assessment model. MS Thesis Department of Civil and Environmental Engineering, Colorado State University. Available from Dissertations & Theses @ Colorado State University. (1726943198).

Alqahtani (2015) presents a comprehensive analysis of the ASR in the Glade Reservoir including designs and estimates of cost. Cost estimates indicate the opportunity to store water at a fraction of the costs of NISP without the consumptive water demand associated with evaporation and seepage loses. As footnotes:

a. Given potential storage in the Northern Colorado Aquifer, described in Topper et al. (2004), ASR can be scaled up for any reasonable future water storage volume.
b. Alqahtani (2015) was provided with my comments on the SEIS but was not acknowledged.

Adam, A. (2017). Hydrologic characterization of upper permian-cenozoic sedimentary strata of Larimer county: Prospective aquifer storage and recovery targets, MS Thesis Department of Geosciences (Order No. 10690375). Available from Dissertations & Theses @ Colorado State University.

Adam (2017) provides a comprehensive review of groundwater usage in Northern Colorado in aquifers other than the Fountain Formation in support of evaluating ASR.

Collazo, D. (2018). Hydrogeologic characterization of the Fountain Formation: prospective aquifer storage and recovery targets in Front Range Colorado. MS Thesis Department of Geosciences (Order No. 10690375). Available from Dissertations & Theses @ Colorado State University.

Collazo (2018) provides a comprehensive review of groundwater usage in the Fountain Formation (including Northern Colorado) in support of evaluating ASR.

A pragmatic path forward for adequate consideration of ASR

The next step forward for ASR in Northern Colorado would be a test well program following the form of ongoing ASR test program in the Denver metropolitan area (e.g., Castle, Rock, East Cherry Creek, Meridian, etc. See page 30 of 20.). The table below advances costs for an ASR test program developed for the City of Fort Collins in Hemenway and Sale (2017). Given interest from multiple parties, the cost of an ASR test program could be supported by multiple participants, and funds from state agencies could be solicited. The test well program proposed to the City of Fort Collins is presented in Attachment C.

Item	Estimated Cost ($)
Phase 1: Initial Test Boring	$500,000
Phase 2: Well Completion	$700,000
Phase 3: Second Test Boring	$400,000
Total Phase 1, 2, and 3 Drilling Costs	**$1,600,000**

FYI, the cost of evaluating ASR is likely far less than the cost of advancing a design for the NISP project. As such, there is little basis for rejecting a test program for ASR in Northern Colorado based on cost.

References

Alqahtani, A. A. (2015). Subsurface water storage assessment model. MS Thesis Department of Civil and Environmental Engineering, Colorado State University. Available from Dissertations & Theses @ Colorado State University. (1726943198).

Adam, A. (2017). Hydrologic characterization of upper permian-cenozoic sedimentary strata of Larimer county: Prospective aquifer storage and recovery targets, MS Thesis Department of Geosciences (Order No. 10690375). Available from Dissertations & Theses @ Colorado State University.

Braddock, W.A., J.J. Connor, G.A. Swan, and D.D. Wohlford (1988). Geologic Map of the Laporte Quadrangle, Larimer County, Colorado, U.S. Geologic Survey Report GQ 1621.

Braddock, W.A., R.H. Calvert, J.T. O`Conner, and G.A. Swann (1989). Geologic Map of the Horsetooth Reservoir Quadrangle, Larimer County, Colorado, U.S. Geologic Survey Report GQ 1625.

CDM Smith (2018). South Metro Water Supply Authority Aquifer Storage and Recovery Feasibility Study Final Report, Prepared for the Colorado Water Conservation Board.

Collazo, D. (2018). Hydrogeologic characterization of the Fountain Formation: prospective aquifer storage and recovery targets in Front Range Colorado. MS Thesis Department of Geosciences (Order No. 10690375). Available from Dissertations & Theses @ Colorado State University.

Pyne (2005). Aquifer Storage Recovery, ASR Press, Gainesville, Florida.

Hemenway, C. and T. Sale (2017), Final Draft Assessment of Fort Collins Aquifer Storage and Recovery (ASR) Opportunities, Project Report to the City of Fort Collins, Colorado.

Hogan, I and S. Sutton (2014), The role of mudstone baffles in controlling fluid pathways in a fluvial sandstone: a study in the Pennsylvanian–Permian Fountain Formation, Northern Colorado, USA Journal of Sedimentary Research, Volume 84, Issue 11, Pages 1064-1078.

Sutton, S.J., Collazo, D., and Sale, T., 2017. Fountain Formation: Potential for Subsurface Water Storage, report for Colorado Water Conservation Board.

Sutton, S.J., Collazo, D. F., and Adam, A.O., 2017, Potential Bedrock Opportunities for Aquifer Storage and Recovery, Colorado Water, July/August, p. 23-27.

Topper, R., P. E. Barkmann, D. A. Bird, and M. A. Sares (2004). EG-13 Artificial Recharge of Ground Water in Colorado – A Statewide Assessment. Artificial Recharge. Environmental Geology. Denver, CO: Colorado Geological Survey, Division of Minerals and Geology, Department of Natural Resource.

Waskom, R. and T. Sale (2017), Aquifer Storage and Recovery Colorado Water Feature Issue, Colorado State University. July/August 2017.

Attachment A – Comments of DEIS and SEIS

Dr. Tom Sale
6700 North County Road 29C
Bellvue, Colorado 80512
970-232-5739
TSale@Engr.Colostate.Edu

Wednesday, September 02, 2015

John Urbanic, NISP EIS Project Manager
U.S. Army Corps of Engineers, Omaha District
Denver Regulatory Office
9307 S. Wadsworth Blvd.
Littleton, CO 80128
E-mail: nisp.eis@usace.army.mil

RE: NISP - Comments on NISP Supplemental Draft Environmental Impact Statement

Attention John Urbanic, NISP EIS Project Manager

The following comments are offered in support of the Crops review of the environmental effects of the proposed NISP. My comments are my own. My current position is Associate Professor, Civil and Environmental Engineering, Colorado State University, Fort Collins CO. My qualifications include BA degrees in Chemistry and Geology, an MS degree in Watershed Hydrology, and a PhD degree in Agricultural Engineering. My employment history includes 19 years of experience in consulting engineering and 15 year of experience in academia. The primary focus of my career has been groundwater.

Comment 1 – The DEIS and SDEIS fail to accurately recognize alternatives based on subsurface water storage

General

My primary comment is that the DEIS, April 2008, and the SDEIS, June 2015, fail to recognize accurately alternatives based on subsurface water storage that:

1) Have dramatically reduced impacts to the environment,
2) Dramatically lower costs, and
3) Cannot be dismissed as unproven technology.

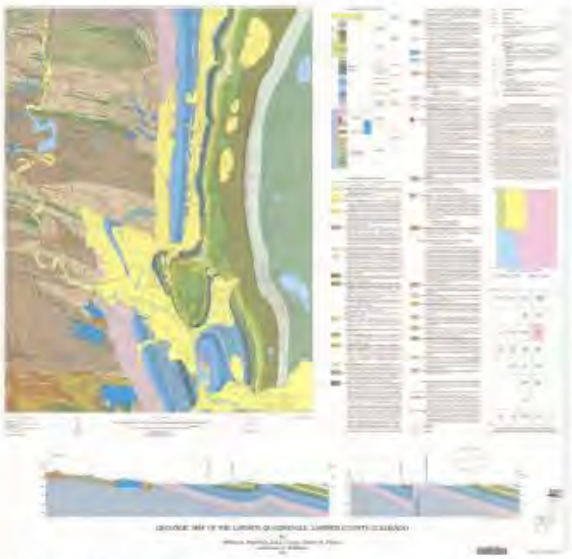
As observed in the SDEIS (page S-16):

> "Regulations implementing NEPA require that an EIS rigorously explore and objectively evaluate all reasonable alternatives."

The primary basis for my comment stems from Abdulaziz A. Alqahtani's 2015 Colorado State University Master of Science (MS) thesis titled "SUBSURFACE WATER STORAGE ASSESSMENT MODEL." Mr. Alqahtani's thesis is included as an attachment in the email transmitted with this letter.

In More Detail

Mr. Alqahtani's MS thesis research was conducted under my supervision as his major advisor over a two-year period. Mr. Alqahtani's research was motivated largely by my concern that the April 2008 DEIS failed to consider fairly subsurface water storage as a viable alternative.



Our explorations of subsurface water-storage opportunities in northern Colorado lead us to the Fountain Formation below Glade. Per the adjacent geologic map (LaPorte Quadrangle), the Fountain Formation (pink) is an approximately 800-foot-thick sandstone layer that dips to the east along the hog backs adjacent to the foothills. The Fountain Formation below Glade is separated from southern portions of the Fountain Formation by the North Fork Fault. Given sparse development and geologic structure, historical use of the Fountain Formation has been limited and the Formation is, in large part, hydraulically isolated.

Mr. Alqahtani's MS thesis advances tools to develop estimates of capital and operation costs for subsurface water storage projects. The model is demonstrated by considering:

- Subsurface water storage in the Fountain Formation beneath Glade
- A system that delivers 6,400 acre feet of water in an average year and up to 12,700 acre feet of water in a drought year. Note: given the extent of the Fountain Formation in

Northern Colorado, systems with larger capacities are feasible with similar costs on a per acre foot of water basis.

The associated present values costs for capital cost and 30 years of operations and maintenance is $23 million. Given these numbers, cost per acre foot for subsurface water storage is on the order of $3,500 and $1,800 per acre of foot yield. These costs are on the order of 1/10th the cost of the current NISP preferred alternative. Estimated cost for subsurface water storage are even lower if one recognizes the values of water that can be saved by effectively eliminating consumptive evaporation and seepage losses from the proposed Glade Reservoirs, which would be on the order of thousands of acre-feet per year.

In addition to reduced cost and water savings, local benefits of subsurface water storage include:

- Eliminating the need to move Highway 287 and the Munroe Ditch.
- An ability to build system capacity in modules to meet future water demands on an as-needed basis, which also provides much greater economic flexibility for the development of water storage over time. Development of large surface water storage projects, such as Glade, require the commitment of large capital resources at the onset of the project. With the modular, as-needed development of subsurface water storage, capital investments may be spread out over time or deferred as economic conditions and water demands vary in the future.
- Preservation of open space and wildlife habitat that would be destroyed by reservoirs.
- An ability to maintain greater streamflow through the Cache La Poudre River by eliminating water consumption due to evaporation and seepage losses.
- Elimination water quality impacts that can occur in the proposed Glade Reservoir due to evaporation driven concentration of salts, biological fouling of water by decaying organic material, and potential anthropogenic releases including release of fuels from recreational motor boats.
- Advancing low-cost water storage in a community that is desperate for new storage, especially as demonstrated in the current year where well over one million acre-feet of water available for use in Colorado flowed downstream to other states.
- Moving forward with new technology that is less hindered by complex permitting processes. Permitting of subsurface water storage in Colorado is simple, quick, and inexpensive through the Colorado State Engineer's Office and the Underground Injection Control Branch of the United States Environmental Protection Agency.
- Elimination of air-quality impact and traffic associated with constructing a large dam.

- Advancing systems that will have far greater resiliency in the face of future drought and climate change.
- Reduction of the debt burden placed on the current and future populace of Northern Colorado.

An anticipated response proposing subsurface water storage as an alternative is an argument that subsurface water storage is an unproven technology. The only basis for voicing this opinion would be based on the lack of knowledge of existing subsurface water storage projects developed nationally since 1980 and in Colorado since the 1990's. Successful bedrock subsurface water storage projects have been implemented in Colorado, including:

- Highlands Ranch with the Centennial Water and Sanitation District since 1991,
- Consolidated Mutual Water District in Lakewood since 2004, and
- Colorado Springs Utilities since 2005.

To enable these projects, the Colorado State Engineer's Office promulgated Rules and Regulations (Artificial Recharge Extraction Rules; 2CCR 402-11) for the Denver Basin in 1995, providing the necessary water-rights framework for subsurface water storage in Colorado.

Further proof of the viability of subsurface water storage projects, including resolution of water-rights issues, can be found for subsurface water storage projects that have been ongoing for decades in Arizona, Southern California, Utah, Florida, and around the world.

Lastly, Colorado is home to a cadre of engineers, scientists, contractors, water-rights attorneys and regulators with the local knowledge and skills needed to deliver subsurface water storage projects. To get a fair assessment of a remarkable opportunity, Northern Colorado simply needs to ask the right people how to do it. Conversely, disregarding subsurface water storage as an option, based on the work of individuals that are obviously unknowledgeable of the technology of subsurface water stoarge, as demonstrated in the DEIS and SDEIS, violates the specified requirement to "rigorously explore and objectively evaluate all reasonable alternatives".

In closing, the time has come for Northern Colorado to embrace modern technology that can responsibly meet the diverse challenges before us, as expressed in the Corps public hearings. The time has come for Coloradans to once again be bold innovators in water storage and the modern corollary of sustainable living.

Attachment B – Applicant response to T. Sale Comment -

… fail to accurately recognize alternatives based on subsurface water storage…

Dr. Tom Sale

2007, 2304, 2305, 5007

Comment 2007: Concern about other screening criteria

Subsurface water storage is a proven technology. *There are several successful bedrock subsurface water storage projects in Colorado*. The Corps considered and screened subsurface storage (6 elements) as part of the evaluation of 215 storage elements (DEIS Section 2.1.4, SDEIS Section 2.2.4 and FEIS Section 2.2.4). The examples cited by the commenter to demonstrate that subsurface storage is a proven technology (Highlands Ranch, Centennial, Lakewood, Colorado Springs) are all locations over thicker portions of the Denver Basin Aquifer. The Denver Basin bedrock aquifers are thinnest in northern Colorado, with the northernmost extent of the aquifers near Kersey. **The Denver Basin aquifers to not extend into Larimer County. The primary groundwater resources in the NISP study area are alluvial aquifers which are shallow and heavily used for agriculture**.

Comment 2304: Suggests an alternative to storage

Commenter(s) expressed concern that the EIS failed to consider subsurface storage. The Corps considered and screened subsurface storage (6 elements) as part of the evaluation of 215 storage elements (DEIS Section 2.1.4, SDEIS Section 2.2.4 and FEIS Section 2.2.4). The examples cited by the commenter to demonstrate that subsurface storage is a proven technology (Highlands Ranch, Centennial, Lakewood, Colorado Springs) are all locations over thicker portions of the Denver Basin Aquifer. The Denver Basin bedrock aquifers are thinnest in northern Colorado, with the northernmost extent of the aquifers near Kersey. **The Denver Basin aquifers do not extend into Larimer County. The primary groundwater resources in the NISP study area are alluvial aquifers that are shallow and heavily used for agriculture.**

Comment 2305: Suggests alternative reservoir site

Commenter(s) expressed concern that the EIS failed to consider subsurface storage. The Corps considered and screened subsurface storage (6 elements) as part of the evaluation of 215 storage elements (DEIS Section 2.1.4, SDEIS Section 2.2.4 and FEIS Section 2.2.4). Six groundwater storage sites, also known as aquifers, within the Poudre River Basin were evaluated and screened. Groundwater storage is the location where surface water rights are captured and stored in subsurface aquifers for later withdrawal. **All six groundwater storage sites were eliminated due to capacity.**

Comment 5007: Concern about NEPA regulations

Commenter(s) expressed concern that disregarding subsurface storage as an option violates the specified requirements to "rigorously explore and objectively evaluate all reasonable alternatives". **The Corps considered and evaluated subsurface storage.** See responses to Comments 2304 and 2305.

Attachment C – Excerpt from Hemenway and Sale 2017 – Test Well Program from Draft Report to the City of Fort Collins

The preceding feasibility analysis indicates that ASR is a promising option for the City of Fort Collins. The primary data gaps in the analyses are:

- Well recovery and storage flow rates that are needed to fully resolve costs
- Formation water quality and mineralogy
- Aquifer properties (T and S) that are needed to:
    - Predict water levels associated with the proposed ASR program
    - Evaluate dominion and control of stored water

The following outlines a test well program that would address data gaps.

Location

Figure 8 shows the location of the proposed ASR well field with Well #1 designated as the proposed test well location. The location of this well is based on proximity to the Fort Collins WTP, treated water storage facilities, and geologic considerations. The proposed location is within the current WTP property boundaries, eliminating any property or easement issues. Locating the well in close proximity to the WTP will minimize the length of pipelines and associated costs with delivering water to and recovering water from the test well. For testing purposes, temporary above-ground piping may be used that would further reduce testing costs. The proposed location would provide reasonable depths of completion for any of the geologic formations considered for testing (**Error! Reference source not found.**).

Drilling and Sampling

The proposed drilling program will be conducted in three phases. The first phase will identify and hydraulically characterize all potential water-bearing intervals from the ground surface through full penetration of the Fountain Formation. The second phase, pending success in the first phase, will develop a fully-functional ASR test well in the formation determined in the first phase to be the best hydraulically capable (pumping and injection) for ASR operations. The third phase includes the drilling of an additional test bore (no well completion) to define the areal extent and hydraulic properties of the aquifer formation selected for the test well in phase 2.

During the first phase of the test well program, a pilot hole with a nominal 9-inch diameter will be drilled to a total depth that fully penetrates the Fountain Formation. A total depth of approximately 3,000 feet is expected to reach the base of the Fountain Formation at the proposed test well location. Drill cuttings will be collected at 10-foot intervals and lithologically logged by a professional geologist. Due to the steep dip in the formations at the test well location, a declinometer in the drill assembly will be used to determine the straightness of the boring during drilling. The borehole direction will be controlled by the speed of the drilling and the weight on the drill bit. If the directional control cannot be maintained, mud motors will be used to control the direction of the drilling to maintain a straight borehole.

Following the completion of the drilling, the borehole will be geophysically logged. The geophysical logs will include natural gamma ray, shallow and deep resistivity, induction, spontaneous potential (SP), caliper, compensated density, and porosity logs. The geophysical logs will delineate the various formations and potential water-bearing zones. Following a review of the geophysical logs, up to 25 sidewall cores will be collected in several potential water-bearing intervals. The sidewall cores will be used to characterize the formations (lithology and mineralogy) and to test the specific yield of the formation. Specific yield is the drainable porosity of the material, or the percentage of water that drains by gravity from the formation material.

Following the side wall coring, up to three drill stem tests (DSTs) will be conducted in the open borehole. The DSTs will be used to hydraulically characterize individual zones within the borehole. The DST will isolate individual zones in the borehole using two inflatable packers. The DSTs will provide information on static water levels, potential water production rates, and water quality in the targeted formations.

Following the completion of the test borehole (phase 1) and review of all the information collected, a formation will be selected to be used for ASR testing (phase 2). The pilot test borehole will be reamed out to a diameter of 20 inches, and 12-inch diameter well casing and screens will be installed in the borehole. The well screen will be stainless steel, continuous wire-wrapped, V-wire screen with a slot size based on the formation materials. The annular space in the screened interval will be gravel packed with specific silica sand that is sized for the selected well screen slot size. The borehole annular space above the screened interval will be grouted with cement to the ground surface, as per Colorado Water Well Construction Rules. Following the grouting, the well will be developed using airlift methods and pumping using a submersible pump. The development will remove drilling fluids and accumulated sediments from the well.

Hydraulic Testing

As part of phase 2, aquifer testing will be conducted at the conclusion of the drilling and development work at the pilot test well and will consist of two tests: (1) a variable-rate drawdown test, and (2) a 72-hour constant-rate pumping test. Water levels and pumping rates will be measured during the pumping and recovery periods of the tests. From the aquifer test information, transmissivity, specific capacity at 72 hours, and when possible, the well efficiency and aquifer storage coefficient at the well will be calculated. Estimates of the long-term production and peaking rates for the well will be provided from the aquifer test results, as well as recommended injection rates for ASR operations.

Following the well installation and hydraulic testing conducted in phases 1 and 2, subsequent equipping of the test well and pilot ASR testing will need to be conducted. Three injection/storage/recovery cycle tests will be completed during the pilot ASR testing. The first of the three cycle tests is usually of a short duration. Typically, the first injection is continuous for three days, and then the water is immediately recovered with little storage time in the aquifer. This test provides for a simple confirmation of the water-quality compatibility assessments made prior to the testing. The second test usually runs for seven days of injection followed by seven days of storage in the aquifer prior to recovery. This test is used to further confirm the water compatibility issues related to ASR operations, as well as to identify the effects of storing the injected water in the aquifer. If the first two tests indicate that ASR operations are feasible at the site, an extended-duration test will be conducted to determine the actual operating criteria for long-term ASR operations in the well. This test usually runs injections for up to 45 days continuously with storage in the aquifer for 30 to 60 days prior to recovery. All of the proposed testing is predicated on the availability and delivery schedule for the injection water to be used in the ASR testing.

Water Quality

Near the conclusion of the 72-hour test conducted in phase 2, a water-quality sample will be collected from the well. This sample will be used to assess the water-quality conditions at the well. The water-

quality sample will be analyzed according to the list of parameters shown in Table 5. The water-quality sample can be used for both the Colorado Department of Public Health and Environment (CDPHE) Public Water System compliance testing and the EPA for amending the Rule Authorization for ASR operations.

Table 5 – Water Quality Parameter List

Total Alkalinity	Oil and Grease
Total Organic Carbon (TOC)	Total Plate Count
Total Coliform	PH
Fecal Coliform	Orthophosphate
Chloride	Total Phosphorus
Chemical Oxygen Demand (COD)	Total Dissolved Solids (TDS)
Color	Sulfate
Cyanide	Sulfide
Fluoride	Surfactants
Fecal Streptococcus	Turbidity
Total Organic Halide (TOX)	Total and Dissolved Metals
Calcium Hardness	Regulated Volatile Organic Compounds (VOCs)
Total Hardness	Nonregulated VOCs
Langelier Saturation Index	Pesticides
Ammonia, Nitrogen	Herbicides
Total Kjeldahl Nitrogen	Gross Alpha
Nitrate, Nitrogen	Gross Beta
Nitrite, Nitrogen	Radium 226
Odor	Radium 228
	Radon

In subsequent ASR testing conducted after phases 1 and 2, eight laboratory water-quality samples will be collected during the three proposed ASR test cycles. HGE will notify Fort Collins water treatment staff prior to each sampling event to coordinate any split sample requirements during the ASR testing.

The preliminary list of water-quality constituents required for analysis during the testing is shown in Table 5. Additional samples for analyses of major cations and anions might be collected on a variable basis if the preliminary test results indicate additional test data are required. Samples collected by HGE will be analyzed by a certified water-quality test laboratory.

During the first ASR cycle test, one water-quality sample will be collected for laboratory analysis during the recovery pumping. For the second ASR cycle test, two laboratory water-quality samples will be collected during the recovery phase at approximately 50 and 90 percent of the injected volume recovered. During the third and final ASR cycle test, four laboratory water-quality samples will be collected during the recovery pumping at 50, 75, 90, and 125 percent of the injected volume recovered. One additional sample will be collected at the wellhead during the injection phase of the cycle test to evaluate any changes to the injection water quality from the first two injection cycle tests.

Estimated Cost

The estimated cost to complete the three phases of the test well program was obtained from Hydro Resources located in Fort Lupton, Colorado. Hydro Resources is a highly-qualified drilling and pump installation contractor who has drilled and completed numerous deep bedrock aquifer wells within Colorado and the western United States. HGE developed general technical specifications for completing the Fort Collins ASR test well program. HGE reviewed the specifications with Hydro Resources and developed a basic cost estimate bid for the project.

The estimated drilling and well installation cost to complete the proposed test well program (phases 1 through 3) is $1.6 million. The cost estimate assumes that the initial test borehole will be completed to a depth of 3,000 feet for an estimated cost of $500,000, including a 25-percent contingency. If the base of the Fountain Formation is determined to be at a shallower depth, the phase 1 cost would be reduced. Similarly, if the base of the Fountain Formation is less than 3,000 feet or a shallow formation is selected for the final pilot well installation, the phase 2 well completion cost of $700,000 would be reduced. The cost to complete phase 3 (supplemental test hole) is estimated to be $400,000. The cost to complete the second test could be reduced if the depth is limited to be the base of the Pierre Formation or Dakota Group.

A 25-percent contingency is included in the budget for phase 1 of the project (test hole drilling) due to various uncertainties and risks associated with a deep test borehole with sidewall coring and DSTs. In addition, if the dip of the formations cannot be controlled using normal drilling techniques and directional drilling controls are required, the drilling costs would increase from the projected $500,000.

At the conclusion of the phase 1 and 2 drilling and installation programs, the pilot well would be installed in accordance with Colorado Water Well Construction Standards. The well would then be ready for installation of permanent equipment for the proposed pilot ASR testing. HGE also requested budget level cost estimates from Hydro Resources for two types of final well equipment designs. The first assumes that a shallow formation would be selected, such as the Dakota Group, and the pumping rate would be limited to 500 gpm. The second scenario assumed a deep well completion into the Fountain Formation with an estimated pumping rate of 1,000 gpm. The cost estimates for each scenario included installing and providing all the downhole equipment (submersible pump and motor, column pipe, electrical cable, downhole Flow Control Valve (FCV), check valves, etc.), well vault with all necessary piping and metering equipment (flow meters, valves, etc.), and all surface facilities (Variable Frequency Drive (VFD), step-up transformers, monitoring equipment, equipment panels and enclosures, etc.). The estimated cost for the shallow-well completion is $618,000, and the deep- well completion is $1 million.

The engineering cost to complete the three-phase drilling and test well installation program is estimated to range from $60,000 to $70,000. The engineering cost to complete the three-cycle ASR testing program is estimated to range from $65,000 to $85,000, including the laboratory cost for sampling during the ASR pilot testing ($32,000 - eight samples at $4,000 per sample). The ASR pilot testing costs could be reduced if some laboratory work was conducted by the Fort Collins WTP laboratory.

A summary of all estimated costs for the project are included in Table 6.

Table 6 – Estimated Test Program Costs

Item	Estimated Cost ($)
Phase 1: Initial Test Boring	$500,000
Phase 2: Well Completion	$700,000
Phase 3: Second Test Boring	$400,000
Total Phase 1, 2, and 3 Drilling Costs	**$1,600,000**
Engineering Cost – Phases 1 - 3	$60,000 to $70,000
Additional Future Costs	
Final Well Equipping Cost Range	$618,000 to $1,000,000
Pilot ASR Testing Engineering Cost Range	$65,000 to $85,000

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 Permit Application; 20-ZONE2657

2 messages

Jan Rothe <lemmule@gmail.com> Thu, May 7, 2020 at 10:04 AM
To: rhelmick@larimer.org

Dear Mr. Helmick,

I am a retired wildlife ecologist who is writing to ask the planning commissioners to very carefully consider the NISP 1041 permit application; Project No. 20-ZONE 2657. It does not comply with many of the applicable criteria set forth in Section 14 of the Larimer County Land Use Code.

Specifically, Glade Reservoir will have many significant adverse affects on the natural resources on which the proposed reservoir is situated, as well as on lands adjacent to the proposal. The construction of Glade Reservoir will result in roughly 1600 acres of habitat being destroyed for many species of wildlife, not only in Larimer County, but as far away as Nebraska, due to a decrease in river flows. Any loss of habitat will, of course, impose certain limitations to wildlife populations, but we can't just consider loss of habitat in thinking about this proposal. **We MUST consider the cumulative effects of these losses**. How many different species of wildlife will be affected, how many individuals will die, how long will the results last, how much will population numbers be reduced. The habitat loss associated with building Glade Reservoir will result in losses of at least 18% of winter habitat for elk, 16% loss of mule deer winter range, 80 acres of habitat loss for the federally-threatened Preble's meadow jumping mouse, and 11 acres of habitat loss for the state-listed black-tailed prairie dog and burrowing owl, just to name a few. It will also further endanger the already federally-endangered Whooping Crane in Nebraska. Wildlife will have fewer migration routes, less food and water, and fewer places to nest, burrow, or den to hide from predators. If we keep pushing wildlife, such as mule deer, elk, pronghorn antelope, bald eagles, golden eagles, burrowing owls, prairie dogs, and the federally threatened Preble's mice aside and destroying their habitat because of huge projects like Glade Reservoir, we will be the losers. **No amount of mitigation will EVER make up for the losses we will all suffer**. No amount of well-designed 'recreation' around a man-made reservoir with a visitor center, campgrounds, man-made hiking trails, and parking lots can ever compare with having magnificent wild places in our midst, where we can occasionally catch a glimpse of wildlife in their native habitats.

The NISP proposal will **DEFINITELY NOT** protect critical environmental resources - most notably the Wild and Scenic Cache la Poudre River. It will negatively affect wetlands, forever change riparian corridors because of decreased river flow, and wipe out important wildlife habitat, as mentioned above. It will also negatively affect some special places in Larimer County, such as the Cache la Poudre River National Heritage Area, which includes 45 miles of the lower Poudre River. This National Heritage Area is one of only 55 such sites in the country and was established by the U.S. Congress in 2009. This heritage area commemorates the river's significant contribution to the development of water law in the western U.S., the evolution of the river's complex water delivery systems, and its cultural heritage.

Glade Reservoir will also **NOT** prevent or decrease danger to life and property from flooding, wildfire, and geologic hazards. The proposed dam will be constructed on a geologic fault, and there will always be risk for wildfire from careless campers in the surrounding recreation area. Additionally, there are potentially significant hazards to local wells in the area adjacent to the dam, from the missile silo site toxic plume, which lies adjacent to the project's proposed forebay.

What makes all of the proposed negative impacts from this project truly upsetting is the fact that they are completely unnecessary. There are many viable alternatives to NISP that are more sustainable, far less expensive, faster to build, and more in line with protecting our natural resources. Not one viable alternative has even been considered!

Please make the right choice for the future of all of us, including our grandchildren and their progeny. Glade Reservoir is the wrong choice. Please advise the County Commissioners to deny NISP's 1041 Permit for Glade Reservoir.

Also, please consider allowing the public 3 minutes in which they may voice their concerns at the public hearing. Two minutes is hardly enough time to state your name and address, let alone make a persuasive argument for or against anything! I feel certain that the NISP project proponents had much more time than this to make their case.

Thank you for your time and consideration.

Respectfully,
Jan Rothe, Ph.D.

Submitted on behalf of Save Rural NoCo

Rob Helmick <helmicrp@co.larimer.co.us> Thu, May 7, 2020 at 11:27 AM
To: Stephanie Cecil <scecil@northernwater.org>

[Quoted text hidden]
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Robert Helmick
Senior Planner

Community Development Department
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521
970-498-7682
rhelmick@larimer.org
https://www.larimer.org/planning

Commissioner Tom Donnelly
PO Box 1190
Ft. Collins, CO 80522

Carolyn Stienmier
6612 Placer Ct.
Bellvue, CO 80512

May 1, 2020

Dear Commissioner Donnelly,

I am writing today in regards to the planned Glade Reservoir. Having been a resident of Larimer County for fifty plus years I am fully aware of the need for water on the front range. To be perfectly honest I'm not sure how I feel about Glade changing how and where I live. I do, however, have some very strong feelings about the waste of taxpayer dollars for this project. Dollars are already being spent and Northern Water doesn't have enough water shares to fill a pond much less a huge reservoir. That isn't the biggest issue for me. It's just not good sense and seems a bit old fashioned to not look into alternative water storage methods. When Northern Water was asked about this at a public meeting they didn't have an answer.

The city of Centennial is already doing aquifer storage successfully. We have experts in this field right here at CSU. The waste of storing and moving water above ground is huge.

Why is the planned moving of US 287 left out of NISP's 1040 permit?

Finally, it seems strange that I hear nothing about these outside communities cooperating to lessen the impact of all these requested water projects on Larimer County.

In conclusion I urge you to deny the "NISP's 1041permit, Project No. 20-ZONE 2657" before you and tell Northern Water to go back to the drawing board.

Respectfully,

Carolyn Stienmier

Carolyn Stienmier
cstienmier@digis.net

1805

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: Construction Doc

5 messages

Jim Hauan <jhauan@thegroupinc.com> Mon, May 11, 2020 at 3:55 PM
To: rhelmick@larimer.org

Hi Rob,

My name is Jim Hauan. I own 4300 Eagle Lake Drive as my personal residence.

I also own the majority of the ditch road which is part of my property.

This is also known as Hood Lane.

A friend of mine just shared this document with me. It was the first I have seen or heard of it. Apparently one plan for the pipeline is to use Hood Lane as an access for construction.

I'm shocked that I have not been contacted by anyone or asked for permission for this? I have owned my property for the past 16 years and am the only person that ever maintained that road until recently when Charlie Meserlian has built his home behind me and now he has done some improvement to the road as well.

The road is in no means capable of handling construction traffic for this project. But most importantly nobody has contacted me to gain any type of permission.

So I thought it might be something that you should be aware of.

It is a private road and there is no access for the public.

Feel free to call me if you have any questions.

Thanks,

Jim Hauan
970-481-9280

Construction Approach Eagle Lake.docx
599K

Rob Helmick <helmicrp@co.larimer.co.us> Wed, May 13, 2020 at 7:57 AM
To: Stephanie Cecil <scecil@northernwater.org>

[Quoted text hidden]
--

Robert Helmick
Senior Planner

Community Development Department
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521
970-498-7682

Construction Approach for Pipeline Segment between Travis Road and Highway 1

In performing the route analysis the engineering team noted the gated entrances to the Eagle Lake Subdivision. The presence of these restricted entrances spurred the team to develop a preliminary approach to construction access and estimated construction duration so that the impacts to these gated entrances could be better understood. The limits of the preliminary plan are depicted in figure P-7 below.

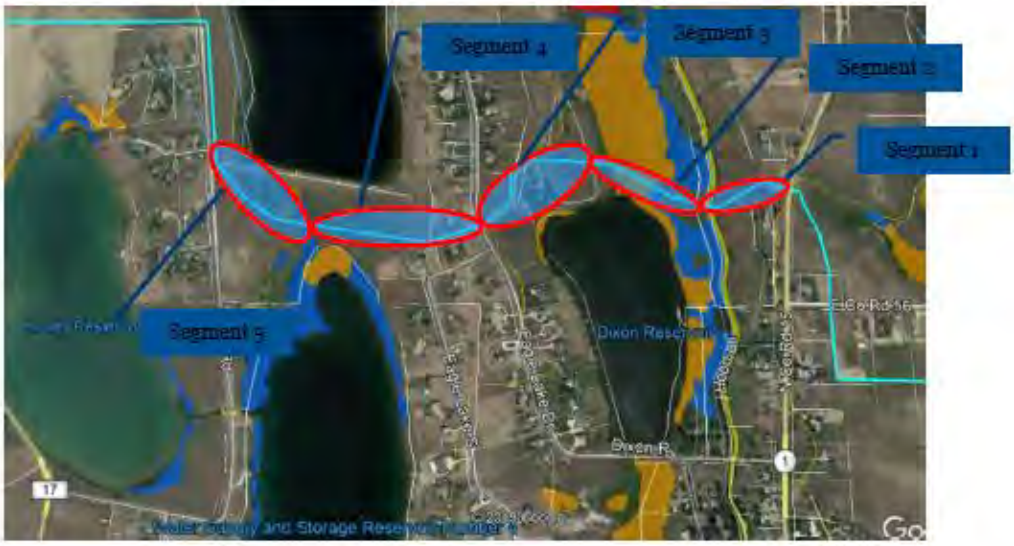

Figure P.9

Construction Access and Duration.

Segment 1 – Highway 1 to Hood Lane. Construction and material delivery vehicles will access the alignment via the alignment as it connects to Highway 1 and Hood Lane. In most cases entering via Highway one and exiting via Hood Lane. This segment is approximately 800 feet in length and is estimated to require approximately 5 to 8 work days for active excavation/pipe installation with activity beginning approximately 1 month prior for clearing, grubbing and site preparation. Following pipe installation, restoration of the disturbed area is anticipated to require approximately another 6 weeks. In total it is anticipated that this area will be impacted for approximately 12 weeks. The pipeline across Highway 1 will be crossed using trenchless methods so traffic on that roadway will not be restricted by construction activity.

Segment 2 – Wetlands North of Dixon Reservoir. Construction and material delivery vehicles will access the alignment via Hood Lane and Eagle Lake Drive. In most cases entering via Hood Lane and Exiting via Eagle Lake Drive. This will require access to the Eagle Lake Subdivision via the gated entrance at Eagle Lake Drive and Highway 1. This segment is approximately 1,100 feet in length and is estimated to require approximately 7 to 11 working days for active excavation/pipe installation with activity beginning approximately 1 month prior to that for clearing, grubbing and site preparation. Following pipe installation, restoration of the disturbed area is anticipated to require approximately another 6 weeks. In total it is anticipated that this area will be impacted for approximately 13 weeks. Because of the presence of wetlands in this segment, construction traffic will not access the alignment via Hood Lane once construction and restoration of this segment is completed. Unless otherwise requested by the County, it is proposed that the contractor not be allowed to use Eagle Lake Court for construction access.

Segment 3 – Private Property East of Eagle Lake Drive (TIPS COREY ALLEN/KAREN KRISTIN). Construction and material delivery vehicles will access the alignment via the Eagle Lake Drive both for construction traffic entering and exiting the site. This will require access to the Eagle Lake Subdivision via the gated entrance at Eagle Lake Drive and Highway 1. It is anticipated that sufficient temporary easement will be obtained from TIPS COREY ALLEN/KAREN KRISTIN to allow construction vehicles to turn around at the eastern end of this segment and exit the same way they came in. This segment is approximately 1,400 feet in length and is estimated to require approximately 9 to 14 working days for active excavation/pipe installation with activity beginning approximately six weeks prior for clearing, grubbing and site preparation. Following pipe installation, restoration of the disturbed area is anticipated to require approximately another 8 weeks. In total it is anticipated that this area will be impacted for approximately 17 weeks. Unless otherwise requested by the County, it is proposed that the contractor not be allowed to use Eagle Lake Court for construction access. The pipeline across Eagle Lake Drive will be crossed using trenchless methods so residential traffic using Eagle Lake Drive will not be restricted.

Segment 4 – Private Property west of Eagle Lake Drive to drainage between Water Supply and Storage Reservoirs 3 and 4. Construction and material delivery vehicles will access the alignment via the Eagle Lake Drive both for construction traffic entering and exiting the site. This will require access to the Eagle Lake Subdivision via the gated entrance at Eagle Lake Drive and Highway 1. It is anticipated that sufficient temporary easement will be obtained from the Water Supply and Storage Company to allow construction vehicles to turn around at the eastern end of the wetland that connects the two reservoirs. This segment is approximately 1,500 feet in length and is estimated to require approximately 9 to 14 working days for active excavation/pipe installation with activity beginning approximately six weeks prior for clearing, grubbing and site preparation. Following pipe installation, restoration of the disturbed area is anticipated to require approximately another 8 weeks. In total it is anticipated that this area will be impacted for approximately 17 weeks. Unless otherwise requested by the County, it is proposed that the contractor not be allowed to use Eagle Lake Court for construction access. Because of the presence of wetlands in this segment, construction traffic will not access the alignment via Eagle Lake Drive once construction and restoration of this segment is completed.

Segment 5 – Private Property east of Travis Road to drainage between Water Supply and Storage Reservoirs 3 and 4. Construction and material delivery vehicles will access the alignment via Travis Road both for construction traffic entering and exiting the site. It is anticipated that sufficient temporary easement will be obtained from the Water Supply and Storage Company to allow construction vehicles to turn around at the western end of the wetland that connects the two reservoirs. This segment is approximately 1,100 feet in length and is estimated to require approximately 8 to 12 working days for active excavation/pipe installation with activity beginning approximately six weeks prior for clearing, grubbing and site preparation. Following pipe installation, restoration of the disturbed area is anticipated to require approximately another 7 weeks. In total it is anticipated that this area will be impacted for approximately 16 weeks.

Space Availability for Other Pipeline in Preferred Corridor.

NISP WAE has not identified a need for an additional pipe in this corridor for its conveyance needs. Should another entity petition the County for a permit to construct a pipeline in parallel to NISP WAE's pipeline, adequate space exists to accommodate that pipeline. NISP WAE will acquire 40 feet of permanent easement plus an additional 60 feet of temporary easement for this project. If another pipeline were to be approved by the County, its permanent easement could abut NISP WAE's easement any they could use NISP WAE's permanent easement as their temporary easement.

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

Weldon Barker <weldonb2@att.net> Fri, May 15, 2020 at 2:45 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkafalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

I'm a retired resident in northern Larimer County, near the proposed location of Glade Reservoir, its massive dam, forebay, pumps, pipelines, campgrounds, parking lots, boat ramps, and other facilities. We strongly urge the Board of County Commissioners to deny the 1041 permit for the Northern Integrated Supply Project because it would forever impact the fundamental nature of the rural landscape in which we live and harm our quality of life.

We choose to live in northern Colorado for its beautiful natural landscapes, its wild and scenic rivers, its clean air and quiet surroundings, its wildlife, its opportunities for outdoor recreation on the abundant state and federal lands in the area. These are key pieces to our quality of life; key pieces that would be lost if this project is constructed and operated as proposed. Our land, water, and communities would be harmed by this project, and any benefits of the project would accrue to communities mostly outside Larimer County.

It is unacceptable that our rural northern Colorado communities must bear the impacts and un-mitigatable risks of this massive and ill-conceived project, the biggest ever proposed for Larimer County.

If construction is executed as planned, there would be seven years of heavy construction impacting our communities. We would be subjected to lots of heavy truck traffic, since the main artery to and from the reservoir site is Highway 287, which is also our main route; 6-days-a-week heavy traffic and heavy machinery operations, and the unwelcome, intrusive, and obnoxious presence of widespread and large-scale construction activity, noise, dust, and danger, over a long period of time. The intrusion would turn the hundreds of acres of the landscape into a construction zone, and take away the attractiveness, the clean air, the quiet – the things we depend on for health and happiness.

Northern Water is currently buying farms in northern Colorado to make up a more than 50% shortfall in the water rights needed for a successful project. In addition, recent prolonged droughts, which are becoming more common, have affected the amount of water that would be available from the Poudre River and other sources. For us, this means that we would endure the years and years of construction, and the irreparable loss of the unique landscape in which we live, all for an unfulfilled promise that "if they build it, the water would come" which is by no means guaranteed. The water shortage will only get worse as the climate dries, so Larimer County should deny this project, which will likely fail to meet its objectives. Less expensive, less destructive alternatives to water supply should be seriously considered.

Encouraging almost 400,000 visitors per year to this area would alter it from the quiet, rural and sparsely populated landscape we sought and invested in, to a busy recreational area with noise, dust, traffic, activity, accidents, and fires. Noise from motorboats on Glade would exceed state standards, would be heard miles away, and would significantly disrupt our lives. For some owners, the noise would cause property values to decline.

That's if the reservoir fills. The photographs Northern Water shows of a beautiful full reservoir are misleading at best, because the reservoir would rarely, if ever, look like that. It would generally look like an abandoned industrial facility marring the area's aesthetics.

Since the reservoir would not fill, and likely would not be full during much of its life, the project would look like an abandoned muddy puddle much of the time, and the recreational facilities would be mostly empty. Who would pay for the upkeep of the unused recreational facilities, Larimer County taxpayers? The project ruins the aesthetics of the valley and hogbacks – a unique and beautiful landscape – for a project that would provide little or no benefit to Larimer County and in fact would negatively impact its residents and its coffers.

The project would also contribute to climate change. Over 30,000 tons per year of CO2 would be emitted by engines to pump water into Glade. Other greenhouse gases would also be produced, both during construction and operation. Air

pollution would also occur due to the project, including gases that form ozone, a severe health hazard.

Dust blown from the barren shorelines would be swept up the valley on the area's strong winds and seep into our homes and further degrade our lives. The EIS states that it would take an 80-mph wind to generate any fugitive dust from the shorelines of the operating reservoir, an assertion that doesn't pass the laugh test for anyone living in this rural landscape. What else has have they got wrong? Are we to be the guinea pigs for some ill-conceived experiment?

We are very concerned about the potential for fire. We live in a high fire hazard, and we take many precautions with our homes and properties to protect against fires. Many visitors, who would be visiting in summer when the land is hottest and driest, would not be aware of how easy it is to cause a wildfire in this landscape. Some would be careless with campfires, with cigarettes, with illegal fireworks, or with firearms, and wildfires would be inadvertently ignited. Their vehicles can start fires. Unfortunately, arson is possible. Our climate is getting drier. Larimer County must recognize the seriousness of this issue and deny this permit. The county cannot simply hope for the best because our homes, our property, our animals would all be put at unacceptable risk of wildfire due to construction, high visitation, and incomplete understanding. These increased risks would also cause increased demands on local emergency services, especially fire, medical, and law enforcement.

No project this big can be undertaken without significant and irreparable impacts. We ask Larimer County to be a good steward and deny this permit PERMANENTLY and prevent the loss of open space and wildlife habitat, increased risk of wildfires and other public safety hazards, increased demands on local volunteer emergency services, noise, light pollution where now there is little, increased development and traffic in ever-widening circles around the reservoir, reduced air quality, climate change, increased illegal activities such as trespass on adjacent private land, decreased property values, and the loss of unique visual and aesthetic values. The natural and rural quality of this land is very important to our lives and communities.

For all the foregoing reasons, this project is a shocking affront to the residents of Larimer County and cannot be ethically--or environmentally--justified! It is only an attempt to reward residents of other counties who wish to usurp a disproportionate share of the limited waters of the Poudre River and to enrich the commercial interests who refuse to let this unconscionable die the death it wholly deserves!

Sincerely,

--
Mr Weldon Barker
weldonb2@att.net
2263 Rocky Mountain Avenue #311
Loveland, CO 80538

Save Rural NoCo Member

1810

Rob Helmick <helmicrp@co.larimer.co.us>

NISP pipeline application and the effects for Eagle Lake Subdivision

1 message

karen@2wellers.com <karen@2wellers.com> Fri, May 15, 2020 at 12:10 PM
To: rhelmick@larimer.org
Cc: Tom's personal <tom@2wellers.com>

Please see the attached letter regarding the proposed NISP pipeline application and its detrimental effects to our Eagle Lake community.

Regards,

Karen

NISP Pipeline - Eagle Lake subdivision.pdf
1114K

May 15, 2020

Rob Helmick, Senior Planner

Larimer County Community Development Division

200 W. Oak Street

Fort Collins, CO 80521

email to: rhelmick@larimer.org

Dear Rob,

As a resident of the Eagle Lake neighborhood, I am writing you to ask that Larimer County not approve the 1041 Application that is before you for a pipeline through the county by Northern Water (NISP). The issues revolving around this application and the reasons it should be denied closely mirror that of the City of Thornton 1041 pipeline application that was rejected by the Board of County Commissioners.

Specifically, here are some of the reasons the County rejected the Thornton application and should do so as well with the NISP application:

1) According to the Land Use Code criteria quoted by the Board of Commissioners, the proposal is inconsistent with the county Master Plan affecting land use and development, specifically that the route will be traversing through significant amounts of private property and through yards in the Eagle Lake neighborhood. Private easements will have to be obtained through eminent domain. Affected residents will not be permitted to construct permanent structures or plant landscape material with deep roots (trees, wind blocks, etc) on their property due to the pipeline easement and maintenance requirements. Affected

925-525-8795
Karen@2wellers.com
4554 Eagle Lake S, Fort Collins CO 80524

residents will be subject to continual intrusion on their land by maintenance crews checking on the pipeline in perpetuity. This is a gross infringement of their right to a peaceful existence on their property and our right to restrict non-resident traffic on our privately owned roads.

2) In addition, according to Northern Water's Construction Approach document, they are anticipating using HOA owned private roads for construction traffic throughout the five segments of construction on the pipeline near and through our neighborhood. **The timeline of the cumulative impact to us is anticipated to be 59 weeks from start to finish for all the segments!** They are asking to use our narrow, non-public grade roads for heavy truck traffic and daily construction crew traffic on our private roads dozens of residents use daily to enter and exit our subdivision. This is an unacceptable burden on us and again is a gross infringement on our neighborhood and our rights to a peaceful existence that is inconsistent with the Master Plan's stated goal of "maintaining and enhancing our county's quality of life and to be fundamentally fair to all our citizens and to respect their individual rights." A quiet residential neighborhood with children playing, residents coming and going, and retirees enjoying the peaceful time they've earned is not a place for construction staging for a project that has no benefit for its residents and even minimal benefit to Larimer County as a whole. The concept and thought of using our roads for this purpose is untenable.

3) The NISP 1041 application negatively impacts public health and safety in our neighborhood. Our private roads are narrow roads and not constructed to handle large, semi-tractor trailer traffic loaded with pipe sections and construction materials for pipeline construction. The roads were not built to handle the volume of traffic or the load. Having these vehicles on our roads creates a safety hazard for children, bicyclists, walkers and resident traffic entering and leaving driveways. In addition, some of our older residents with health issues are at risk due to the constant coming and going of non-resident truck traffic. Noise levels, pollution from diesel vehicles, and anxiety from interruptions to our peaceful existence can all lead to increased health problems for all residents.

4) In the Land Use Code criteria for consideration by the County, Criteria C states its purpose is to "Promote the economic stability of existing land uses that are

925-525-8795
Karen@2wellers.com
4554 Eagle Lake S, Fort Collins CO 80524

consistent with the Master Plan and protect them by incompatible or harmful land uses." The proposed pipeline is certainly an incompatible and harmful use of the land in our neighborhood.

We recently annexed three parcels to our HOA (the TIPS Development) whose owner was required by the County to development certain aspects of the land (drainage, roads, etc) to be approved by the County before being allowed to offer the plots for sale and final residential development. The owner has spent thousands of dollars to prepare this land, yet the proposed pipeline path crosses near or on some of the new parcels rendering them virtually unsellable until the pipeline is built and completed. No buyer will pay a premium price for a parcel with the amount of disruption, uncertainty of building site and septic placement, and ongoing nuisance this project will cause to these three parcels for well over a year. The County is in effect killing the owner's ability to sell his parcels and recoup his already substantial investment that the County has made him invest to get the land ready for development. This is not "promoting the economic stability of existing land uses" (ie. Residential development) or "protecting incompatible and harmful land uses".

Other residents in our neighborhood who may be contemplating or are in the process of listing their property are also economically negatively impacted by the proposed pipeline. Buyers will use every reason to lower the price on a sale and a year or more of construction traffic, noise, dirt and dust flying in the neighborhood are good leverage points for them to either not buy at all, or attempt to attain a lower selling price than normal. The County is truly hurting the economic stability of the whole neighborhood with this proposal and hundreds of thousands of dollars in values may be lost if the application is approved.

5) Northern Water has presented other reasonable siting and design alternatives that do not include bisecting resident's property or cutting through our neighborhood that they have dismissed due to cost or more difficult construction conditions like their N2.4 (north of Reservoir #3) and N2.5 routes (Douglas Road). The Board of County Commissioners rejected reasoning that expense or difficulty of construction were disqualifying reasons for rejecting routes over ones that impacted private property owners and individual rights in the Thornton pipeline application. Northern's preferred

925-525-8795
Karen@2wellers.com
4554 Eagle Lake S, Fort Collins CO 80524

N2.1 route severely impacts our rights as property owners and citizens and should similarly be dismissed by the Commissioners when there are viable alternate routing options.

6) Another issue of grave concern to the Commissioners in the Thornton application was the construction and pipeline proximity to occupied dwellings. Proximity of construction and construction impact along with the long-term detriment to property owners was a primary concern. The Northern Water proposal includes a 100' easement – a 40' construction easement and a 60' permanent easement. If the pipeline were to be placed on the property line between the two residences the proposed N2.1 routing prefers, that will put the easement only 30 feet or less from one of the residences. The disruption and imposition on private property this close to an occupied dwelling is unacceptable when there are route alternatives that do not cross private property between two dwellings.
7) The other major point that should either cause the county to reject the application or defer a decision until later is the Thornton pipeline issue now pending before the courts. The proposed routing of their pipeline has almost identical routing alternatives to Northerns. Both entities are in the review process at the same time with construction timelines that are similar. Multiple times in the record for Larimer County in the proceedings with Thornton, both Thornton, Northern Water, and the County mentioned or agreed that co-location of the two pipelines along their nearly identical paths made sense and should be pursued. It has been discussed between all three parties on numerous occasions and should be part of the discussion now.
   In fact, one of the objections the Board of County Commissioners expressed to deny the Thornton pipeline by only submitting an application for one of their proposed pipelines in isolation from their planned future ones was that, **"Thornton deprives the Board and public of the opportunity to consider cumulative impacts and the effectiveness of mitigation. A route that may be appropriate for a single pipeline may be inappropriate for additional pipelines. If this information is not considered now, future pipelines may not be able to co-locate which would result in the disorderly development of Thornton's project and compound the impacts on Larimer County through multiple different pipelines in separate locations."**

   How is this not the case with the proposed Northern pipeline and Thornton's pipeline, both of which are looking at nearly identical routing alternatives? This is not just an issue of "disorderly development and compounding of the impacts" on Larimer County – it is the disorderly development and compounding of the impacts

925-525-8795
Karen@2wellers.com
4554 Eagle Lake S, Fort Collins CO 80524

on Eagle Lake in a much shorter timeframe than the proposed build out of the future Thornton pipelines. And how is the reverse not true – that a route that may be inappropriate for a single pipeline due to cost and difficulty of construction may be entirely appropriate for the combined resources of two pipelines from two well-funded entities with capable engineering that will minimize the impacts not only on Larimer County but the Eagle Lake neighborhood that is the target of two separate pipelines?

The precedent for this is Section A.2 of the Land Use Code itself that says the Code is intended to:

"A. Provide for the physical development of the county in order to:

1. Preserve the character and quality of rural and urban areas;

2. Foster convenient, harmonious and workable relationships among land uses; and

3. Achieve the principles and strategies described in the master plan."

This alone should allow the County to consider co-location as part of the process in both the Thornton and Northern Water 1041 applications. In addition, the Colorado Supreme Court noted that the purpose of the 1041 statute is to allow state and local governments to "supervise land use which may have an impact on the people of this state beyond the immediate scope of the project." Colorado Land Use Commission v. Board of County Comm'rs of Larimer County, 604 P.2d 32, 34 (Colo. 1979). The reference to impacts "beyond the immediate scope of the project" suggests that the Commissioners can and should consider the relationship between the project under consideration and other projects. Such sensitivity would definitely further the statute's apparent purpose of "protection of the utility, value, and future" of land, which the statute states is in the public interest. C.R.S. § 24-65.1-101(1)(a).

For these reasons, I ask the Planning Commission and the Board of County Commissioners reject the Northern Water 1041 application until such time that

925-525-8795
Karen@2wellers.com
4554 Eagle Lake S, Fort Collins CO 80524

there is resolution to the Thornton 1041 application so that both pipelines can apply for a co-location routing option where both entities can share costs and choose routes they might not otherwise consider around residential areas. Our specific properties and the Eagle Lake neighborhood should not have to shoulder the burden of these two projects for the sake of Larimer County.

Kind Regards,

Tom and Karen Weller

925-525-8795
Karen@2wellers.com
4554 Eagle Lake S, Fort Collins CO 80524

Rob Helmick <helmicrp@co.larimer.co.us>

Do Not Approve NISP 1041 Project No. 20-ZONE 2- Save Our Rural Northern Colorado

1 message

Pamela Cruse <pjody@lpbroadband.net> Fri, May 15, 2020 at 5:25 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

We are landowners residing in the area of the proposed Glade reservoir that have concerns with the proposed Glade Project and the negative impacts that would occur if the project moves forward.

The primary benefits of this proposed reservoir would be enjoyed by the 15 subscriber towns or agencies that receive the proposed Glade water. Most of these towns and agencies are outside Larimer County. The most obvious and intense costs would be borne by local and other surrounding communities.

In general, our concerns are that the scope and scale of this proposed project, if approved, would have significant, detrimental, and permanent impact on our rural community, environment, and lifestyle we enjoy today and desire to have in the future.

Specifically, our rural environment we believe would be negatively impacted in the following ways:

1) Noise - The rerouted highway over the most eastern hogback would have an unobstructed view from residences in the foothills, there would be no middle hogback to block truck and auto noise. The NISP publications suggest that recreation would include motorboats and jet skis. Boats and skis are loud, they would likely be louder than current road traffic.

2) Light Pollution – This rural area enjoys fairly dark skies. The proposed recreational activities would generate significant exterior lighting for boats, facilities, camping, pumping facilities, traffic, etc. and headlights from traffic coming down the hogback on the rerouted 287 would shine into the adjacent private property. This could destroy the enjoyment of our night skies.

3) New development - We do not know what sort of development would occur near and north of proposed Glade. The rerouted highway 287 would invite more residential development on the plains. The reservoir would invite more development in the adjacent foothills and valleys. It's not inconceivable that more commercial development catering to visitors would encroach into currently uncommercialized lands, forever altering the rural nature of the area.

4) Trespass – Plans for proposed Glade project almost 400,000 visitors per year. This would include boaters, campers, fishers and hikers and bikers, among others. There is every reason to believe that not all these visitors would stay within the confines of designated recreational areas. Some visitors are likely to explore the inviting foothills that border the reservoir and trespass, however inadvertently, on our private property.

5) Wildlife – Proposed Glade would become a significant barrier to the permanent and migratory herds of deer and elk that reside in our area and would be disruptive to other wildlife. In a world where wildlife and nature are under stress, and is diminishing generally owing to human activities, should we be contributing to those activities for unnecessary purposes? We encourage the county to find alternatives that don't result in the significant loss of open space and wildlife habitat that this project would cause.

6) Wildfires – In this century three major wildfires burned over 100,000 acres on and around Glade. Two of the three forest fires were caused by careless people. Can we rely on the >1000 daily visitors to proposed Glade to be careful?

7) Emergency response – The recreation on the proposed reservoir is projected to be almost 400,000 visitors per year. Such a large increase in recreationalists would likely increase the number of emergency calls thereby further stretching emergency response agency resources. Costs would be borne by Larimer County taxpayers, and emergency services

that are diverted to Glade would not be readily available to serve the local communities.

8) Air quality – Because Glade would have junior water rights, the water level of the proposed reservoir would be highly variable, unlike Horsetooth. The water level frequently would drop precipitously, often changing proposed Glade Reservoir to Glade Mudflats, and could stay that way for years. The large “bathtub ring” that would materialize around the reservoir would become dry soil that would blow in our strong winds causing air quality and visual concerns. The hundreds or thousands of vehicles that would travel to the area emit gases, particulates, and ozone precursors (i.e., health hazards).

9) Climate change – the pumps, the construction vehicles, the recreational vehicles: the project would result in considerable burning of fossil fuels, forever, and the emission of greenhouse gases. The pumping stations alone would emit the equivalent of adding 7000 GHG emitting cars at a time when Colorado is implementing zero emissions vehicle standards.

10) State Land Usage - The large area of state land west of the proposed reservoir is devoted to hunting and cattle grazing. The state and federal lands in this region of northern Colorado provide abundant and easily accessible opportunities for recreation, which we gratefully utilize. Impacts to use of or access to the state land is a negative impact to our communities.

11) Aesthetic - The drive from Livermore to Laporte would no longer be through the heritage rangeland and the familiar hogbacks. Since the proposed reservoir would likely be only partially filled much of the time, instead of beautiful hogbacks and grassy foothills, our viewshed would be marred by the barren sides (bathtub ring) and murky surface of a partially filled reservoir.

12) Lack of combined Project evaluation/coordination - There is no apparent coordination of the NISP or the proposed Seaman’s expansion or the Halligan expansion. All these projects surround our properties and would leave us on a peninsula of land cut from the rural environment we now enjoy. We met with the City of Greeley in August 2018 and learned that they are not planning to cooperate with other cities due to “challenges” and are proceeding on an expansion of Seamen’s reservoir from 5,000 to 80,000 acre-feet. In the 21st century, surface storage just doesn’t make sense; this is a semi-arid climate that is getting drier. Alternatives are available and should be seriously considered.

13) Social justice - While the benefits of proposed Glade would be enjoyed by people who live and work far from the reservoir site, the costs would be borne by those whose quality of life would be severely lessened.

14) Conservation and Alternatives – Conservation is not begin adequately considered. While the Colorado Front Range is land-rich for development, it is semi-arid and thus water-limited. About 2/3 of the Poudre is already taken out, and Glade would take another 40% of what’s left. Yet another reservoir is nothing but a temporary fix for a small portion of the state’s water needs; but one with permanent, destructive impacts on a large part of rural northern Colorado. The time is way past due for developing long-term solutions based on state-of-the-art technologies and widespread education on the absolute necessity to conserve water, and to stop relying on 19th century solutions for 21st century challenges.

The Larimer County Commissioners must save our rural communities and be good stewards of our natural resources by saying no Glade Reservoir!

Sincerely,

--
Mrs Pamela Cruse
pjody@lpbroadband.net
6016 N. County Rd 29c
BELLVUE, CO 80512

Save Rural NoCo Member

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

Pamela Cruse <pjody@lpbroadband.net> Fri, May 15, 2020 at 5:08 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

I'm a landowner residing in northern Larimer County, near the proposed location of Glade Reservoir, it's massive dam, forebay, pumps, pipelines, campgrounds, parking lots, boat ramps, and other facilities. We strongly urge the Board of County Commissioners to deny the 1041 permit for the Northern Integrated Supply Project because it would forever impact the fundamental nature of the rural landscape in which we live and harm our quality of life.

We choose to live in northern Colorado for its beautiful natural landscapes, its wild and scenic rivers, it's clean air and quiet surroundings, its wildlife, its opportunities for outdoor recreation on the abundant state and federal lands in the area. These are key pieces to our quality of life; key pieces that would be lost if this project is constructed and operated as proposed. Our land, water, and communities would be harmed by this project, and any benefits of the project would accrue to communities mostly outside Larimer County.

It is unacceptable that our rural northern Colorado communities must bear the impacts and unmitigable risks of this massive and ill-conceived project, the biggest ever proposed for Larimer County.

If construction is executed as planned, there would be seven years of heavy construction impacting our communities. We would be subjected to lots of heavy truck traffic, since the main artery to and from the reservoir site is Highway 287, which is also our main route; 6-days-a-week heavy traffic and heavy machinery operations, and the unwelcome, intrusive, and obnoxious presence of widespread and large-scale construction activity, noise, dust, and danger, over a long period of time. The intrusion would turn the hundreds of acres of the landscape into a construction zone, and take away the attractiveness, the clean air, the quiet – the things we depend on for health and happiness.

Northern Water is currently buying farms in northern Colorado to make up a more than 50% shortfall in the water rights needed for a successful project. In addition, recent prolonged droughts, which are becoming more common, have affected the amount of water that would be available from the Poudre River and other sources. For us, this means that we would endure the years and years of construction, and the irreparable loss of the unique landscape in which we live, all for an unfulfilled promise that "if they build it, the water would come" which is by no means guaranteed. The water shortage will only get worse as the climate dries, so Larimer County should deny this project, which will likely fail to meet its objectives. Less expensive, less destructive alternatives to water supply should be seriously considered.

Encouraging almost 400,000 visitors per year to this area would alter it from the quiet, rural and sparsely populated landscape we sought and invested in, to a busy recreational area with noise, dust, traffic, activity, accidents, and fires. Noise from motorboats on Glade would exceed state standards, would be heard miles away, and would significantly disrupt our lives. For some owners, the noise would cause property values to decline.

That's if the reservoir fills. The photographs Northern Water shows of a beautiful full reservoir are misleading at best, because the reservoir would rarely, if ever, look like that. It would generally look like an abandoned industrial facility marring the area's aesthetics.

Since the reservoir would not fill, and likely would not be full during much of its life, the project would look like an abandoned muddy puddle much of the time, and the recreational facilities would be mostly empty. Who would pay for the upkeep of the unused recreational facilities, Larimer County taxpayers? The project ruins the aesthetics of the valley and hogbacks – a unique and beautiful landscape – for a project that would provide little or no benefit to Larimer County and in fact would negatively impact its residents and its coffers.

The project would also contribute to climate change. Over 30,000 tons per year of CO2 would be emitted by engines to pump water into Glade. Other greenhouse gases would also be produced, both during construction and operation. Air

pollution would also occur due to the project, including gases that form ozone, a severe health hazard.

Dust blown from the barren shorelines would be swept up the valley on the area's strong winds and seep into our homes and further degrade our lives. The EIS states that it would take an 80-mph wind to generate any fugitive dust from the shorelines of the operating reservoir, an assertion that doesn't pass the laugh test for anyone living in this rural landscape. What else has have they got wrong? Are we to be the guinea pigs for some ill-conceived experiment?

We are very concerned about the potential for fire. We live in a high fire hazard, and we take many precautions with our homes and properties to protect against fires. Many visitors, who would be visiting in summer when the land is hottest and driest, would not be aware of how easy it is to cause a wildfire in this landscape. Some would be careless with campfires, with cigarettes, with illegal fireworks, or with firearms, and wildfires would be inadvertently ignited. Their vehicles can start fires. Unfortunately, arson is possible. Our climate is getting drier. Larimer County must recognize the seriousness of this issue and deny this permit. The county cannot simply hope for the best because our homes, our property, our animals would all be put at unacceptable risk of wildfire due to construction, high visitation, and incomplete understanding. These increased risks would also cause increased demands on local emergency services, especially fire, medical, and law enforcement.

No project this big can be undertaken without significant and irreparable impacts. We ask Larimer County to be a good steward and deny this permit and prevent the loss of open space and wildlife habitat, increased risk of wildfires and other public safety hazards, increased demands on local volunteer emergency services, noise, light pollution where now there is little, increased development and traffic in ever-widening circles around the reservoir, reduced air quality, climate change, increased illegal activities such as trespass on adjacent private land, decreased property values, and the loss of unique visual and aesthetic values. The natural and rural quality of this land is very important to our lives and communities.

Sincerely,

--
Mrs Pamela Cruse
pjody@lpbroadband.net
6016 N. County Rd 29c
BELLVUE, CO 80512

Save Rural NoCo Member

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

NIST 1041

1 message

C. J. Taylor <taylor.jerry@gmail.com> Fri, May 15, 2020 at 11:35 AM
To: rhelmick@larimer.org, me <taylor.jerry@gmail.com>

Rob Helmick, Senior Planner
Larimer County Community Development Division
200 W. Oak Street
Suite 3100
PO Box 1190
Fort Collins, CO 80521

Dear Rob,

As residents of the Eagle Lake neighborhood, my wife and I are wring y ou to ask that Larimer County not approve the 1041 Applicaon tha t is before you for a pipeline through the county by Northern Water (NISP). The issues revolving around this applicaon and the r easons it should be denied closely mirror that of the City of Thornton 1041 pipeline applicaon tha t was rejected by the Board of County Commissioners. We are a. aching the list of 7 reasons as listed by our HOA that led the county Commissioners to reject the Thornton 1041 pipeline applicaon. It seems t o us that these reasons are more than applicable to this new 1041 applicaon and should lead t o its rejecon. Further more, it certainly seems to us that their applicaon is pr emature as we wait for the Thornton court case to be decided.

Sincerely,

Gerald and Carolyn Taylor
412 Eagle Watch
Lot 76 Eagle Lake Estates
Fort Collins, CO 80524

Attachment:
Specifically, here are some of the reasons the County rejected the Thornton applicaon and should do so as w ell with the NISP applicaon:

1) According to the Land Use Code criteria quoted by the Board of Commissioners, the proposal is inconsistent with the county Master Plan affecng land use and de velopment, specifically that the route will be traversing through significant amounts of private property and through yards in the Eagle Lake neighborhood. Private easements will have to be obtained through eminent domain. Affected residents will not be permi ed to construct permanent structures or plant landscape material with deep roots (trees, wind blocks, etc) on their property due to the pipeline easement and maintenance requirements. Affected residents will be subject to connual in trusion on their land by maintenance crews checking on the pipeline in perpetuity. This is a gross infringement of their right to a peaceful existence on their property and our right to restrict non-resident traffic on our privately owned roads.
2) In addion, acc ording to Northern Water's Construcon Appr oach document, they are ancipa ng using HO A owned private roads for construcon tr affic throughout the five segments of construcon on the pipeline near and thr ough our neighborhood.
The meline of the cumula v e impact to us is ancipa ted to be 59 weeks from start to finish for all the segments! They are asking to use our narrow, non-public grade roads for heavy truck traffic and

daily construcon cr ew traffic on our private roads dozens of residents use daily to enter and exit our subdivision. This is an unacceptable burden on us and again is a gross infringement on our neighborhood and our rights to a peaceful existence that is inconsistent with the Master Plan's stated goal of "maintaining and enhancing our county's quality of life and to be fundamentally fair to all our ciz ens and to respect their individual rights." A quiet residenal neighborhood with childr en playing, residents coming and going, and rer ees enjoying the peaceful me the y've earned is not a place for construcon s taging for a project that has no benefit for its residents and even minimal benefit to Larimer County as a whole. The concept and thought of using our roads for this purpose is untenable.

3) The NISP 1041 applicaon neg av ely impacts public health and safety in our neighborhood. Our private roads are narrow roads and not constructed to handle large, semi-tractor trailer traffic loaded with pipe secons and c onstrucon ma terials for pipeline construcon. The r oads were not built to handle the volume of traffic or the load. Having these vehicles on our roads creates a safety hazard for children, bicyclists, walkers and resident traffic entering and leaving driveways. In addion, some of our older residents with health issues are at risk due to the constant coming and going of non-resident truck traffic. Noise levels, polluon fr om diesel vehicles, and anxiety from interrupons t o our peaceful existence can all lead to increased health problems for all residents.

4) In the Land Use Code criteria for consideraon b y the County, Criteria C states its purpose is to "Promote the economic stability of exisng land uses tha t are consistent with the Master Plan and protect them by incompable or harm ful land uses." The proposed pipeline is certainly an incompable and harm ful use of the land in our neighborhood.

We recently annexed three parcels to our HOA (the TIPS Development) whose owner was required by the County to development certain aspects of the land (drainage, roads, etc) to be approved by the County before being allowed to offer the plots for sale and final residenal de velopment. The owner has spent thousands of dollars to prepare this land, yet the proposed pipeline path crosses near or on some of the new parcels rendering them virtually unsellable unl the pipeline is built and c ompleted. No buyer will pay a premium price for a parcel with the amount of disrupon, uncert ainty of building site and sepc placemen t, and ongoing nuisance this project will cause to these three parcels for well over a year. The County is in effect killing the owner's ability to sell his parcels and recoup his already substanal in vestment that the County has made him invest to get the land ready for development. This is not "promong the ec onomic stability of exisng land uses" (ie. R esidenal de velopment) or "protecng inc ompable and harm ful land uses".

Other residents in our neighborhood who may be contemplang or ar e in the process of lisng their property are also economically negav ely impacted by the proposed pipeline. Buyers will use every reason to lower the price on a sale and a year or more of construcon tr affic, noise, dirt and dust flying in the neighborhood are good leverage points for them to either not buy at all, or attempt to attain a lower selling price than normal. The County is truly hurng the ec onomic stability of the whole neighborhood with this proposal and hundreds of thousands of dollars in values may be lost if the applicaon is appr oved.

5) Northern Water has presented other reasonable sing and design alt ernav es that do not include bisecng r esident's property or cung thr ough our neighborhood that they have dismissed due to cost or more difficult construcon c ondions lik e their N2.4 (north of Reservoir #3) and N2.5 routes (Douglas Road). The Board of County Commissioners rejected reasoning that expense or difficulty of construcon w ere disqualifying reasons for rejecng r outes over ones that impacted private property owners and individual rights in the Thornton pipeline applicaon. Northern' s preferred N2.1 route severely impacts our rights as property owners and ciz ens and should similarly be dismissed by the Commissioners when there are viable alternate roung op ons.

6) Another issue of grave concern to the Commissioners in the Thornton applicaon w as the construcon and pipeline pr oximity to occupied dwellings. Proximity of construcon and construcon impact along with the long-t erm detriment to property owners was a primary concern. The Northern Water proposal includes a 100' easement – a 40' construcon easemen t and a 60' permanent easement. If the pipeline were to be placed on the property line between the two residences the proposed N2.1 roung pr efers, that will put the easement only 30 feet or less from one of the residences. The disrupon and imposion on priv ate property this close to an occupied

dwelling is unacceptable when there are route alternav es that do not cross private property between two dwellings.

7) The other major point that should either cause the county to reject the applicaon or de fer a decision unl la ter is the Thornton pipeline issue now pending before the courts. The proposed roung of their pipeline has almos t idenc al roung alt ernav es to Northerns. Both enes ar e in the review process at the same me with c onstrucon me lines tha t are similar. Mulple mes in the record for Larimer County in the proceedings with Thornton, both Thornton, Northern Water, and the County menoned or agr eed that co-locaon of the tw o pipelines along their nearly idenc al paths made sense and should be pursued. It has been discussed between all three pares on numerous occasions and should be part of the discussion now.

In fact, one of the objecons the Boar d of County Commissioners expressed to deny the Thornton pipeline by only subming an applic aon f or one of their proposed pipelines in isolaon fr om their planned future ones was that, **"Thornton deprives the Board and public of the opportunity to consider cumulav e impacts and the effecv eness of mig aon. A r oute that may be appropriate for a single pipeline may be inappropriate for addional pipelines. If this in formaon is not considered now, future pipelines may not be able to co-locate which would result in the disorderly development of Thornton's project and compound the impacts on Larimer County through mulple different pipelines in separate locaons. "**

How is this not the case with the proposed Northern pipeline and Thornton's pipeline, both of which are looking at nearly idenc al roung alt ernav es? This is not just an issue of "disorderly development and compounding of the impacts" on Larimer County – it is the disorderly development and compounding of the impacts on Eagle Lake in a much shorter me fr ame than the proposed build out of the future Thornton pipelines. And how is the reverse not true – that a route that may be inappropriate for a single pipeline due to cost and difficulty of construcon ma y be enr ely appropriate for the combined resources of two pipelines from two well-funded enes with c apable engineering that will minimize the impacts not only on Larimer County but the Eagle Lake neighborhood that is the target of two separate pipelines?

The precedent for this is Secon A .2 of the Land Use Code itself that says the Code is intended to:

"A. Provide for the physical development of the county in order to:
1. Preserve the character and quality of rural and urban areas;
2. Foster convenient, harmonious and workable relaonship s among land uses; and
3. Achieve the principles and strategies described in the master plan."

This alone should allow the County to consider co-locaon as part of the pr ocess in both the Thornton and Northern Water 1041 applicaons. In addion, the Color ado Supreme Court noted that the purpose of the 1041 statute is to allow state and local governments to "supervise land use which may have an impact on the people of this state beyond the immediate scope of the project." Colorado Land Use Commission v. Board of County Comm'rs of Larimer County, 604 P.2d 32, 34 (Colo. 1979). The reference to impacts "beyond the immediate scope of the project" suggests that the Commissioners can and should consider the relaonship be tween the project under consideraon and other projects. Such sensivity w ould definitely further the statute's apparent purpose of "protecon of the ulity , value, and future" of land, which the statute states is in the public interest. C.R.S. § 24-65.1-101(1)(a).

For these reasons, I ask the Planning Commission and the Board of County Commissioners reject the Northern Water 1041 applicaon un l such me tha t there is resoluon t o the Thornton 1041 applicaon so tha t both pipelines can apply for a co-locaon r oung op on wher e both enes c an share costs and choose routes they might not otherwise consider around residenal ar eas. Our specific properes and the E agle Lake neighborhood should not have to shoulder the burden of these two projects for the sake of Larimer County.

Rob Helmick <helmicrp@co.larimer.co.us>

Petition AGAINST NISP 1041 Permit Application; Project No. 20-ZONE 2657

2 messages

John Dettenwanger <jjdettenwanger@gmail.com> Fri, May 15, 2020 at 4:04 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkafalas@larimer.org
Cc: Karyn Coppinger <kcoppinger31@gmail.com>, Roy Campbell <roy@bonnersprings.net>, Rodger <rodger.b.ames@gmail.com>, Linda Griego <dakolinda@gmail.com>, Gary Wockner <gary.wockner@savethepoudre.org>

On behalf of members of Save Rural NoCo, we are submitting a signed petition from 168 of our members that stand united against the NISP 1041 Permit Application; Project No. 20-ZONE 2657. These signatures represent a significant number of county citizens that will be directly affected if this project were to be approved.

We ask that this petition be included in the public record of the 1041 process for this project, and be made available to both the Planning Commission and the County Commissioners for their deliberations.

John Dettenwanger
Save Rural NoCo

Petition Against NISP 1041 Project No 20-ZONE 2657.pdf
280K

Linda Griego <dakolinda@gmail.com> Fri, May 15, 2020 at 5:52 PM
To: John Dettenwanger <jjdettenwanger@gmail.com>
Cc: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkafalas@larimer.org, Karyn Coppinger <kcoppinger31@gmail.com>, Roy Campbell <roy@bonnersprings.net>, Rodger <rodger.b.ames@gmail.com>, Gary Wockner <gary.wockner@savethepoudre.org>

Excellent job John...and with a hurting knee at that! Hope it's still elevated.

Thanks!

Linda
[Quoted text hidden]

May 15, 2020

Dear Larimer County Commissioner,

Save Rural NoCo - Don't Support Glade Reservoir (Project No. 20-ZONE 2657)

We join the citizen's group "Save Rural NoCo" in asking the Larimer County Commissioners to deny the Northern Water's 1041 permit application for the Northern Integrated Supply Project and Glade Reservoir. The damage to communities, land, and water from this project will be widespread and permanent.

We encourage the Larimer County Commissioners to be proactive in supporting, not only the citizens they represent, but also the Poudre River, which struggles to support communities like the City of Fort Collins, and the rural lands of northern Colorado.

A number of communities and rural landowners lie near the proposed Glade Reservoir with its huge dam, forebay, and pumping station. Many more lie between the Glade Reservoir and the cities miles to the south that are slated to receive Poudre River water via 85 miles of pipeline. Still more lie along the reroute of Highway 287, a major federal highway that would tear through what is now rural open land.

Communities throughout northern Colorado will be harmed by 1) air, noise, light, and possibly water pollution; 2) loss of open space and wildlife habitat; 3) risk of wildfires and over-burdening of local emergency services; 4) increased development and traffic in relatively undeveloped areas, 5) loss of property access, 6) decreased property values, 7) loss of farmland, and 8) permanent damage to the aesthetics and character of northern Colorado, to name a few. The list of negative impacts is long, as is the list of affected communities.

In denying the NISP/Glade Reservoir project, the Larimer County Commissioners will avoid disturbing ecosystems—from the river and its riparian zone to the foothills, prairies, and farmlands; avoid permanently harming rural land uses; and avoid disrupting the communities residing in and around the sprawling pieces of this massive project.

We strongly urge the Larimer County Commissioners to reject Northern Water's 1041 permit application and, in doing so, join the citizens of Larimer County in supporting the health, vitality, and survival of rural northern Colorado communities, land, and water. It's never too late to do the right thing.

Respectfully,

Ms	Lynn	Utzman-Nichols	lynn.healthwrite@gmail.com
Ms	daniel	vigil	dnlvigil@mac.com
Mr	Weldon	Barker	weldonb2@att.net
Ms	Morgan	Moxley	moxleycats@aol.com
Mr	Charles	Kopp	charleskop@centurylink.net
Ms	Bill	Besser	bill.besser@gmail.com
Mr	Herb	Schaal	herb.schaal@bellvueemporium.com

Ms	Raye	Sullivan	raye.sullivan@gmail.com
Ms	diane	zuerlein	zuerzedlein9@gmail.com
Mr	Ray	Piira	rpiira@frii.com
Mrs	Anneke	Bierenbroodspot	mr.bierenbroodspot@planet.nl
Ms	Terry	Waters	terrywaters125@msn.com
Ms	Frances P	wright	fpwright@digis.net
Mr	William	Ringer	cringerster@gmail.com
Ms	Gabriel	Prizer	gprizer1@gmail.com
Ms	Adam	Nickel	elmowarrior99@rocketmail.com
Ms	Phillip	Chamberlain	chamberlainphillip@gmail.com
Mr	James	Boyd	springcreekdry@gmail.com
Ms	Catherine	Wilkins	lestertownsend@icloud.com
Mr	Wayne	Sundberg	sunddayres@outlook.com
Mr	Charles	Minks	crminks@outlook.com
Ms	David	Twedt	twedt@colostate.edu
Ms	carol	peacock	carolzpeacock@gmail.com
Mr	Bruce	Peacock	econ2357@gmail.com
Ms	Heather	Watson	teamfeather@gmail.com
Ms	Janet	Chapman	bicster2@gmail.com
Ms	susan	ferrari	FERRARI28@MSN.COM
Ms	Liz	Whitney	borderdog.annie@gmail.com
Mr	Matthew	Goldberg	mattgoldberg83@gmail.com
Mrs	Chloe	Andrews Goldberg	chloemail00@gmail.com
Ms	Ann	Ryan	anngryan@frii.com
Mr	Zachary	Gosnell	gosnelldentwerx@gmail.com
Mr	Jerry	Dauth	jerrydauth@gmail.com
Ms	Sara &	Stephen	john.sara.stephen@gmail.com
Mr	michael	hare	mhare123@msn.com
Mr	Ross	Lock	ralwildlifer@comcast.net
Ms	Amy	Jablonovsky	ajhessen73@gmail.com
Mr	David	Smeltzer	dcsmeltzer@yahoo.com
Ms	Ann	Murphy	ambaseballfan@gmail.com
Mr	Jeremy	Heineke	jheineke@gmail.com
Mrs	Colleen	Finnman	cfinnman1524@gmail.com

Mr	Doug	Finnman	dfinnman72@yahoo.com
Ms	Greg	Heiden	hydraulicman@atcjet.net
Mr	Lindsey	Wess	lindsey.wess@gmail.com
Ms	Susanne	Cordery	susannecordery@gmail.com
Mr	Steve	Bane	sbaneaz@aol.com
Ms	Rhea- Claire	Ferranti	rheaclaire@aol.com
Ms	Elissa	Douglas	Douglas.duo@gmail.com
Ms	Pam	Scinto	pamscinto@hotmail.com
Ms	Caroline	Francklyn	tigerlilly62@gmail.com
Mr	John	Tschirhart	cheerheart@msn.com
Ms	Patricia	Haley-Miller	trishhm@frii.com
Ms	RHEBA	MASSEY	massey@frii.com
Mr	Robert	Hufziger	rhufzige@rams.colostate.edu
Ms	Alan	Miller	alanm@frii.com
Ms	Janice	Haley	janicemhaley@hotmail.com
Ms	Darlena	Mortenson	Dar.Mortenson@gmail.com
Mr	Nathan	Troop	nattroop@hotmail.com
Ms	Steve	Carroll	s_s_carroll@msn.com
Mrs	Sheila	Webber	13sheilaw@gmail.com
Mr	Tom	Mackenzie	tom.mackenzie66@yahoo.com
Ms	Barbara	Denny	barbarawaves@gmail.com
Mr	Ethan	Hodgson	ethan.t.hodgson@gmail.com
Ms	Linn	Shaw	lss.gvm@gmail.com
Ms	Jane	Dege	jeddege@hotmail.com
Mr	Fred	Zipp	fzipp@frii.com
Mr	Jesse	Taylor	jtaylor@remingtontech.net
Ms	Nancy	Morgan	nmorgan522@gmail.com
Ms	Jennifer	Sunderland	jennifer@woollygoatfarm.com
Mr	Al	Judd	Ajudd002@gmail.com
Ms	Kurt	Buss	KURTBUSS@GMAIL.COM
Mr	AJ	Romero	naturezwayz.aho00@outlook.com
Mrs	Jennifer	Romero	jenniferromero@outlook.com
Ms	Pamela	May	pm9008@gmail.com
Mr	Gerald	Pitter	gp6165@gmail.com

Mr	Josh	Henriksen	joshrhenriksen@gmail.com
Ms	Dottie	Boscamp	dottieboscamp@gmail.com
Ms	Christine	Noble Lehmann	chrissie.lehmann1@gmail.com
Mr	James	Cox	jimc0818@gmail.com
Ms	ANDREW	BLANTON	ajbtone@yahoo.com
Ms	Robin	MacDonald	bellvuerobin@gmail.com
Ms	Karen	Wheeler	skyband0@q.com
Ms	Gloria	Edwards	canyonglo@gmail.com
Dr.	Jacqueline	Voss	jacque@bonnersprings.net
Mr	Thomas	Hilinski	tom.hilinski@gmail.com
Mr	Tom	Forbes	thomasjforbes@mac.com
Ms	Marcia	Donnan	Marcia@DonnanLTD.com
Mr	Stefan	Ellis	Stellis99@gmail.com
Ms	Yvette	Nout-Lomas	ysnout@gmail.com
Mrs	Dianne	Baldwin	dhbaldwin57@gmail.com
Ms	Laura	Prechel	prechellm@gmail.com
Mr	John	Calderazzo	john.calderazzo@colostate.edu
Ms	Linda	Best	lindakaybest@gmail.com
Mr	Joel	Peterson	skyview.moose@gmail.com
Mr	R Warren	Lemerich	warrenlemerich@gmail.com
Ms	Charmaine	Stavedahl	stavedahlc@gmail.com
Ms	Elaine	Spencer	espencer@frii.com
Mrs	Mina	Holley	minalholley@gmail.com
Mr	Gregory	Holley	gcholleycolorado@gmail.com
Mr	William	Embrey	williamembrey4@gmail.com
Mrs	Miriam	Gassman	msgluna1964@gmail.com
Mr	cris	peterson	crispetrson9@gmail.com
Ms	Neil	Bright	neilbright@gmail.com
Ms	Sarah	Yaneza	sarahbyaneza@gmail.com
Ms	Robin	McGehee	onlyairedales@gmail.com
Ms	SueEllen	Campbell	sueellen.campbell@colostate.edu
Ms	Christina	Pender	ckloukides@gmail.com
Mr	Tom	Jennings	tjmacky@mailmt.com
Ms	Kristen	Michaels	kristen.michaels@gmail.com

Ms	Christine	Proulx	redpanda5@juno.com
Ms	Michelle	Proulx	boomer-hunter@juno.com
Dr.	Della	Garelle	dgarelle@gmail.com
Dr.	Shelley	Coldiron	shelley.coldiron@gmail.com
Mrs	Elaine	Embrey	emb5ela@gmail.com
Ms	Kari Jo	Mc Inturff	lakota.mcinturff37@gmail.com
Ms	Nancy	Mulvany	mulvany@protonmail.com
Ms	Mary	Humstone	humstone@gmail.com
Mr	Scott	Brooks	rafterbrooks@yahoo.com
Mrs	Heather	Henke	heatherlhenke@gmail.com
Ms	Linda	Bevard	bevard.linda@gmail.com
Ms	Kathleen	Dapkus	dapkuseckert@gmail.com
Dr.	Christian	Weder	cdweder@gmail.com
Ms	Catherine	Grime	cathy@cathygrimes.com
Mrs	Gail	Ford	sonomafords@comcast.net
Mr	Mathew	Lomas	azteckeeper@gmail.com
Ms	Elsbeth	O'Fallon	lv2che@yahoo.com
Ms	Joel	Meeter	joelmeeter@gmail.com
Ms	Susan	Barbour	sebarbour56@msn.com
Ms	Pam	Cruse	pjody@lpbroadband.net
Mx.	Scot	Lee	scotlee@frii.com
Ms	Karyn	Coppinger	kcoppinger31@gmail.com
Ms	Linda Jacque	Jacque	jacque2@comcast.net
Ms	Cheryl	Costigan	Hklbrries@gmail.com
Ms	Carolyn	Stienmier	cstienmier@gmail.com
Ms	Lisa	Bright	lisajulianne@gmail.com
Dr.	Ryan	Bright	rbright970@gmail.com
Dr.	Janice	Bright	jmbright@colostate.edu
Mr	Rodger	Ames	rodger.b.ames@gmail.com
Mr	Grant	Campbell	roy@bonnersprings.net
Ms	Joanne	Lishman	gimpy3201@gmail.com
Ms	Tara	Parr	taralparr@gmail.com
Dr.	Ronald	Bright	rnjbright@msn.com
Mr	William	Snodgrass	William@Snodgrass.com

Mr	Jerry	Lynch	cptlynch4@gmail.com
Mr	Richard	Wollam	richw@digis.net
Ms	Vincent	Fayad	fayadcattle@gmail.com
Ms	Jesse	Etters	jettyice2@hotmail.com
Ms	Kay	Mikesky	factualfitness@yahoo.com
Dr.	Tom	Sale	TSale@engr.colostate.edu
Mr	Brent	Hawley	bhawley@frii.com
Ms	Brett	Spencer	brett.spencer@colorado.edu
Mrs	rose	brinks	rosebrinks@gmail.com
Mr	neal	spencer	neal@usa.net
Dr.	Alan	Mikesky	amikesky@iupui.edu
Ms	Elizabeth	Ashbach	ivylane1934@gmail.com
Ms	Theresa	Meyer	love2syt@gmail.com
Ms	Amy	Stultz	amysingrey@yahoo.com
Ms	Rose	Walker	rosew9252@msn.com
Ms	Noelle	Douglass	tonoelle@msn.com
Mr	steve	miller	Parrhesia80@protonmail.com
Ms	Jeanette	Jojola	jvjojola@hotmail.com
Ms	Patricia	Buchenberger	pattymb222@gmail.com
Mr	Josh	Griego	jogr_98@yahoo.com
Ms	Stella	Vigil	starwatcher2413@icloud.com
Ms	Carole	Meeter	campl41@yahoo.com
Mr	Tom	Petsja	tom.petska@verizon.net
Ms	Linda	Griego	linda.griego@earth2man.com
Mr	John	Dettenwanger	jjdettenwanger@gmail.com

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

Robert Hufziger <rhufziger@gmail.com> Fri, May 15, 2020 at 3:20 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkafalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

I'm a landowner residing in northern Larimer County, near the proposed location of Glade Reservoir, it's massive dam, forebay, pumps, pipelines, campgrounds, parking lots, boat ramps, and other facilities. We strongly urge the Board of County Commissioners to deny the 1041 permit for the Northern Integrated Supply Project because it would forever impact the fundamental nature of the rural landscape in which we live and harm our quality of life.

We choose to live in northern Colorado for its beautiful natural landscapes, its wild and scenic rivers, it's clean air and quiet surroundings, its wildlife, its opportunities for outdoor recreation on the abundant state and federal lands in the area. These are key pieces to our quality of life; key pieces that would be lost if this project is constructed and operated as proposed. Our land, water, and communities would be harmed by this project, and any benefits of the project would accrue to communities mostly outside Larimer County.

It is unacceptable that our rural northern Colorado communities must bear the impacts and unmitigable risks of this massive and ill-conceived project, the biggest ever proposed for Larimer County.

If construction is executed as planned, there would be seven years of heavy construction impacting our communities. We would be subjected to lots of heavy truck traffic, since the main artery to and from the reservoir site is Highway 287, which is also our main route; 6-days-a-week heavy traffic and heavy machinery operations, and the unwelcome, intrusive, and obnoxious presence of widespread and large-scale construction activity, noise, dust, and danger, over a long period of time. The intrusion would turn the hundreds of acres of the landscape into a construction zone, and take away the attractiveness, the clean air, the quiet – the things we depend on for health and happiness.

Northern Water is currently buying farms in northern Colorado to make up a more than 50% shortfall in the water rights needed for a successful project. In addition, recent prolonged droughts, which are becoming more common, have affected the amount of water that would be available from the Poudre River and other sources. For us, this means that we would endure the years and years of construction, and the irreparable loss of the unique landscape in which we live, all for an unfulfilled promise that "if they build it, the water would come" which is by no means guaranteed. The water shortage will only get worse as the climate dries, so Larimer County should deny this project, which will likely fail to meet its objectives. Less expensive, less destructive alternatives to water supply should be seriously considered.

Encouraging almost 400,000 visitors per year to this area would alter it from the quiet, rural and sparsely populated landscape we sought and invested in, to a busy recreational area with noise, dust, traffic, activity, accidents, and fires. Noise from motorboats on Glade would exceed state standards, would be heard miles away, and would significantly disrupt our lives. For some owners, the noise would cause property values to decline.

That's if the reservoir fills. The photographs Northern Water shows of a beautiful full reservoir are misleading at best, because the reservoir would rarely, if ever, look like that. It would generally look like an abandoned industrial facility marring the area's aesthetics.

Since the reservoir would not fill, and likely would not be full during much of its life, the project would look like an abandoned muddy puddle much of the time, and the recreational facilities would be mostly empty. Who would pay for the upkeep of the unused recreational facilities, Larimer County taxpayers? The project ruins the aesthetics of the valley and hogbacks – a unique and beautiful landscape – for a project that would provide little or no benefit to Larimer County and in fact would negatively impact its residents and its coffers.

The project would also contribute to climate change. Over 30,000 tons per year of CO2 would be emitted by engines to pump water into Glade. Other greenhouse gases would also be produced, both during construction and operation. Air

pollution would also occur due to the project, including gases that form ozone, a severe health hazard.

Dust blown from the barren shorelines would be swept up the valley on the area's strong winds and seep into our homes and further degrade our lives. The EIS states that it would take an 80-mph wind to generate any fugitive dust from the shorelines of the operating reservoir, an assertion that doesn't pass the laugh test for anyone living in this rural landscape. What else has have they got wrong? Are we to be the guinea pigs for some ill-conceived experiment?

We are very concerned about the potential for fire. We live in a high fire hazard, and we take many precautions with our homes and properties to protect against fires. Many visitors, who would be visiting in summer when the land is hottest and driest, would not be aware of how easy it is to cause a wildfire in this landscape. Some would be careless with campfires, with cigarettes, with illegal fireworks, or with firearms, and wildfires would be inadvertently ignited. Their vehicles can start fires. Unfortunately, arson is possible. Our climate is getting drier. Larimer County must recognize the seriousness of this issue and deny this permit. The county cannot simply hope for the best because our homes, our property, our animals would all be put at unacceptable risk of wildfire due to construction, high visitation, and incomplete understanding. These increased risks would also cause increased demands on local emergency services, especially fire, medical, and law enforcement.

No project this big can be undertaken without significant and irreparable impacts. We ask Larimer County to be a good steward and deny this permit and prevent the loss of open space and wildlife habitat, increased risk of wildfires and other public safety hazards, increased demands on local volunteer emergency services, noise, light pollution where now there is little, increased development and traffic in ever-widening circles around the reservoir, reduced air quality, climate change, increased illegal activities such as trespass on adjacent private land, decreased property values, and the loss of unique visual and aesthetic values. The natural and rural quality of this land is very important to our lives and communities.

Sincerely,

--
Ms Robert Hufziger
rhufziger@gmail.com
400 Mica Ct.
BELLVUE, CO 80512

Save Rural NoCo Member

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

William Embrey <williamembrey4@gmail.com> Sat, May 16, 2020 at 11:59 AM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

I'm a landowner residing in northern Larimer County, near the proposed location of Glade Reservoir, it's massive dam, forebay, pumps, pipelines, campgrounds, parking lots, boat ramps, and other facilities. We strongly urge the Board of County Commissioners to deny the 1041 permit for the Northern Integrated Supply Project because it would forever impact the fundamental nature of the rural landscape in which we live and harm our quality of life.

We choose to live in northern Colorado for its beautiful natural landscapes, its wild and scenic rivers, it's clean air and quiet surroundings, its wildlife, its opportunities for outdoor recreation on the abundant state and federal lands in the area. These are key pieces to our quality of life; key pieces that would be lost if this project is constructed and operated as proposed. Our land, water, and communities would be harmed by this project, and any benefits of the project would accrue to communities mostly outside Larimer County.

It is unacceptable that our rural northern Colorado communities must bear the impacts and unmitigable risks of this massive and ill-conceived project, the biggest ever proposed for Larimer County.

If construction is executed as planned, there would be seven years of heavy construction impacting our communities. We would be subjected to lots of heavy truck traffic, since the main artery to and from the reservoir site is Highway 287, which is also our main route; 6-days-a-week heavy traffic and heavy machinery operations, and the unwelcome, intrusive, and obnoxious presence of widespread and large-scale construction activity, noise, dust, and danger, over a long period of time. The intrusion would turn the hundreds of acres of the landscape into a construction zone, and take away the attractiveness, the clean air, the quiet – the things we depend on for health and happiness.

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That's if the reservoir fills. The photographs Northern Water shows of a beautiful full reservoir are misleading at best, because the reservoir would rarely, if ever, look like that. It would generally look like an abandoned industrial facility marring the area's aesthetics.

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Sincerely,

--
Mr William Embrey
williamembrey4@gmail.com
1456 Redstone Dr
Bellvue, CO 80512

Save Rural NoCo Member

Rob Helmick <helmicrp@co.larimer.co.us>

Do Not Approve NISP 1041 Project No. 20-ZONE 2- Save Our Rural Northern Colorado

1 message

Stefan Ellis <Stellis99@gmail.com> Mon, May 18, 2020 at 9:03 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

We are landowners residing in the area of the proposed Glade reservoir that have concerns with the proposed Glade Project and the negative impacts that would occur if the project moves forward.

The primary benefits of this proposed reservoir would be enjoyed by the 15 subscriber towns or agencies that receive the proposed Glade water. Most of these towns and agencies are outside Larimer County. The most obvious and intense costs would be borne by local and other surrounding communities.

In general, our concerns are that the scope and scale of this proposed project, if approved, would have significant, detrimental, and permanent impact on our rural community, environment, and lifestyle we enjoy today and desire to have in the future.

Specifically, our rural environment we believe would be negatively impacted in the following ways:

New development - We do not know what sort of development would occur near and north of proposed Glade. The rerouted highway 287 would invite more residential development on the plains. The reservoir would invite more development in the adjacent foothills and valleys. It's not inconceivable that more commercial development catering to visitors would encroach into currently uncommercialized lands, forever altering the rural nature of the area.

Wildlife – Proposed Glade would become a significant barrier to the permanent and migratory herds of deer and elk that reside in our area and would be disruptive to other wildlife. In a world where wildlife and nature are under stress, and is diminishing generally owing to human activities, should we be contributing to those activities for unnecessary purposes? We encourage the county to find alternatives that don't result in the significant loss of open space and wildlife habitat that this project would cause.

Wildfires – In this century three major wildfires burned over 100,000 acres on and around Glade. Two of the three forest fires were caused by careless people. Can we rely on the >1000 daily visitors to proposed Glade to be careful?

7) Emergency response – The recreation on the proposed reservoir is projected to be almost 400,000 visitors per year. Such a large increase in recreationalists would likely increase the number of emergency calls thereby further stretching emergency response agency resources. Costs would be borne by Larimer County taxpayers, and emergency services that are diverted to Glade would not be readily available to serve the local communities.

8) Air quality – Because Glade would have junior water rights, the water level of the proposed reservoir would be highly variable, unlike Horsetooth. The water level frequently would drop precipitously, often changing proposed Glade Reservoir to Glade Mudflats, and could stay that way for years. The large "bathtub ring" that would materialize around the reservoir would become dry soil that would blow in our strong winds causing air quality and visual concerns. The hundreds or thousands of vehicles that would travel to the area emit gases, particulates, and ozone precursors (i.e., health hazards).

9) Climate change – the pumps, the construction vehicles, the recreational vehicles: the project would result in considerable burning of fossil fuels, forever, and the emission of greenhouse gases. The pumping stations alone would emit the equivalent of adding 7000 GHG emitting cars at a time when Colorado is implementing zero emissions vehicle

standards.

10) State Land Usage - The large area of state land west of the proposed reservoir is devoted to hunting and cattle grazing. The state and federal lands in this region of northern Colorado provide abundant and easily accessible opportunities for recreation, which we gratefully utilize. Impacts to use of or access to the state land is a negative impact to our communities.

11) Aesthetic - The drive from Livermore to Laporte would no longer be through the heritage rangeland and the familiar hogbacks. Since the proposed reservoir would likely be only partially filled much of the time, instead of beautiful hogbacks and grassy foothills, our viewshed would be marred by the barren sides (bathtub ring) and murky surface of a partially filled reservoir.

12) Lack of combined Project evaluation/coordination - There is no apparent coordination of the NISP or the proposed Seaman's expansion or the Halligan expansion. All these projects surround our properties and would leave us on a peninsula of land cut from the rural environment we now enjoy. We met with the City of Greeley in August 2018 and learned that they are not planning to cooperate with other cities due to "challenges" and are proceeding on an expansion of Seamen's reservoir from 5,000 to 80,000 acre-feet. In the 21st century, surface storage just doesn't make sense; this is a semi-arid climate that is getting drier. Alternatives are available and should be seriously considered.

13) Social justice - While the benefits of proposed Glade would be enjoyed by people who live and work far from the reservoir site, the costs would be borne by those whose quality of life would be severely lessened.

14) Conservation and Alternatives – Conservation is not begin adequately considered. While the Colorado Front Range is land-rich for development, it is semi-arid and thus water-limited. About 2/3 of the Poudre is already taken out, and Glade would take another 40% of what's left. Yet another reservoir is nothing but a temporary fix for a small portion of the state's water needs; but one with permanent, destructive impacts on a large part of rural northern Colorado. The time is way past due for developing long-term solutions based on state-of-the-art technologies and widespread education on the absolute necessity to conserve water, and to stop relying on 19th century solutions for 21st century challenges.

The Larimer County Commissioners must save our rural communities and be good stewards of our natural resources by saying no Glade Reservoir!

Sincerely,

--
Ms Stefan Ellis
Stellis99@gmail.com
2144 cocklebur lane
Fort Collins, Colorado 80525

Save Rural NoCo Member

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

Sheila Webber <13sheilaw@gmail.com> Sat, May 16, 2020 at 5:43 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

I'm a landowner residing in northern Larimer County, near the proposed location of Glade Reservoir, it's massive dam, forebay, pumps, pipelines, campgrounds, parking lots, boat ramps, and other facilities. We strongly urge the Board of County Commissioners to deny the 1041 permit for the Northern Integrated Supply Project because it would forever impact the fundamental nature of the rural landscape in which we live and harm our quality of life.

We choose to live in northern Colorado for its beautiful natural landscapes, its wild and scenic rivers, it's clean air and quiet surroundings, its wildlife, its opportunities for outdoor recreation on the abundant state and federal lands in the area. These are key pieces to our quality of life; key pieces that would be lost if this project is constructed and operated as proposed. Our land, water, and communities would be harmed by this project, and any benefits of the project would accrue to communities mostly outside Larimer County.

It is unacceptable that our rural northern Colorado communities must bear the impacts and unmitigable risks of this massive and ill-conceived project, the biggest ever proposed for Larimer County.

If construction is executed as planned, there would be seven years of heavy construction impacting our communities. We would be subjected to lots of heavy truck traffic, since the main artery to and from the reservoir site is Highway 287, which is also our main route; 6-days-a-week heavy traffic and heavy machinery operations, and the unwelcome, intrusive, and obnoxious presence of widespread and large-scale construction activity, noise, dust, and danger, over a long period of time. The intrusion would turn the hundreds of acres of the landscape into a construction zone, and take away the attractiveness, the clean air, the quiet – the things we depend on for health and happiness.

Northern Water is currently buying farms in northern Colorado to make up a more than 50% shortfall in the water rights needed for a successful project. In addition, recent prolonged droughts, which are becoming more common, have affected the amount of water that would be available from the Poudre River and other sources. For us, this means that we would endure the years and years of construction, and the irreparable loss of the unique landscape in which we live, all for an unfulfilled promise that "if they build it, the water would come" which is by no means guaranteed. The water shortage will only get worse as the climate dries, so Larimer County should deny this project, which will likely fail to meet its objectives. Less expensive, less destructive alternatives to water supply should be seriously considered.

Encouraging almost 400,000 visitors per year to this area would alter it from the quiet, rural and sparsely populated landscape we sought and invested in, to a busy recreational area with noise, dust, traffic, activity, accidents, and fires. Noise from motorboats on Glade would exceed state standards, would be heard miles away, and would significantly disrupt our lives. For some owners, the noise would cause property values to decline.

That's if the reservoir fills. The photographs Northern Water shows of a beautiful full reservoir are misleading at best, because the reservoir would rarely, if ever, look like that. It would generally look like an abandoned industrial facility marring the area's aesthetics.

Since the reservoir would not fill, and likely would not be full during much of its life, the project would look like an abandoned muddy puddle much of the time, and the recreational facilities would be mostly empty. Who would pay for the upkeep of the unused recreational facilities, Larimer County taxpayers? The project ruins the aesthetics of the valley and hogbacks – a unique and beautiful landscape – for a project that would provide little or no benefit to Larimer County and in fact would negatively impact its residents and its coffers.

The project would also contribute to climate change. Over 30,000 tons per year of CO2 would be emitted by engines to pump water into Glade. Other greenhouse gases would also be produced, both during construction and operation. Air

pollution would also occur due to the project, including gases that form ozone, a severe health hazard.

Dust blown from the barren shorelines would be swept up the valley on the area's strong winds and seep into our homes and further degrade our lives. The EIS states that it would take an 80-mph wind to generate any fugitive dust from the shorelines of the operating reservoir, an assertion that doesn't pass the laugh test for anyone living in this rural landscape. What else has have they got wrong? Are we to be the guinea pigs for some ill-conceived experiment?

We are very concerned about the potential for fire. We live in a high fire hazard, and we take many precautions with our homes and properties to protect against fires. Many visitors, who would be visiting in summer when the land is hottest and driest, would not be aware of how easy it is to cause a wildfire in this landscape. Some would be careless with campfires, with cigarettes, with illegal fireworks, or with firearms, and wildfires would be inadvertently ignited. Their vehicles can start fires. Unfortunately, arson is possible. Our climate is getting drier. Larimer County must recognize the seriousness of this issue and deny this permit. The county cannot simply hope for the best because our homes, our property, our animals would all be put at unacceptable risk of wildfire due to construction, high visitation, and incomplete understanding. These increased risks would also cause increased demands on local emergency services, especially fire, medical, and law enforcement.

No project this big can be undertaken without significant and irreparable impacts. We ask Larimer County to be a good steward and deny this permit and prevent the loss of open space and wildlife habitat, increased risk of wildfires and other public safety hazards, increased demands on local volunteer emergency services, noise, light pollution where now there is little, increased development and traffic in ever-widening circles around the reservoir, reduced air quality, climate change, increased illegal activities such as trespass on adjacent private land, decreased property values, and the loss of unique visual and aesthetic values. The natural and rural quality of this land is very important to our lives and communities.
The impact of this project on the extremely important, extremely beautiful Poudre River would break my heart and make me angry. As a master naturalist I know the value of this wildlife corridor and Important Bird Area. Please do not jeopardize our natural environment.

Sincerely,

--
Mrs Sheila Webber
13sheilaw@gmail.com
2515 Sunbury Lane
Fort Collins, CO 80524

Save Rural NoCo Member

1839

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

NISP / 20-ZONE2657

1 message

mike.noonan@aspenconsultinginc.com <mike.noonan@aspenconsultinginc.com> Sat, May 16, 2020 at 8:08 AM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>

Rob,
I wanted to share my family's thoughts on the NISP project and proposal.

We live in Bonner Peak Ranch, and I am a native resident who is old enough to remember the dirt roads and weekend parties at Horsetooth. Likewise I have witnessed the tremendous growth over the years in our northern front range.

I work in the construction and infrastructure space, and like to think I take a balanced common sense approach to development and infrastructure planning. I also come from a ranching family who have valued water resources as a premium resource to conserve.

We look forward to the new reservoir in our community, and likewise understand the huge benefits the pipeline will bring to our downstream neighbors. The firm I work for (HDR) has supported various aspects of the NISP including the design of the new pipeline facilities. It is important to note that our relationship with NCWCD in no way affects my personal views on the benefits of the project.

We look forward to a more public setting to further engage with the County and our neighbors regarding the NISP.

Please consider our household as being firmly supportive of the current proposals for developing the NISP.

MICHAEL D. NOONAN
President
ASPEN CONSULTING SERVICES, INC.
Siting • Permitting • Acquisitions and Right of Way
P.O. Box 303 • Bellvue, CO 80512 • (970) 443-0164

RECEIVED May 15, 2020

MAY 21 2020

COMMISSIONERS' OFFICE

Dear Larimer County Commissioner,

Save Rural NoCo - Don't Support Glade Reservoir (Project No. 20-ZONE-2667)

We join the citizen's group "Save Rural NoCo" in asking the Larimer County Commissioners to deny the Northern Water's 1041 permit application for the Northern Integrated Supply Project and Glade Reservoir. The damage to communities, land, and water from this project will be widespread and permanent.

We encourage the Larimer County Commissioners to be proactive in supporting, not only the citizens they represent, but also the Poudre River, which struggles to support communities like the City of Fort Collins, and the rural lands of northern Colorado.

A number of communities and rural landowners lie near the proposed Glade Reservoir with its huge dam, forebay, and pumping station. Many more lie between the Glade Reservoir and the cities miles to the south that are slated to receive Poudre River water via 85 miles of pipeline. Still more lie along the reroute of Highway 287, a major federal highway that would tear through what is now rural open land.

Communities throughout northern Colorado will be harmed by 1) air, noise, light, and possibly water pollution; 2) loss of open space and wildlife habitat; 3) risk of wildfires and over-burdening of local emergency services; 4) increased development and traffic in relatively undeveloped areas, 5) loss of property access, 6) decreased property values, 7) loss of farmland, and 8) permanent damage to the aesthetics and character of northern Colorado, to name a few. The list of negative impacts is long, as is the list of affected communities.

In denying the NISP/Glade Reservoir project, the Larimer County Commissioners will avoid disturbing ecosystems—from the river and its riparian zone to the foothills, prairies, and farmlands; avoid permanently harming rural land uses; and avoid disrupting the communities residing in and around the sprawling pieces of this massive project.

We strongly urge the Larimer County Commissioners to reject Northern Water's 1041 permit application and, in doing so, join the citizens of Larimer County in supporting the health, vitality, and survival of rural northern Colorado communities, land, and water. It's never too late to do the right thing.

Respectfully,

Ms	Lynn	Utzman-Nichols	lynn.healthwrite@gmail.com
Ms	daniel	vigil	dnlvigil@mac.com
Mr	Weldon	Barker	weldonb2@att.net
Ms	Morgan	Moxley	moxleycats@aol.com
Mr	Charles	Kopp	charleskop@centurylink.net
Ms	Bill	Besser	bill.besser@gmail.com
Mr	Herb	Schaal	herb.schaal@bellvueemporium.com

Ms	Raye	Sullivan	raye.sullivan@gmail.com
Ms	diane	zuerlein	zuerzedlein9@gmail.com
Mr	Ray	Piira	rpiira@frii.com
Mrs	Anneke	Bierenbroodspot	mr.bierenbroodspot@planet.nl
Ms	Terry	Waters	terrywaters125@msn.com
Ms	Frances P	wright	fpwright@digis.net
Mr	William	Ringer	cringerster@gmail.com
Ms	Gabriel	Prizer	gprizer1@gmail.com
Ms	Adam	Nickel	elmowarrior99@rocketmail.com
Ms	Phillip	Chamberlain	chamberlainphillip@gmail.com
Mr	James	Boyd	springcreekdry@gmail.com
Ms	Catherine	Wilkins	lestertownsend@icloud.com
Mr	Wayne	Sundberg	sunddayres@outlook.com
Mr	Charles	Minks	crminks@outlook.com
Ms	David	Twedt	twedt@colostate.edu
Ms	carol	peacock	carolzpeacock@gmail.com
Mr	Bruce	Peacock	econ2357@gmail.com
Ms	Heather	Watson	teamfeather@gmail.com
Ms	Janet	Chapman	bicster2@gmail.com
Ms	susan	ferrari	FERRARI28@MSN.COM
Ms	Liz	Whitney	borderdog.annie@gmail.com
Mr	Matthew	Goldberg	mattgoldberg83@gmail.com
Mrs	Chloe	Andrews Goldberg	chloemail00@gmail.com
Ms	Ann	Ryan	anngryan@frii.com
Mr	Zachary	Gosnell	gosnelldentwerx@gmail.com
Mr	Jerry	Dauth	jerrydauth@gmail.com
Ms	Sara &	Stephen	john.sara.stephen@gmail.com
Mr	michael	hare	mhare123@msn.com
Mr	Ross	Lock	ralwildlifer@comcast.net
Ms	Amy	Jablonovsky	ajhessen73@gmail.com
Mr	David	Smeltzer	dcsmeltzer@yahoo.com
Ms	Ann	Murphy	ambaseballfan@gmail.com
Mr	Jeremy	Heineke	jheineke@gmail.com
Mrs	Colleen	Finnman	cfinnman1524@gmail.com

May 15, 2020

Mr	Doug	Finnman	dfinnman72@yahoo.com
Ms	Greg	Heiden	hydraulicman@atcjet.net
Mr	Lindsey	Wess	lindsey.wess@gmail.com
Ms	Susanne	Cordery	susannecordery@gmail.com
Mr	Steve	Bane	sbaneaz@aol.com
Ms	Rhea- Claire	Ferranti	rheaclaire@aol.com
Ms	Elissa	Douglas	Douglas.duo@gmail.com
Ms	Pam	Scinto	pamscinto@hotmail.com
Ms	Caroline	Francklyn	tigerlilly62@gmail.com
Mr	John	Tschirhart	cheerheart@msn.com
Ms	Patricia	Haley-Miller	trishhm@frii.com
Ms	RHEBA	MASSEY	massey@frii.com
Mr	Robert	Hufziger	rhufzige@rams.colostate.edu
Ms	Alan	Miller	alanm@frii.com
Ms	Janice	Haley	janicemhaley@hotmail.com
Ms	Darlena	Mortenson	Dar.Mortenson@gmail.com
Mr	Nathan	Troop	nattroop@hotmail.com
Ms	Steve	Carroll	s_s_carroll@msn.com
Mrs	Sheila	Webber	13sheilaw@gmail.com
Mr	Tom	Mackenzie	tom.mackenzie66@yahoo.com
Ms	Barbara	Denny	barbarawaves@gmail.com
Mr	Ethan	Hodgson	ethan.t.hodgson@gmail.com
Ms	Linn	Shaw	lss.gvm@gmail.com
Ms	Jane	Dege	jeddege@hotmail.com
Mr	Fred	Zipp	fzipp@frii.com
Mr	Jesse	Taylor	jtaylor@remingtontech.net
Ms	Nancy	Morgan	nmorgan522@gmail.com
Ms	Jennifer	Sunderland	jennifer@woollygoatfarm.com
Mr	Al	Judd	Ajudd002@gmail.com
Ms	Kurt	Buss	KURTBUSS@GMAIL.COM
Mr	AJ	Romero	naturezwayz.aho00@outlook.com
Mrs	Jennifer	Romero	jenniferromero@outlook.com
Ms	Pamela	May	pm9008@gmail.com
Mr	Gerald	Pitter	gp6165@gmail.com

Mr	Josh	Henriksen	joshrhenriksen@gmail.com
Ms	Dottie	Boscamp	dottieboscamp@gmail.com
Ms	Christine	Noble Lehmann	chrissie.lehmann1@gmail.com
Mr	James	Cox	jimc0818@gmail.com
Ms	ANDREW	BLANTON	ajbtone@yahoo.com
Ms	Robin	MacDonald	bellvuerobin@gmail.com
Ms	Karen	Wheeler	skyband0@q.com
Ms	Gloria	Edwards	canyonglo@gmail.com
Dr.	Jacqueline	Voss	jacque@bonnersprings.net
Mr	Thomas	Hilinski	tom.hilinski@gmail.com
Mr	Tom	Forbes	thomasjforbes@mac.com
Ms	Marcia	Donnan	Marcia@DonnanLTD.com
Mr	Stefan	Ellis	Stellis99@gmail.com
Ms	Yvette	Nout-Lomas	ysnout@gmail.com
Mrs	Dianne	Baldwin	dhbaldwin57@gmail.com
Ms	Laura	Prechel	prechellm@gmail.com
Mr	John	Calderazzo	john.calderazzo@colostate.edu
Ms	Linda	Best	lindakaybest@gmail.com
Mr	Joel	Peterson	skyview.moose@gmail.com
Mr	R Warren	Lemerich	warrenlemerich@gmail.com
Ms	Charmaine	Stavedahl	stavedahlc@gmail.com
Ms	Elaine	Spencer	espencer@frii.com
Mrs	Mina	Holley	minalholley@gmail.com
Mr	Gregory	Holley	gcholleycolorado@gmail.com
Mr	William	Embrey	williamembrey4@gmail.com
Mrs	Miriam	Gassman	msgluna1964@gmail.com
Mr	cris	peterson	crispetrson9@gmail.com
Ms	Neil	Bright	neilbright@gmail.com
Ms	Sarah	Yaneza	sarahbyaneza@gmail.com
Ms	Robin	McGehee	onlyairedales@gmail.com
Ms	SueEllen	Campbell	sueellen.campbell@colostate.edu
Ms	Christina	Pender	ckloukides@gmail.com
Mr	Tom	Jennings	tjmacky@mailmt.com
Ms	Kristen	Michaels	kristen.michaels@gmail.com

May 15, 2020

Ms	Christine	Proulx	redpanda5@juno.com
Ms	Michelle	Proulx	boomer-hunter@juno.com
Dr.	Della	Garelle	dgarelle@gmail.com
Dr.	Shelley	Coldiron	shelley.coldiron@gmail.com
Mrs	Elaine	Embrey	emb5ela@gmail.com
Ms	Kari Jo	Mc Inturff	lakota.mcinturff37@gmail.com
Ms	Nancy	Mulvany	mulvany@protonmail.com
Ms	Mary	Humstone	humstone@gmail.com
Mr	Scott	Brooks	rafterbrooks@yahoo.com
Mrs	Heather	Henke	heatherlhenke@gmail.com
Ms	Linda	Bevard	bevard.linda@gmail.com
Ms	Kathleen	Dapkus	dapkuseckert@gmail.com
Dr.	Christian	Weder	cdweder@gmail.com
Ms	Catherine	Grime	cathy@cathygrimes.com
Mrs	Gail	Ford	sonomafords@comcast.net
Mr	Mathew	Lomas	azteckeeper@gmail.com
Ms	Elsbeth	O'Fallon	lv2che@yahoo.com
Ms	Joel	Meeter	joelmeeter@gmail.com
Ms	Susan	Barbour	sebarbour56@msn.com
Ms	Pam	Cruse	pjody@lpbroadband.net
Mx.	Scot	Lee	scotlee@frii.com
Ms	Karyn	Coppinger	kcoppinger31@gmail.com
Ms	Linda Jacque	Jacque	jacque2@comcast.net
Ms	Cheryl	Costigan	Hklbrries@gmail.com
Ms	Carolyn	Stienmier	cstienmier@gmail.com
Ms	Lisa	Bright	lisajulianne@gmail.com
Dr.	Ryan	Bright	rbright970@gmail.com
Dr.	Janice	Bright	jmbright@colostate.edu
Mr	Rodger	Ames	rodger.b.ames@gmail.com
Mr	Grant	Campbell	roy@bonnersprings.net
Ms	Joanne	Lishman	gimpy3201@gmail.com
Ms	Tara	Parr	taralparr@gmail.com
Dr.	Ronald	Bright	rnjbright@msn.com
Mr	William	Snodgrass	William@Snodgrass.com

May 15, 2020

Mr	Jerry	Lynch	cptlynch4@gmail.com
Mr	Richard	Wollam	richw@digis.net
Ms	Vincent	Fayad	fayadcattle@gmail.com
Ms	Jesse	Etters	jettyice2@hotmail.com
Ms	Kay	Mikesky	factualfitness@yahoo.com
Dr.	Tom	Sale	TSale@engr.colostate.edu
Mr	Brent	Hawley	bhawley@frii.com
Ms	Brett	Spencer	brett.spencer@colorado.edu
Mrs	rose	brinks	rosebrinks@gmail.com
Mr	neal	spencer	neal@usa.net
Dr.	Alan	Mikesky	amikesky@iupui.edu
Ms	Elizabeth	Ashbach	ivylane1934@gmail.com
Ms	Theresa	Meyer	love2syt@gmail.com
Ms	Amy	Stultz	amysingrey@yahoo.com
Ms	Rose	Walker	rosew9252@msn.com
Ms	Noelle	Douglass	tonoelle@msn.com
Mr	steve	miller	Parrhesia80@protonmail.com
Ms	Jeanette	Jojola	jvjojola@hotmail.com
Ms	Patricia	Buchenberger	pattymb222@gmail.com
Mr	Josh	Griego	jogr_98@yahoo.com
Ms	Stella	Vigil	starwatcher2413@icloud.com
Ms	Carole	Meeter	campl41@yahoo.com
Mr	Tom	Petsja	tom.petska@verizon.net
Ms	Linda	Griego	linda.griego@earth2man.com
Mr	John	Dettenwanger	jjdettenwanger@gmail.com

136K

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Do Not Approve NISP 1041 Project No. 20-ZONE 2- Save Our Rural Northern Colorado

1 message

Renatta Griego <griegorenatta@gmail.com> Sun, May 17, 2020 at 2:30 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

Hello,

I live on County Road 29C with my three young children and have MAJOR concerns with the proposed Glade Project and the negative impacts that would occur to my family if the project moves forward.

In general, my concern is that the scope and scale of this proposed project, if approved, would have significant, detrimental, and permanent impact on this rural community, environment, and the lifestyle we enjoy today and desire to have in the future.

The primary benefits of this proposed reservoir would be enjoyed by the 15 subscriber towns or agencies that receive the proposed Glade water. Most of these towns and agencies are outside Larimer County. The most obvious and intense costs would be borne by local and other surrounding communities.

Specifically, our rural environment we believe would be negatively impacted in the following ways:

1) Noise - The rerouted highway over the most eastern hogback would have an unobstructed view from residences in the foothills, there would be no middle hogback to block truck and auto noise. The NISP publications suggest that recreation would include motorboats and jet skis. Boats and skis are loud, they would likely be louder than current road traffic.

2) Light Pollution – This rural area enjoys fairly dark skies. The proposed recreational activities would generate significant exterior lighting for boats, facilities, camping, pumping facilities, traffic, etc. and headlights from traffic coming down the hogback on the rerouted 287 would shine into the adjacent private property. This could destroy the enjoyment of our night skies.

3) New development - We do not know what sort of development would occur near and north of proposed Glade. The rerouted highway 287 would invite more residential development on the plains. The reservoir would invite more development in the adjacent foothills and valleys. It's not inconceivable that more commercial development catering to visitors would encroach into currently uncommercialized lands, forever altering the rural nature of the area.

4) Trespass – Plans for proposed Glade project almost 400,000 visitors per year. This would include boaters, campers, fishers and hikers and bikers, among others. There is every reason to believe that not all these visitors would stay within the confines of designated recreational areas. Some visitors are likely to explore the inviting foothills that border the reservoir and trespass, however inadvertently, on our private property.

5) Wildlife – Proposed Glade would become a significant barrier to the permanent and migratory herds of deer and elk that reside in our area and would be disruptive to other wildlife. In a world where wildlife and nature are under stress, and is diminishing generally owing to human activities, should we be contributing to those activities for unnecessary purposes? We encourage the county to find alternatives that don't result in the significant loss of open space and wildlife habitat that this project would cause.

6) Wildfires – In this century three major wildfires burned over 100,000 acres on and around Glade. Two of the three forest fires were caused by careless people. Can we rely on the >1000 daily visitors to proposed Glade to be careful?

7) Emergency response – The recreation on the proposed reservoir is projected to be almost 400,000 visitors per year.

Such a large increase in recreationalists would likely increase the number of emergency calls thereby further stretching emergency response agency resources. Costs would be borne by Larimer County taxpayers, and emergency services that are diverted to Glade would not be readily available to serve the local communities.

8) Air quality – Because Glade would have junior water rights, the water level of the proposed reservoir would be highly variable, unlike Horsetooth. The water level frequently would drop precipitously, often changing proposed Glade Reservoir to Glade Mudflats, and could stay that way for years. The large “bathtub ring” that would materialize around the reservoir would become dry soil that would blow in our strong winds causing air quality and visual concerns. The hundreds or thousands of vehicles that would travel to the area emit gases, particulates, and ozone precursors (i.e., health hazards).

9) Climate change – the pumps, the construction vehicles, the recreational vehicles: the project would result in considerable burning of fossil fuels, forever, and the emission of greenhouse gases. The pumping stations alone would emit the equivalent of adding 7000 GHG emitting cars at a time when Colorado is implementing zero emissions vehicle standards.

10) State Land Usage - The large area of state land west of the proposed reservoir is devoted to hunting and cattle grazing. The state and federal lands in this region of northern Colorado provide abundant and easily accessible opportunities for recreation, which we gratefully utilize. Impacts to use of or access to the state land is a negative impact to our communities.

11) Aesthetic - The drive from Livermore to Laporte would no longer be through the heritage rangeland and the familiar hogbacks. Since the proposed reservoir would likely be only partially filled much of the time, instead of beautiful hogbacks and grassy foothills, our viewshed would be marred by the barren sides (bathtub ring) and murky surface of a partially filled reservoir.

12) Lack of combined Project evaluation/coordination - There is no apparent coordination of the NISP or the proposed Seaman’s expansion or the Halligan expansion. All these projects surround our properties and would leave us on a peninsula of land cut from the rural environment we now enjoy. We met with the City of Greeley in August 2018 and learned that they are not planning to cooperate with other cities due to “challenges” and are proceeding on an expansion of Seamen’s reservoir from 5,000 to 80,000 acre-feet. In the 21st century, surface storage just doesn’t make sense; this is a semi-arid climate that is getting drier. Alternatives are available and should be seriously considered.

13) Social justice - While the benefits of proposed Glade would be enjoyed by people who live and work far from the reservoir site, the costs would be borne by those whose quality of life would be severely lessened.

14) Conservation and Alternatives – Conservation is not begin adequately considered. While the Colorado Front Range is land-rich for development, it is semi-arid and thus water-limited. About 2/3 of the Poudre is already taken out, and Glade would take another 40% of what’s left. Yet another reservoir is nothing but a temporary fix for a small portion of the state’s water needs; but one with permanent, destructive impacts on a large part of rural northern Colorado. The time is way past due for developing long-term solutions based on state-of-the-art technologies and widespread education on the absolute necessity to conserve water, and to stop relying on 19th century solutions for 21st century challenges.

PLEASE...the Larimer County Commissioners must save our rural communities and be good stewards of our natural resources by saying no Glade Reservoir!

Sincerely,

--
Ms Renatta Griego
griegorenatta@gmail.com
6401 N. County Road 29C
Bellvue, CO 80512

Save Rural NoCo Member

1849

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

Lucas Griego <lgriego04@gmail.com> Sun, May 17, 2020 at 2:08 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick
Hello,

I am a landowner residing in northern Larimer County - unfortunately, on County Road 29C next to the proposed location of Glade Reservoir, it's massive dam, forebay, pumps, pipelines, campgrounds, parking lots, boat ramps, and other facilities. I STRONGLY urge the Board of County Commissioners to deny the 1041 permit for the Northern Integrated Supply Project because it would forever impact the fundamental nature of the rural landscape in which I live and will harm my quality of life and those neighbors in this neighborhood.

I chose to live in northern Colorado for its beautiful natural landscapes, its wild and scenic rivers, it's clean air and quiet surroundings, its wildlife, its opportunities for outdoor recreation on the abundant state and federal lands in the area. These are key pieces to the quality of life; key pieces that would be lost if this project is constructed and operated as proposed. This land, the water, and the communities would be harmed by this project, and any benefits of the project would accrue to communities mostly outside Larimer County.

It is unacceptable that our rural northern Colorado communities must bear the impacts and unmitigable risks of this massive and ill-conceived project, the biggest ever proposed for Larimer County.

If construction is executed as planned, there would be seven years of heavy construction impacting our communities. We would be subjected to lots of heavy truck traffic, since the main artery to and from the reservoir site is Highway 287, which is also our main route; 6-days-a-week heavy traffic and heavy machinery operations, and the unwelcome, intrusive, and obnoxious presence of widespread and large-scale construction activity, noise, dust, and danger, over a long period of time. The intrusion would turn the hundreds of acres of the landscape into a construction zone, and take away the attractiveness, the clean air, the quiet – the things we depend on for health and happiness.

Encouraging almost 400,000 visitors per year to this area would alter it from the quiet, rural and sparsely populated landscape we sought and invested in, to a busy recreational area with noise, dust, traffic, activity, accidents, and fires. Noise from motorboats on Glade would exceed state standards, would be heard miles away, and would significantly disrupt our lives. There is no doubt that the noise would cause my property value to decline.

That is if the reservoir fills. The photographs Northern Water shows of a beautiful full reservoir are misleading at best, because the reservoir would rarely, if ever, look like that. It would generally look like an abandoned industrial facility marring the area's aesthetics.

Since the reservoir would not fill, and likely would not be full during much of its life, the project would look like an abandoned muddy puddle much of the time, and the recreational facilities would be mostly empty. Who would pay for the upkeep of the unused recreational facilities, Larimer County taxpayers? The project ruins the aesthetics of the valley and hogbacks – a unique and beautiful landscape – for a project that would provide little or no benefit to Larimer County and in fact would negatively impact its residents and its coffers.

Dust blown from the barren shorelines would be swept up the valley on the area's strong winds and seep into our homes and further degrade our lives. The EIS states that it would take an 80-mph wind to generate any fugitive dust from the shorelines of the operating reservoir, an assertion that doesn't pass the laugh test for anyone living in this rural landscape. And worse, they plan on using fly ash to build much of the concrete structures, which can do major health harm to many of the mostly retired folks living on County Road 29C, who have been diagnosed with medical breathing difficulties of one kind or another. Are we to be the guinea pigs for some ill-conceived experiment and will this open up Larimer County to a class action lawsuit?

My neighborhood is very concerned about the potential for fire. We live in a high fire hazard, and we take many precautions with our homes and properties to protect against fires. Many visitors would be careless with campfires, cigarettes, with illegal fireworks, or with firearms, and wildfires would be inadvertently ignited. Their vehicles can start fires. Unfortunately, arson is possible. Our climate is getting drier. Larimer County must recognize the seriousness of this issue and deny this permit. The county cannot simply hope for the best because our homes, our property, our animals would all be put at unacceptable risk of wildfire due to construction, high visitation, and incomplete understanding. These increased risks would also cause increased demands on local emergency services, especially fire, medical, and law enforcement.

No project this big can be undertaken without significant and irreparable impacts. I am asking Larimer County to be a good steward and deny this permit and prevent the loss of open space and wildlife habitat, increased risk of wildfires and other public safety hazards, increased demands on local volunteer emergency services, noise, light pollution where now there is little, increased development and traffic in ever-widening circles around the reservoir, reduced air quality, climate change, increased illegal activities such as trespass on adjacent private land, decreased property values, and the loss of unique visual and aesthetic values. The natural and rural quality of this land is very important to our lives and communities.

Sincerely,

--
Mr Lucas Griego
lgriego04@gmail.com
6401 N. County Road 29C
Bellvue, CO 80512

Save Rural NoCo Member

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

Christina Pender <ckloukides@gmail.com> Sun, May 17, 2020 at 12:16 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

NOT BLIND OPPOSITION TO PROGRESS, BUT OPPOSITION TO BLIND PROGRESS.

This is an incredibly poorly-thought project from its very beginning. It is UNACCEPTABLE that our rural northern Colorado communities must bear the impacts and risks of this massive and ill-conceived project, the biggest ever proposed for Larimer County.

I'm a landowner residing in northern Larimer County, near the proposed location of Glade Reservoir, its massive dam, forebay, pumps, pipelines, campgrounds, parking lots, boat ramps, and other facilities. We strongly urge the Board of County Commissioners to DENY the 1041 permit for the Northern Integrated Supply Project because it would forever impact the fundamental nature of the rural landscape in which we live and harm our quality of life.

We choose to live in northern Colorado for its beautiful natural landscapes, its wild and scenic rivers, its clean air and quiet surroundings, its wildlife, its opportunities for outdoor recreation on the abundant state and federal lands in the area. These are key pieces to our quality of life; key pieces that would be lost if this project is constructed and operated as proposed. Our land, water, and communities would be harmed by this project, and any benefits of the project would accrue to communities mostly outside Larimer County.

If construction is executed as planned, there would be seven years of heavy construction impacting our communities. We would be subjected to unbearable heavy truck traffic, since the main artery to and from the reservoir site is Highway 287, our main route; 6-days-a-week heavy traffic and heavy machinery operations, and the unwelcome, intrusive, and obnoxious presence of widespread and large-scale construction activity, noise, dust, and danger, over a long period of time. The intrusion would turn the hundreds of acres of the landscape into a construction zone, and take away the attractiveness, the clean air, the quiet – the things we depend on for health and happiness.

Northern Water is currently buying farms in northern Colorado to make up a more than 50% shortfall in the water rights needed for a successful project. In addition, recent prolonged droughts, which are becoming more common, have affected the amount of water that would be available from the Poudre River and other sources. For us, this means that we would endure the years and years of construction, and the IRREPARABLE LOSS of the unique landscape in which we live, all for an unfulfilled promise that "if they build it, the water would come" which is NOT guaranteed. The water shortage will only get worse as the climate dries. Larimer County should DENY this project, which will likely fail to meet its objectives.

Encouraging almost 400,000 visitors per year to this area would FOREVER ALTER it from the quiet, rural and sparsely populated landscape we sought and invested in, to a busy recreational area with noise, dust, traffic, activity, accidents, and fires. Noise from motorboats on Glade would exceed state standards, would be heard miles away, and would significantly disrupt our lives. For some owners, the noise would cause property values to decline.

That's if the reservoir fills. The photographs Northern Water shows of a beautiful full reservoir are misleading because the reservoir would rarely, if ever, look like that. The project ruins the aesthetics of the valley and hogbacks – a unique and beautiful landscape – for a project that would provide little or no benefit to Larimer County, and in fact would negatively impact its residents and its coffers.

The project would also contribute to climate change and increase air pollution. Over 30,000 tons per year of CO_2 would be emitted by engines to pump water into Glade. High levels of greenhouse gases would be produced, both during construction and daily operation.
We are very concerned about the potential for fire, having endured the disastrous High Park Fire of 2012. We live in a

high fire hazard area, and we take many precautions with our homes and properties to protect against wildfires. Many visitors, who would be visiting in summer when the land is hottest and driest, would not be aware of how easy it is to cause a wildfire in this landscape. Some would be careless with campfires, cigarettes, illegal fireworks, or firearms, and wildfires could easily ignite. Their vehicles can start fires. Unfortunately, arson is possible. Our climate is getting drier. Larimer County must recognize the seriousness of this issue and DENY this permit. These increased risks would also cause increased demands on local emergency services, especially fire, medical, and law enforcement.

No project this big can be undertaken without significant and irreparable impacts. We ask Larimer County to be a good steward and deny this permit and prevent the loss of open space and wildlife habitat, increased risk of wildfires and other public safety hazards, increased demands on local volunteer emergency services, noise, light pollution where now there is little, increased development and traffic in ever-widening circles around the reservoir, reduced air quality, climate change, increased illegal activities such as trespass on adjacent private land, decreased property values, and the loss of unique visual and aesthetic values.

The natural and rural quality of this land is very important to our lives and communities.

VOTE NO ON THIS ILL-CONCEIVED PLAN THAT WILL FOREVER DESTROY OUR LAND.

Sincerely,

--
Ms Christina Pender
ckloukides@gmail.com
321 Redstone Drive
Bellvue, CO 80512

Save Rural NoCo Member

Rob Helmick <helmicrp@co.larimer.co.us>

Do Not Approve NISP 1041 Project No. 20-ZONE 2- Save Our Rural Northern Colorado

1 message

Vincent Fayad <fayadcattle@gmail.com> Mon, May 18, 2020 at 6:39 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

We are landowners residing in the area of the proposed Glade reservoir that have concerns with the proposed Glade Project and the negative impacts that would occur if the project moves forward.

The primary benefits of this proposed reservoir would be enjoyed by the 15 subscriber towns or agencies that receive the proposed Glade water. Most of these towns and agencies are outside Larimer County. The most obvious and intense costs would be borne by local and other surrounding communities.

In general, our concerns are that the scope and scale of this proposed project, if approved, would have significant, detrimental, and permanent impact on our rural community, environment, and lifestyle we enjoy today and desire to have in the future.

Specifically, our rural environment we believe would be negatively impacted in the following ways:

1) Noise - The rerouted highway over the most eastern hogback would have an unobstructed view from residences in the foothills, there would be no middle hogback to block truck and auto noise. The NISP publications suggest that recreation would include motorboats and jet skis. Boats and skis are loud, they would likely be louder than current road traffic.

2) Light Pollution – This rural area enjoys fairly dark skies. The proposed recreational activities would generate significant exterior lighting for boats, facilities, camping, pumping facilities, traffic, etc. and headlights from traffic coming down the hogback on the rerouted 287 would shine into the adjacent private property. This could destroy the enjoyment of our night skies.

3) New development - We do not know what sort of development would occur near and north of proposed Glade. The rerouted highway 287 would invite more residential development on the plains. The reservoir would invite more development in the adjacent foothills and valleys. It's not inconceivable that more commercial development catering to visitors would encroach into currently uncommercialized lands, forever altering the rural nature of the area.

4) Trespass – Plans for proposed Glade project almost 400,000 visitors per year. This would include boaters, campers, fishers and hikers and bikers, among others. There is every reason to believe that not all these visitors would stay within the confines of designated recreational areas. Some visitors are likely to explore the inviting foothills that border the reservoir and trespass, however inadvertently, on our private property.

5) Wildlife – Proposed Glade would become a significant barrier to the permanent and migratory herds of deer and elk that reside in our area and would be disruptive to other wildlife. In a world where wildlife and nature are under stress, and is diminishing generally owing to human activities, should we be contributing to those activities for unnecessary purposes? We encourage the county to find alternatives that don't result in the significant loss of open space and wildlife habitat that this project would cause.

6) Wildfires – In this century three major wildfires burned over 100,000 acres on and around Glade. Two of the three forest fires were caused by careless people. Can we rely on the >1000 daily visitors to proposed Glade to be careful?

7) Emergency response – The recreation on the proposed reservoir is projected to be almost 400,000 visitors per year. Such a large increase in recreationalists would likely increase the number of emergency calls thereby further stretching emergency response agency resources. Costs would be borne by Larimer County taxpayers, and emergency services

that are diverted to Glade would not be readily available to serve the local communities.

8) Air quality – Because Glade would have junior water rights, the water level of the proposed reservoir would be highly variable, unlike Horsetooth. The water level frequently would drop precipitously, often changing proposed Glade Reservoir to Glade Mudflats, and could stay that way for years. The large “bathtub ring” that would materialize around the reservoir would become dry soil that would blow in our strong winds causing air quality and visual concerns. The hundreds or thousands of vehicles that would travel to the area emit gases, particulates, and ozone precursors (i.e., health hazards).

9) Climate change – the pumps, the construction vehicles, the recreational vehicles: the project would result in considerable burning of fossil fuels, forever, and the emission of greenhouse gases. The pumping stations alone would emit the equivalent of adding 7000 GHG emitting cars at a time when Colorado is implementing zero emissions vehicle standards.

10) State Land Usage - The large area of state land west of the proposed reservoir is devoted to hunting and cattle grazing. The state and federal lands in this region of northern Colorado provide abundant and easily accessible opportunities for recreation, which we gratefully utilize. Impacts to use of or access to the state land is a negative impact to our communities.

11) Aesthetic - The drive from Livermore to Laporte would no longer be through the heritage rangeland and the familiar hogbacks. Since the proposed reservoir would likely be only partially filled much of the time, instead of beautiful hogbacks and grassy foothills, our viewshed would be marred by the barren sides (bathtub ring) and murky surface of a partially filled reservoir.

12) Lack of combined Project evaluation/coordination - There is no apparent coordination of the NISP or the proposed Seaman’s expansion or the Halligan expansion. All these projects surround our properties and would leave us on a peninsula of land cut from the rural environment we now enjoy. We met with the City of Greeley in August 2018 and learned that they are not planning to cooperate with other cities due to “challenges” and are proceeding on an expansion of Seamen’s reservoir from 5,000 to 80,000 acre-feet. In the 21st century, surface storage just doesn’t make sense; this is a semi-arid climate that is getting drier. Alternatives are available and should be seriously considered.

13) Social justice - While the benefits of proposed Glade would be enjoyed by people who live and work far from the reservoir site, the costs would be borne by those whose quality of life would be severely lessened.

14) Conservation and Alternatives – Conservation is not begin adequately considered. While the Colorado Front Range is land-rich for development, it is semi-arid and thus water-limited. About 2/3 of the Poudre is already taken out, and Glade would take another 40% of what’s left. Yet another reservoir is nothing but a temporary fix for a small portion of the state’s water needs; but one with permanent, destructive impacts on a large part of rural northern Colorado. The time is way past due for developing long-term solutions based on state-of-the-art technologies and widespread education on the absolute necessity to conserve water, and to stop relying on 19th century solutions for 21st century challenges.

The Larimer County Commissioners must save our rural communities and be good stewards of our natural resources by saying no Glade Reservoir!

Sincerely,

--
Ms Vincent Fayad
fayadcattle@gmail.com
3263 W. County Road 60
Fort Collins, CO 80524

Save Rural NoCo Member

1855

Rob Helmick <helmicrp@co.larimer.co.us>

NISP Pipeline

1 message

Essay, Isaac I <Isaac.Essay@gs.com> Mon, May 18, 2020 at 10:50 AM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>

Hi Rob,

I am sending you a brief email today regarding the proposal to run the NISP pipeline through Eagle Lake Subdivision. Please don't do that.

It is unnecessary and unfair to cause so much disruption to one neighborhood when there are alternatives. Finally, I believe a decision on NISP should be done after we know what Thornton is going to do. It sure makes sense to me that there should be some coordination there.

Thanks for taking the time to read this email.

Isaac

Isaac Essay

VP, Senior Wealth Advisor

Goldman Sachs Personal Financial Management

Consumer and Investment Management Division

412 W. Mountain Avenue

Fort Collins, CO 80521

Phone: 970-484-8806

Email: Isaac.essay@gs.com

Website: goldmanpfm.com/co1

Blog | LinkedIn | YouTube | Twitter | Facebook

1857

Rob Helmick <helmicrp@co.larimer.co.us>

Pipeline

morganmauro via Planning Commission Board <pcboard@co.larimer.co.us> Tue, May 19, 2020 at 8:33 PM
Reply-To: morganmauro@aol.com
To: "pcboard@larimer.org" <pcboard@larimer.org>

We are losing our way of life on a daily basis up here. This is an awful idea. This river is our home. My great, great grandparents settled on this river in the 1800's and the water loss is going to ruin the habitat. I am not a NIMBY and believe development is important, but this is a terrible thing that could happen to our community.
Please vote against this.
Cherylann Morgan

1858

Rob Helmick <helmicrp@co.larimer.co.us>

NISP, Thornton Pipeline and other 19th-century infrastructure ideas

'Karen Kalavity' via Planning Commission Board <pcboard@co.larimer.co.us> Tue, May 19, 2020 at 12:55 PM
Reply-To: Karen Kalavity <integradesign1@yahoo.com>
To: "pcboard@larimer.org" <pcboard@larimer.org>, "bocc@larimer.org" <bocc@larimer.org>

NISP, Thornton Pipeline and other 19th-century infrastructure ideas...

We are in the 21st century, not the 19th or 20th century. We need to plan for environmentally - friendly "green infrastructure", not environmentally-destructive 19th and 20th century infrastructure.

Bulldozing ecosystems and installing pipes to transport water and construct new dams is old century stuff.

Let's start using our heads and good design, and move water from existing waterways from into places in a cost-effective and environmentally effective way. Use the existing rivers to transport water....that is what they are there for and they are already there!

Also, let's respect the nature and the environment that brought us all here in the first place, not convert Colorado's front-range into a high-density version of New York City or L.A.

Let's keep Colorado being Colorado! Stop the high density and environmental nonsense. Please use earth-friendly and sensible design and implementation practices!

Thanks,
Karen

1859

Rob Helmick <helmicrp@co.larimer.co.us>

Please Suspend NISP Permitting During COVID-19 Pandemic

1 message

Will Becker <will.becker84111@everyactioncustom.com> Tue, May 19, 2020 at 1:14 PM
Reply-To: will.becker84111@gmail.com
To: rhelmick@larimer.org

Dear Community Development Rob Helmick,

I am writing in objection to Larimer County's triggering of the 1041 permitting process for the Northern Integrated Supply Project (NISP). It is incredible that despite Larimer County itself declaring a formal emergency and stay-at-home order and the Governor of Colorado declaring a "State of Emergency" due to the COVID-19 pandemic, that the County is choosing to move forward with this permit on a normal timeline. NISP is by far the most controversial project in the history of Larimer County, and it will likely generate thousands of comments and hundreds of people wanting to appear at public hearings that cannot be held at this time. The NISP project has been in some form of the Federal, State, and County permitting process for 17 years and the public deserves a full, transparent, and normal permit process that is not rushed and unduly affected by the current COVID-19 pandemic.

I believe that the Governor's declaration of an official "State of Emergency," as well as the County's own emergency powers, gives you broad discretion to suspend the permitting process, and I encourage you to take this action as soon as possible. Attempting to hold a public permitting process during this pandemic, when the citizens of Larimer County and state of Colorado are under a stay-at-home order and a formally declared emergency is not only one of the most tone-deaf actions this County has taken in its history, it is most likely illegal. No meaningful public process could be completed under these conditions and if County citizens are to believe that its government is acting in good faith, this permit process must be suspended.

This project would significantly affect the Poudre River and it is actively being opposed by river-protection and river-recreation groups, and there is broad opposition to NISP from homeowners around the proposed reservoir, neighbors along Highway 287, and homeowners along proposed pipeline routes. I respectfully request that you "suspend" the 1041 permitting process for NISP during this COVID-19 pandemic and that you conduct a real and meaningful public process once the pandemic has abated.

Sincerely,
Will Becker
Salt Lake City, UT 84115
will.becker84111@gmail.com

Rob Helmick <helmicrp@co.larimer.co.us>

Do Not Approve NISP 1041 Project No. 20-ZONE 2- Save Our Rural Northern Colorado

1 message

Robin MacDonald <bellvuerobin@gmail.com> Thu, May 21, 2020 at 2:38 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

We are landowners residing in the area of the proposed Glade reservoir that have concerns with the proposed Glade Project and the negative impacts that would occur if the project moves forward.

The primary benefits of this proposed reservoir would be enjoyed by the 15 subscriber towns or agencies that receive the proposed Glade water. Most of these towns and agencies are outside Larimer County. The most obvious and intense costs would be borne by local and other surrounding communities.

In general, our concerns are that the scope and scale of this proposed project, if approved, would have significant, detrimental, and permanent impact on our rural community, environment, and lifestyle we enjoy today and desire to have in the future.

Specifically, our rural environment we believe would be negatively impacted in the following ways:

1) Noise - The rerouted highway over the most eastern hogback would have an unobstructed view from residences in the foothills, there would be no middle hogback to block truck and auto noise. The NISP publications suggest that recreation would include motorboats and jet skis. Boats and skis are loud, they would likely be louder than current road traffic.

2) Light Pollution – This rural area enjoys fairly dark skies. The proposed recreational activities would generate significant exterior lighting for boats, facilities, camping, pumping facilities, traffic, etc. and headlights from traffic coming down the hogback on the rerouted 287 would shine into the adjacent private property. This could destroy the enjoyment of our night skies.

3) New development - We do not know what sort of development would occur near and north of proposed Glade. The rerouted highway 287 would invite more residential development on the plains. The reservoir would invite more development in the adjacent foothills and valleys. It's not inconceivable that more commercial development catering to visitors would encroach into currently uncommercialized lands, forever altering the rural nature of the area.

4) Trespass – Plans for proposed Glade project almost 400,000 visitors per year. This would include boaters, campers, fishers and hikers and bikers, among others. There is every reason to believe that not all these visitors would stay within the confines of designated recreational areas. Some visitors are likely to explore the inviting foothills that border the reservoir and trespass, however inadvertently, on our private property.

5) Wildlife – Proposed Glade would become a significant barrier to the permanent and migratory herds of deer and elk that reside in our area and would be disruptive to other wildlife. In a world where wildlife and nature are under stress, and is diminishing generally owing to human activities, should we be contributing to those activities for unnecessary purposes? We encourage the county to find alternatives that don't result in the significant loss of open space and wildlife habitat that this project would cause.

6) Wildfires – In this century three major wildfires burned over 100,000 acres on and around Glade. Two of the three forest fires were caused by careless people. Can we rely on the >1000 daily visitors to proposed Glade to be careful?

7) Emergency response – The recreation on the proposed reservoir is projected to be almost 400,000 visitors per year. Such a large increase in recreationalists would likely increase the number of emergency calls thereby further stretching emergency response agency resources. Costs would be borne by Larimer County taxpayers, and emergency services

that are diverted to Glade would not be readily available to serve the local communities.

8) Air quality – Because Glade would have junior water rights, the water level of the proposed reservoir would be highly variable, unlike Horsetooth. The water level frequently would drop precipitously, often changing proposed Glade Reservoir to Glade Mudflats, and could stay that way for years. The large “bathtub ring” that would materialize around the reservoir would become dry soil that would blow in our strong winds causing air quality and visual concerns. The hundreds or thousands of vehicles that would travel to the area emit gases, particulates, and ozone precursors (i.e., health hazards).

9) Climate change – the pumps, the construction vehicles, the recreational vehicles: the project would result in considerable burning of fossil fuels, forever, and the emission of greenhouse gases. The pumping stations alone would emit the equivalent of adding 7000 GHG emitting cars at a time when Colorado is implementing zero emissions vehicle standards.

10) State Land Usage - The large area of state land west of the proposed reservoir is devoted to hunting and cattle grazing. The state and federal lands in this region of northern Colorado provide abundant and easily accessible opportunities for recreation, which we gratefully utilize. Impacts to use of or access to the state land is a negative impact to our communities.

11) Aesthetic - The drive from Livermore to Laporte would no longer be through the heritage rangeland and the familiar hogbacks. Since the proposed reservoir would likely be only partially filled much of the time, instead of beautiful hogbacks and grassy foothills, our viewshed would be marred by the barren sides (bathtub ring) and murky surface of a partially filled reservoir.

12) Lack of combined Project evaluation/coordination - There is no apparent coordination of the NISP or the proposed Seaman’s expansion or the Halligan expansion. All these projects surround our properties and would leave us on a peninsula of land cut from the rural environment we now enjoy. We met with the City of Greeley in August 2018 and learned that they are not planning to cooperate with other cities due to “challenges” and are proceeding on an expansion of Seamen’s reservoir from 5,000 to 80,000 acre-feet. In the 21st century, surface storage just doesn’t make sense; this is a semi-arid climate that is getting drier. Alternatives are available and should be seriously considered.

13) Social justice - While the benefits of proposed Glade would be enjoyed by people who live and work far from the reservoir site, the costs would be borne by those whose quality of life would be severely lessened.

14) Conservation and Alternatives – Conservation is not begin adequately considered. While the Colorado Front Range is land-rich for development, it is semi-arid and thus water-limited. About 2/3 of the Poudre is already taken out, and Glade would take another 40% of what’s left. Yet another reservoir is nothing but a temporary fix for a small portion of the state’s water needs; but one with permanent, destructive impacts on a large part of rural northern Colorado. The time is way past due for developing long-term solutions based on state-of-the-art technologies and widespread education on the absolute necessity to conserve water, and to stop relying on 19th century solutions for 21st century challenges.

The Larimer County Commissioners must save our rural communities and be good stewards of our natural resources by saying no Glade Reservoir!

Sincerely,

--
Ms Robin MacDonald
bellvuerobin@gmail.com
5409 Rist Canyon Rd Apt, Suite, Bldg. (optional)
Bellvue, CO 80512

Save Rural NoCo Member

1862

Rob Helmick <helmicrp@co.larimer.co.us>

Objection to Northern Water 1041 Application

2 messages

Mark Heiden <mheiden@eaglelakefchoa.com> Thu, May 21, 2020 at 3:14 PM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>

Hi Rob,

The attached letter contains my comments for the record on the NISP 1041 application.

Please also consider this my formal request for a block of time (15 minutes) to present Eagle Lake's case during the public comment period of the Planning Commission hearings.

Thanks,

Mark

Mark Heiden, President

Eagle Lake Association

mheiden@eaglelakefchoa.com

C: 970-988-8433

NISP Objection Letter to Rob Helmick.pdf
136K

Rob Helmick <helmicrp@co.larimer.co.us> Thu, May 21, 2020 at 3:26 PM
To: Stephanie Cecil <scecil@northernwater.org>
Cc: Don Threewitt <threewdl@co.larimer.co.us>, Lesli Ellis <ellislk@larimer.org>

[Quoted text hidden]
--

Robert Helmick
Senior Planner

Community Development Department
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521
970-498-7682
rhelmick@larimer.org
https://www.larimer.org/planning

NISP Objection Letter to Rob Helmick.pdf

Rob Helmick, Senior Planner
Larimer County Community Development Division
200 W. Oak Street
Suite 3100
PO Box 1190
Fort Collins, CO 80521

May 21, 2020

Dear Rob,

As president of the Eagle Lake Association, I have a unique perspective on Northern Water's 1041 application and their proposed pipeline through Eagle Lake. I have been working on both this and the Thornton pipeline projects for the HOA for the better part of three years and see many similarities in the process that is unfolding before the County. I am writing you to ask that the Planning Commission, and ultimately the Board of County Commissioners for Larimer County, not approve the 1041 Application that is before you for a pipeline through the county by Northern Water (NISP).

The issues revolving around this application and the reasons it should be denied closely mirror that of the City of Thornton 1041 pipeline application that was rejected by the Board of County Commissioners.

Specifically, here are some of the reasons the County rejected the Thornton application and should do so as well with the NISP application:

1) According to the Land Use Code criteria quoted by the Board of Commissioners, the proposal is inconsistent with the county Master Plan affecting land use and development, specifically that the route will be traversing through significant amounts of private property and through yards in the Eagle Lake neighborhood. Private easements will have to be obtained through eminent domain. Affected residents will not be permitted to construct permanent structures or plant landscape material with deep roots (trees, wind blocks, etc) on their property due to the pipeline easement and maintenance requirements. Affected residents will be subject to continual intrusion on their land by maintenance crews checking on the pipeline in perpetuity. This is a gross infringement of their right to a peaceful existence on their property and our right to restrict non-resident traffic on our privately owned roads.
2) In addition, according to Northern Water's Construction Approach document, they are anticipating using HOA owned private roads for construction traffic throughout the five segments of construction on the pipeline near and through our neighborhood. **The timeline of the cumulative impact to us is anticipated to be 59 weeks from start to finish for all the segments!** They are asking to use our narrow, non-public grade roads for heavy truck traffic and daily construction crew traffic on our private roads dozens of residents use daily to enter and exit our subdivision. This is an unacceptable burden on us and again is a gross infringement on our neighborhood and our rights to a peaceful existence that is inconsistent with the Master Plan's stated goal of "maintaining and enhancing our county's quality of life and to be fundamentally fair to all our citizens and to respect their individual rights." A quiet residential neighborhood with children playing, residents coming and going, and retirees enjoying the peaceful time they've

earned is not a place for construction staging for a project that has no benefit for its residents and even minimal benefit to Larimer County as a whole. The concept and thought of using our roads for this purpose is untenable.

3) Lack of transparency and communication with affected properties were a large negative for the Board of Commissioners during the Thornton hearings and should be as well for the NISP application. Although they have held numerous public information events, they have not reached out to the affected property owners in Eagle Lake whose land will be crossed by the proposed pipeline. They have not held any discussions with the HOA about the use of our roads and what that may look like. They have not contacted any of the 24 Eagle Lake residents plus adjacent non-resident households who will be impacted by the use of our private roads during construction for over a year.
4) Importantly from a construction traffic standpoint, they have not contacted the three owners of the properties that Hood Lane crosses about the viability of that dirt road for construction traffic – all three of whom tell us that it is not designed or built for heavy truck traffic and will probably collapse into the adjacent water canal if used for that purpose. Erosion from the canal on the road bed and underlying bank make this a dangerous proposition at best. Not to mention the fact that no truck longer than about 20 feet can make the turn from Eagle Lake Drive onto Hood Lane which is a backward angle turn past the HOA owned and maintained bridge. It seems no one from Northern Water has done their due diligence on this path for the purposes they propose.
5) The NISP 1041 application negatively impacts public health and safety in our neighborhood. Our private roads are narrow roads and not constructed to handle large, semi-tractor trailer traffic loaded with pipe sections and construction materials for pipeline construction. The roads were not built to handle the volume of traffic or the load. Having these vehicles on our roads creates a safety hazard for children, bicyclists, walkers and resident traffic entering and leaving driveways. In addition, some of our older residents with health issues are at risk due to the constant coming and going of non-resident truck traffic. Noise levels, pollution from diesel vehicles, and anxiety from interruptions to our peaceful existence can all lead to increased health problems for all residents.
6) In the Land Use Code criteria for consideration by the County, Criteria C states its purpose is to “Promote the economic stability of existing land uses that are consistent with the Master Plan and protect them by incompatible or harmful land uses.” The proposed pipeline is certainly an incompatible and harmful use of the land in our neighborhood.

   We recently annexed three parcels to our HOA (the TIPS Development) whose owner was required by the County to development certain aspects of the land (drainage, roads, etc) to be approved by the County before being allowed to offer the plots for sale and final residential development. The owner has spent thousands of dollars to prepare this land, yet the proposed pipeline path crosses near or on some of the new parcels rendering them virtually unsellable until the pipeline is built and completed. No buyer will pay a premium price for a parcel with the amount of disruption, uncertainty of building site and septic placement, and ongoing nuisance this project will cause to these three parcels for well over a year. The County is in effect killing the owner’s ability to sell his parcels and recoup his already substantial investment that the County has made him invest to get the land ready for development. This is not “promoting the economic stability of existing land uses” (ie. Residential development) or “protecting incompatible and harmful land uses”.

Other residents in our neighborhood who may be contemplating or are in the process of listing their property are also economically negatively impacted by the proposed pipeline. Buyers will use every reason to lower the price on a sale and a year or more of construction traffic, noise, dirt and dust flying in the neighborhood are good leverage points for them to either not buy at all, or attempt to attain a lower selling price than normal. The County is truly hurting the economic stability of the whole neighborhood with this proposal and hundreds of thousands of dollars in values may be lost if the application is approved.

7) Northern Water has presented other reasonable siting and design alternatives that do not include bisecting resident's property or cutting through our neighborhood that they have dismissed due to cost or more difficult construction conditions like their N2.4 (north of Reservoir #3) and N2.5 routes (Douglas Road). The Board of County Commissioners rejected reasoning that expense or difficulty of construction were disqualifying reasons for rejecting routes over ones that impacted private property owners and individual rights in the Thornton pipeline application. Northern's preferred N2.1 route severely impacts our rights as property owners and citizens and should similarly be dismissed by the Commissioners when there are viable alternate routing options.
8) Another issue of grave concern to the Commissioners in the Thornton application was the construction and pipeline proximity to occupied dwellings. Proximity of construction and construction impact along with the long-term detriment to property owners was a primary concern. The Northern Water proposal includes a 100' easement – a 40' construction easement and a 60' permanent easement. If the pipeline were to be placed on the property line between the two residences the proposed N2.1 routing prefers, that will put the easement only 30 feet or less from one of the residences. The disruption and imposition on private property this close to an occupied dwelling is unacceptable when there are route alternatives that do not cross private property between two dwellings.
9) The other major point that should either cause the county to reject the application or defer a decision until later is the Thornton pipeline issue now pending before the courts. The proposed routing of their pipeline has almost identical routing alternatives to Northerns. Both entities are in the review process at the same time with construction timelines that are similar. Multiple times in the record for Larimer County in the proceedings with Thornton, both Thornton, Northern Water, and the County mentioned or agreed that co-location of the two pipelines along their nearly identical paths made sense and should be pursued. It has been discussed between all three parties on numerous occasions and should be part of the discussion now.
   In fact, one of the objections the Board of County Commissioners expressed to deny the Thornton pipeline by only submitting an application for one of their proposed pipelines in isolation from their planned future ones was that, **"Thornton deprives the Board and public of the opportunity to consider cumulative impacts and the effectiveness of mitigation. A route that may be appropriate for a single pipeline may be inappropriate for additional pipelines. If this information is not considered now, future pipelines may not be able to co-locate which would result in the disorderly development of Thornton's project and compound the impacts on Larimer County through multiple different pipelines in separate locations."**
   How is this not the case with the proposed Northern pipeline and Thornton's pipeline, both of which are looking at nearly identical routing alternatives? This is not just an

issue of "disorderly development and compounding of the impacts" on Larimer County – it is the disorderly development and compounding of the impacts on Eagle Lake in a much shorter timeframe than the proposed build out of the future Thornton pipelines. And how is the reverse not true – that a route that may be inappropriate for a single pipeline due to cost and difficulty of construction may be entirely appropriate for the combined resources of two pipelines from two well-funded entities with capable engineering that will minimize the impacts not only on Larimer County but the Eagle Lake neighborhood that is the target of two separate pipelines?
The precedent for this is Section A.2 of the Land Use Code itself that says the Code is intended to:

"A. Provide for the physical development of the county in order to:
1. Preserve the character and quality of rural and urban areas;
2. Foster convenient, harmonious and workable relationships among land uses; and
3. Achieve the principles and strategies described in the master plan."

This alone should allow the County to consider co-location as part of the process in both the Thornton and Northern Water 1041 applications. In addition, the Colorado Supreme Court noted that the purpose of the 1041 statute is to allow state and local governments to "supervise land use which may have an impact on the people of this state beyond the immediate scope of the project." Colorado Land Use Commission v. Board of County Comm'rs of Larimer County, 604 P.2d 32, 34 (Colo. 1979). The reference to impacts "beyond the immediate scope of the project" suggests that the Commissioners can and should consider the relationship between the project under consideration and other projects. Such sensitivity would definitely further the statute's apparent purpose of "protection of the utility, value, and future" of land, which the statute states is in the public interest. C.R.S. § 24-65.1-101(1)(a).

For these reasons, I ask the Planning Commission and the Board of County Commissioners reject the Northern Water 1041 application until such time that there is resolution to the Thornton 1041 application so that both pipelines can apply for a co-location routing option where both entities can share costs and choose routes they might not otherwise consider around residential areas. Our specific properties and the Eagle Lake neighborhood should not have to shoulder the burden of these two projects for the sake of Larimer County.

Thank you for consideration of our points and position.

Respectfully submitted,

Mark Heiden, President and Affected Homeowner
Eagle Lake Association

NMLS ID 566156

FirstBank – Northern Colorado Market

1013 East Harmony Rd., Fort Collins, CO 80525

T 970.282.3901 **F** 970.282.3925 | efirstbank.com | Blog

Staudinger, Nicole <Nicole.Staudinger@efirstbank.com> Fri, May 22, 2020 at 8:36 AM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>

HI Rob:

I wanted to reach out to you again prior to the hearing. I personally am very supportive of the NISP project but I would like to understand what this means for our property. We have a large concrete driveway, mature trees and landscaping that runs towards the front of our property. The County does not have an easement. How do you intend to handle this? Where exactly will the pipeline run? Why did you choose the north side of the road versus the south side (where there are no houses)? When will this project start?

Thanks. I look forward to hearing from you.

Nicole

[Quoted text hidden]
[Quoted text hidden]

rhelmick@larimer.org
https://www.larimer.org/planning

Construction Approach Eagle Lake.docx
599K

Jim Hauan <jhauan@thegroupinc.com> Fri, May 22, 2020 at 2:44 PM
To: rhelmick@larimer.org

I was just curious if you guys actually reply to emails or if you don't have to worry about it?

Thanks,

Jim Hauan

[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us> Fri, May 22, 2020 at 2:48 PM
To: Jim Hauan <jhauan@thegroupinc.com>

Jim, Generally if it is a comment on a project I do not respond. If there is a real question then i do otherwise the letter/email goes into the file and is part of the record. I have forwarded your comments to Northern and we will need to see how they respond.
[Quoted text hidden]
[Quoted text hidden]

Jim Hauan <jhauan@thegroupinc.com> Fri, May 22, 2020 at 2:57 PM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Great.
Thanks.
I just want to be sure that they contact me in the future if they expect to go thru my property for construction.
I own the ditch road and its not fit for heavy construction traffic anyway.

[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us>

Letter of Objection FAO of Rob Helmick

1 message

Tom Mackenzie <tom.mackenzie77@yahoo.com> Fri, May 22, 2020 at 2:44 PM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>
Cc: Mark Heiden <mheiden@eaglelakefchoa.com>

Dear Rob,

Please review my letter of objection, and the detailed reasons provided, to NISP's proposal for alternative N2.1.

Have a great weekend.

Stay safe!

Sincerely,

Tom.

NISP Objection Letter - Tom Mackenzie.docx
21K

Rob Helmick, Senior Planner
Larimer County Community Development Division
200 W. Oak Street
Suite 3100
PO Box 1190
Fort Collins, CO 80521

Dear Rob,

As a resident of the Eagle Lake neighborhood, I am writing you to ask that Larimer County not approve the 1041 Application that is before you for a pipeline through the county by Northern Water (NISP).

NISP conducted criteria assessments on only three of five alternatives. Alternatives N2.1, N2.2 and N2.3 all entail going through the Eagle Lake neighborhood. No assessment was conducted on N2.4 [north of reservoir 3] and N2.5 [Douglas Road]. Neither of these two alternatives entail the level of neighborhood disruption or environmental impact [no wet lands] compared to N2.1, N2.2 or N2.3. I am against N2.1 because it affects the neighborhood I live in. Although not proposed by NISP, I would be against N2.2 and N2.3 since I would be directly impacted because I live in one of the eight properties affected on the east side of reservoir 3. I ask that Larimer County request NISP to look at the N2.4 or the N2.5 alternatives.

The issues revolving around this application and the reasons it should be denied closely mirror that of the City of Thornton 1041 pipeline application that was rejected by the Board of County Commissioners. Specifically, here are some of the reasons the County rejected the Thornton application and should do so as well with the NISP application:

1) According to the Land Use Code criteria quoted by the Board of Commissioners, the proposal is inconsistent with the county Master Plan affecting land use and development, specifically that the route will be traversing through significant amounts of private property and through yards in the Eagle Lake neighborhood. Private easements will have to be obtained through eminent domain. Affected residents will not be permitted to construct permanent structures or plant landscape material with deep roots (trees, wind blocks, etc) on their property due to the pipeline easement and maintenance requirements. Affected residents will be subject to continual intrusion on their land by maintenance crews checking on the pipeline in perpetuity. This is a gross infringement of their right to a peaceful existence on their property and our right to restrict non-resident traffic on our privately owned roads.
2) In addition, according to Northern Water's Construction Approach document, they are anticipating using HOA owned private roads for construction traffic throughout the five segments of construction on the pipeline near and through our neighborhood. **The timeline of the cumulative impact to us is anticipated to be 59 weeks from start to finish for all the segments!** They are asking to use our narrow, non-public grade roads for heavy truck traffic and daily construction crew traffic on our private roads dozens of residents use daily to enter and exit our subdivision. This is an unacceptable burden on us and again is a gross infringement on our neighborhood and our rights to a peaceful existence that is inconsistent with the Master Plan's stated goal of "maintaining and enhancing our county's quality of life and to be fundamentally fair to all our citizens and

to respect their individual rights." A quiet residential neighborhood with children playing, residents coming and going, and retirees enjoying the peaceful time they've earned is not a place for construction staging for a project that has no benefit for its residents and even minimal benefit to Larimer County as a whole. The concept and thought of using our roads for this purpose is untenable.

3) The NISP 1041 application negatively impacts public health and safety in our neighborhood. Our private roads are narrow roads and not constructed to handle large, semi-tractor trailer traffic loaded with pipe sections and construction materials for pipeline construction. The roads were not built to handle the volume of traffic or the load. Having these vehicles on our roads creates a safety hazard for children, bicyclists, walkers and resident traffic entering and leaving driveways. In addition, some of our older residents with health issues are at risk due to the constant coming and going of non-resident truck traffic. Noise levels, pollution from diesel vehicles, and anxiety from interruptions to our peaceful existence can all lead to increased health problems for all residents.
4) In the Land Use Code criteria for consideration by the County, Criteria C states its purpose is to "Promote the economic stability of existing land uses that are consistent with the Master Plan and protect them by incompatible or harmful land uses." The proposed pipeline is certainly an incompatible and harmful use of the land in our neighborhood.

   We recently annexed three parcels to our HOA (the TIPS Development) whose owner was required by the County to development certain aspects of the land (drainage, roads, etc) to be approved by the County before being allowed to offer the plots for sale and final residential development. The owner has spent thousands of dollars to prepare this land, yet the proposed pipeline path crosses near or on some of the new parcels rendering them virtually unsellable until the pipeline is built and completed. No buyer will pay a premium price for a parcel with the amount of disruption, uncertainty of building site and septic placement, and ongoing nuisance this project will cause to these three parcels for well over a year. The County is in effect killing the owner's ability to sell his parcels and recoup his already substantial investment that the County has made him invest to get the land ready for development. This is not "promoting the economic stability of existing land uses" (ie. Residential development) or "protecting incompatible and harmful land uses".

   Other residents in our neighborhood who may be contemplating or are in the process of listing their property are also economically negatively impacted by the proposed pipeline. Buyers will use every reason to lower the price on a sale and a year or more of construction traffic, noise, dirt and dust flying in the neighborhood are good leverage points for them to either not buy at all, or attempt to attain a lower selling price than normal. The County is truly hurting the economic stability of the whole neighborhood with this proposal and hundreds of thousands of dollars in values may be lost if the application is approved.
5) Northern Water has presented other reasonable siting and design alternatives that do not include bisecting resident's property or cutting through our neighborhood that they have dismissed due to cost or more difficult construction conditions like their N2.4 (north of Reservoir #3) and N2.5 routes (Douglas Road). The Board of County Commissioners rejected reasoning that expense or difficulty of construction were disqualifying reasons for rejecting routes over ones that impacted private property owners and individual rights in the Thornton pipeline application. Northern's preferred

N2.1 route severely impacts our rights as property owners and citizens and should similarly be dismissed by the Commissioners when there are viable alternate routing options.

6) Another issue of grave concern to the Commissioners in the Thornton application was the construction and pipeline proximity to occupied dwellings. Proximity of construction and construction impact along with the long-term detriment to property owners was a primary concern. The Northern Water proposal includes a 100' easement – a 40' construction easement and a 60' permanent easement. If the pipeline were to be placed on the property line between the two residences the proposed N2.1 routing prefers, that will put the easement only 30 feet or less from one of the residences. The disruption and imposition on private property this close to an occupied dwelling is unacceptable when there are route alternatives that do not cross private property between two dwellings.
7) The other major point that should either cause the county to reject the application or defer a decision until later is the Thornton pipeline issue now pending before the courts. The proposed routing of their pipeline has almost identical routing alternatives to Northern's. Both entities are in the review process at the same time with construction timelines that are similar. Multiple times in the record for Larimer County in the proceedings with Thornton, both Thornton, Northern Water, and the County mentioned or agreed that co-location of the two pipelines along their nearly identical paths made sense and should be pursued. It has been discussed between all three parties on numerous occasions and should be part of the discussion now.
   In fact, one of the objections the Board of County Commissioners expressed to deny the Thornton pipeline by only submitting an application for one of their proposed pipelines in isolation from their planned future ones was that, "Thornton deprives the Board and public of the opportunity to consider cumulative impacts and the effectiveness of mitigation. A route that may be appropriate for a single pipeline may be inappropriate for additional pipelines. If this information is not considered now, future pipelines may not be able to co-locate which would result in the disorderly development of Thornton's project and compound the impacts on Larimer County through multiple different pipelines in separate locations."
   How is this not the case with the proposed Northern pipeline and Thornton's pipeline, both of which are looking at nearly identical routing alternatives? This is not just an issue of "disorderly development and compounding of the impacts" on Larimer County – it is the disorderly development and compounding of the impacts on Eagle Lake in a much shorter timeframe than the proposed build out of the future Thornton pipelines. And how is the reverse not true – that a route that may be inappropriate for a single pipeline due to cost and difficulty of construction may be entirely appropriate for the combined resources of two pipelines from two well-funded entities with capable engineering that will minimize the impacts not only on Larimer County but the Eagle Lake neighborhood that is the target of two separate pipelines?
   The precedent for this is Section A.2 of the Land Use Code itself that says the Code is intended to:

   "A. Provide for the physical development of the county in order to:
   1. Preserve the character and quality of rural and urban areas;
   2. Foster convenient, harmonious and workable relationships among land uses; and
   3. Achieve the principles and strategies described in the master plan."

This alone should allow the County to consider co-location as part of the process in both the Thornton and Northern Water 1041 applications. In addition, the Colorado Supreme Court noted that the purpose of the 1041 statute is to allow state and local governments to "supervise land use which may have an impact on the people of this state beyond the immediate scope of the project." Colorado Land Use Commission v. Board of County Comm'rs of Larimer County, 604 P.2d 32, 34 (Colo. 1979). The reference to impacts "beyond the immediate scope of the project" suggests that the Commissioners can and should consider the relationship between the project under consideration and other projects. Such sensitivity would definitely further the statute's apparent purpose of "protection of the utility, value, and future" of land, which the statute states is in the public interest. C.R.S. § 24-65.1-101(1)(a).

For these reasons, I ask the Planning Commission and the Board of County Commissioners reject the Northern Water 1041 application until such time that there is resolution to the Thornton 1041 application so that both pipelines can apply for a co-location routing option where both entities can share costs and choose routes they might not otherwise consider around residential areas. Our specific properties and the Eagle Lake neighborhood should not have to shoulder the burden of these two projects for the sake of Larimer County.

Sincerely,

Tom Mackenzie
5149 Eagle Lake Drive
Fort Collins
CO
80524

Tom.mackenzie77@yahoo.com
Tel: 970 232 5294

Rob Helmick <helmicrp@co.larimer.co.us>

NISP Permitting 1041: Letter of Opposition from a Farmer

1 message

Ken McCullough <k.mcculough1231@gmail.com> Fri, May 22, 2020 at 9:52 PM
To: rhelmick@larimer.org, jkefalas@larimer.org, swjohnson@larimer.org, tdonnelly@larimer.org, pcboardmember9@larimer.org, pcboardmember5@larimer.org, pcboardmember8@larimer.org, pcboardmember4@larimer.org, pcboardmember3@larimer.org, pcboardmember1@larimer.org, pcboardmember7@co.larimer.co.us, pcboardmember2@larimer.org, pcboardmember6@larimer.org, jshanahan@fcgov.com, cwebb@fcgov.com, nisp.eis@usace.army.mil

Dear Mr. Helmick, County Commissions, and Planning Commission,

I am submitting a letter to be included in the County's review of the proposed NISP project. As a life-long alfalfa farmer in Larimer County, I feel honored to represent the agricultural community in opposing this project.

Please see attached my letter directed to the Larimer County Commissioners, Planning Commission, and Planning Staff regarding the 1041 permitting process for the NISP project.

Please include this letter in the official notes for the meeting agendas going forward. If you have any questions, please let me know.

Thank you,

Ken McCullough
Laporte, Colorado

K_McCullough_NISP Opposition.pdf
102K

May 22, 2020
Larimer County Board of County Commissioners
Larimer County Planning Staff
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521

RE: NISP 1041 Permit Application; Project No. 20-ZONE 2657

Dear Planning Commision, Commissioner Johnson, Commissioner Kefalas, Commissioner Donnelly, and Planning Staff:

My name is Ken McCullough, I am a life-long resident of Larimer County and a third-generation alfalfa farmer. My 45-acre farm is irrigated with water diverted directly out of the Cache la Poudre River via a canal operated by the Larimer and Weld Irrigation Company. This canal is located just east of Taft Hill Road and is downstream of the diversion point for the proposed Glade Reservoir. As someone with deep ties to the agricultural economy and rural culture of the Fort Collins area, I am opposed to the Northern Integrated Supply Project (NISP) being pushed by the Northern CO. Water District. For many reasons, I urge you as Commissioners and County Staff to oppose this God-awful project. Let me explain why I am so strongly opposed to this project and believe you should be too.

My farm diverts about 30-acre feet of water from the river annually, primarily June through September. This is a reliable water right, although my water rights are not senior to many upstream and down-stream users, I have never suffered from an inadequate supply when I needed it most. There have been many years when I don't get my full 30-acre feet, but my alfalfa operation has always received enough water, even in the driest years of 2000-2006, to get a reliable crop and stay in the black. After review of the NISP project and discussions with others in the agricultural economy, including leadership Larimer and Weld Irrigation Company, the NISP project will not benefit me at all, in fact, it could make me lose my farm.

The NISP project does not supply any new additional water to irrigators, agricultural users, or farmers in Larimer County. However, the water diverted into Glade Reservoir would be water that is *already* allo-cated and exists in paper water rights with farms in Larimer and Weld Counties. A major problem with NISP is that the water to be stored in Glade would need to be purchased in order to be allocated to the project, which it isn't, and unless Northern Water and NISP customers purchase thousands of acres of farmland, that water will never make it to Glade except for years with incredibly exceptional runoff. Since most of the water NISP is hoping to capture is already allocated for downstream users, NISP would need to purchase the farmland where the water rights are held in order to divert and eventually sell that water to customers. This issue was pointed out in the 2018 Final Environmental Impact Statement for the NISP project produced by the United States Army Corps of Engineers. Despite this incredibly prob-lematic detail, Northern Water thinks they can purchase these farms eventually over the next 30-40 years. Frankly, that is unrealistic, this is a billion-dollar pipe dream that won't likely operate at full capac-ity unless billions of more dollars are sourced to purchase farmland.

The issue I fear most that could jeopardize my farm is if Northern Water begins purchasing farmland and water rights in Larimer and Weld Counties. If farms are purchased for their water rights, the value of the

farmland will skyrocket because the water rights associated with the land will be “developed” and stored behind a dam and made available for urban users instead of kept in the river. This would result in a major *negative* economic incentive for farmers to sell their land and water rights to NISP in order to “cash out”. Farmers would of course have to sell their land willingly but imagine if a big fat “green carrot” was dangled in front of a working-class family? We all know what will happen, the pressure to sell the land for cash would be too overwhelming for most, and the multi-generation farms will be turned over for a quick buck.

Developers would then be able to buy the land from NISP and turn the land into homes and subdivisions, knowing that the farmland being paved over and has fed the Country for generations and will forever be lost.

My biggest fear about NISP is that if it were successful, which is unlikely, it would incentivize the development of Larimer and Weld Counties rich farmlands and rural charters, resulting in appalling urban sprawl and will contribute to the loss of a stable and reliable agricultural economy. At best NISP would waste billions of dollars and never become operational, but at worst, it would turn our beautiful rich agricultural lands into cement cul-de-sacs and parking lots.

My family and I have weathered through many years of drought, lost revenue, pest diseases, broken equipment, labor disputes, and market swings, but we’ve always kept our heads above water. However, I see NISP as the grim reaper, a sign of danger coming to turn my farm and our neighbors’ farms into lawns and asphalt driveways, forever destroying the traditions we have established in Larimer County.

This is not the future I want to leave my daughter, who will inherit the farm and be the first woman in the family to run it. I want her to have the same lifestyle and traditions that my grandfather had when he came to Larimer County in 1910 to farm alfalfa and corn. As someone who is trying to find their way in this chaotic world and walk tall as a steady and honorable person, I find myself feeling helpless and in utter despair if NISP were built. That’s why I am writing, to urge you to hear my story and see my perspective as a farmer who wishes the best for his home. Please stand with me and do not issue a 1041 permit for the Northern Integrated Supply Project.

Sincerely,

Ken McCullough

Laporte, Colorado

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041

1 message

Dori Aravis <dori.aravis@gmail.com> Sun, May 24, 2020 at 3:35 PM
To: rhelmick@larimer.org

Hi, my name is Dori Aravis and I am a long time resident of Fort Collins/Larimer County, and I simply cannot believe that we are still having to save the Poudre River from those who would exploit it. I am talking about the Glade Reservoir and the NISP plan to run pipeline from this ill-conceived reservoir across private property (mine included) to give this water to others. This damn is totally unnecessary and the citizens of Larimer County will not benefit from it in any way.

The Poudre is one of the last free-running rivers in the area. It is a treasure not only to Fort Collins, Larimer County, and the State of Colorado, but to the whole country. Taking water from it to serve the needs of a few with vested interests is not only a crime, but is morally wrong. We have fought against the Glade for many, many years; please don't let this happen, but preserve the natural world from this travesty!

And don't think for one moment that all the "recreational" benefits of Glade, would make up for the loss of the same recreational benefits of having a beautiful free-flowing river. Dams are 19 Century technology: We are living in the 21 Century and need to find better ways to meet our needs while at the same time saving the natural world.

And finally on a personal level— the route that is proposed that goes through my property is by no means the best choice. A route that was proposed by my neighbor, Karl Swenson, one that you have in the record, is much better with far less stress and disruption to the neighbors all along its pathway. It goes between the irrigation lakes and runs over mostly open sagebrush and would be so much better. Please look at it and consider this option if this terrible pipeline must be built at all.
Dori Aravis
4304 N. County Road 13
80524

Rob Helmick <helmicrp@co.larimer.co.us>

Water

1 message

Glenn Reiff <reiffglenn@gmail.com> Sun, May 24, 2020 at 2:06 PM
To: rhelmick@larimer.org
Cc: mheiden@eaglelakefchoa.com

Mr. Robert Helmick, Senior Planner

Larimer County Community Development Division

200 W. Oak Street

Suite 3100

P.O. Box 1190

Ft. Collins, CO 80521

Mr. Helmick:

On behalf of the people of Ft. Collins and Larimer County, my wife and I would like to voice our opinions regarding the routing of water lines for NISP and Thornton. Both interests are so much alike that it seems redundant and inefficient to deal with one and not the other simultaneously. Whatever the outcome of these debates, the answers should be pretty much the same for each water concern.

We live in the Eagle Lake Subdivision and can't even believe you would consider bringing one or both pipe lines through our area for all the disruption that it would cause for many months. Our housing area would be terribly abused to achieve these projects. Potential maintenance of these pipelines in the future would also be more of a problem if running through a residential neighborhood. From an aerial standpoint, water that needs to originate in the vicinity of Hwy 14 and 287 (Ted's Place) should be brought east in a more northernly location than Eagle Lake Subdivision. There exist plenty of open areas where two 40" pipelines can run side by side to the east side of I-25 and not have to impact as many people as it would running through Eagle Lake.

Thank You,

Lynn & Glenn Reiff

4449 Eagle Lake South

Ft. Collins, CO 80524

(970) 846-0184

Rob Helmick <helmicrp@co.larimer.co.us>

Do Not Approve NISP 1041 Project No. 20-ZONE 2- Save Our Rural Northern Colorado

1 message

Colleen Finnman <cfinnman1524@gmail.com> Sun, May 24, 2020 at 3:22 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

I am a landowner residing in the area of the proposed Glade reservoir who has concerns with the proposed Glade Project and the negative impacts that would occur if the project moves forward.

My understanding is that the primary benefits of this proposed reservoir would be enjoyed by the 15 subscriber towns or agencies that receive the proposed Glade water. Most of these towns and agencies are outside Larimer County. The most obvious and intense costs would be borne by local and other surrounding communities. Furthermore, I am wholly opposed to capturing and piping precious water that originates in the Poudre water shed to other locales.

As landowners and residents, our concerns are that the scope and scale of this proposed project, if approved, would have significant, detrimental, and permanent impact on our rural community, environment, and lifestyle we enjoy today and desire to have for future generations.

Specifically, we believe our rural environment would be negatively impacted in the following ways:

1) Noise - The rerouted highway over the most eastern hogback would have an unobstructed view from residences in the foothills, there would be no middle hogback to block truck and auto noise. The NISP publications suggest that recreation would include motorboats and jet skis. Boats and skis are loud, they would likely be louder than current road traffic.

2) Light Pollution – This rural area now enjoys fairly dark skies. The proposed recreational activities would generate significant exterior lighting for boats, facilities, camping, pumping facilities, traffic, etc. and headlights from traffic coming down the hogback on the rerouted 287 would shine into the adjacent private property. This will undoubtedly destroy the enjoyment of our night skies.

3) New development - We do not know what sort of development would occur near and north of proposed Glade. The rerouted highway 287 would invite more residential development on the plains. The reservoir would invite more development in the adjacent foothills and valleys. It's not inconceivable that more commercial development catering to visitors would encroach into currently uncommercialized lands, forever altering the rural nature of the area. I would point out that this sort of development is clearly incompatible with the vision for the area articulated in the current Larimer County Comprehensive Land Use Plan.

4) Wildlife – Proposed Glade would become a significant barrier to the permanent and migratory herds of deer and elk that reside in our area and would be disruptive to other wildlife. There will also be negative impacts to the Poudre River as a viable coldwater fishery below the dam. In a world where wildlife and nature are under stress, and is diminishing generally owing to human activities, should we be contributing to those activities for unnecessary purposes? We encourage the county to find alternatives that don't result in the significant loss of open space and wildlife habitat that this project would cause.

5) Destruction of important historical and cultural sites -- Proposed Glade would obliterate the lower reaches of historic Hook and Moore Glade, along with a portion of the Overland Trail and many other sites of historical and cultural significance. Is this the way we want to treat these sites?

6) Wildfires – In this century three major wildfires burned over 100,000 acres on and around Glade. Two of the three forest fires were caused by careless people. Can we rely on the >1000 daily visitors to proposed Glade to be careful?

7) Emergency response – The recreation on the proposed reservoir is projected to be almost 400,000 visitors per year. Such a large increase in recreationalists would likely increase the number of emergency calls thereby further stretching emergency response agency resources. Costs would be borne by Larimer County taxpayers, and emergency services that are diverted to Glade would not be readily available to serve the local communities.

8) Air quality – Because Glade would have junior water rights, the water level of the proposed reservoir would be highly variable, unlike Horsetooth. The water level frequently would drop precipitously, often changing proposed Glade Reservoir to Glade Mudflats, and could stay that way for years. This us particularly true in an era of climate change. The large "bathtub ring" that would materialize around the reservoir would become dry soil that would blow in our strong winds causing air quality and visual concerns. The hundreds or thousands of vehicles that would travel to the area emit gases, particulates, and ozone precursors (i.e., health hazards).

9) Climate change – the pumps, the construction vehicles, the recreational vehicles: the project would result in considerable burning of fossil fuels, forever, and the emission of greenhouse gases. The pumping stations alone would emit the equivalent of adding 7000 GHG emitting cars at a time when Colorado is implementing zero emissions vehicle standards. Perhaps even more concerning is that with increasing droughts, it is unlikely that the proposed Glade Reservoir will be able to consistently reach the water levels projected for the project.

10) Aesthetic - The drive from Livermore to Laporte would no longer be through the heritage rangeland and the familiar hogbacks. Since the proposed reservoir would likely be only partially filled much of the time, instead of beautiful hogbacks and grassy foothills, our views would be marred by the barren sides (bathtub ring) and murky surface of a partially filled reservoir.

11) Conservation and Alternatives – Conservation is not being adequately considered. While the Colorado Front Range is land-rich for development, it is semi-arid and thus water-limited. About 2/3 of the Poudre is already taken out, and Glade would take another 40% of what's left. Yet another reservoir is nothing but a temporary fix for a small portion of the state's water needs; but one with permanent, destructive impacts on a large part of rural northern Colorado. In the 21st century, surface storage just doesn't make sense; this is a semi-arid climate that is getting drier.The time is way past due for developing long-term solutions based on state-of-the-art technologies and widespread education on the absolute necessity to conserve water, and to stop relying on 19th century solutions for 21st century challenges.

The Larimer County Commissioners must save our rural communities and be good stewards of our natural resources by saying no Glade Reservoir!

Sincerely,

--
Ms Colleen Finnman
cfinnman1524@gmail.com
805 Pecan Drive
Bellvue, CO 80512

Save Rural NoCo Member

1881

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 Application

1 message

Patrick Crotzer <patrick.crotzer@gmail.com> Mon, May 25, 2020 at 11:51 AM
To: rhelmick@larimer.org

Dear Mr. Helmick,
As you prepare for the upcoming Planning Commission Hearings and follow on County Commissioners' meetings I wanted to provide a couple of general observations and questions as well as questions more focused on the CR 56 area.

I don't believe limiting comments to two minutes per person will allow in-depth information to be exchanged with the Planning Commission and the County Commissioners. There should be a way for people to yield time to a larger group so that more detailed information than "not in my backyard" comments can be made. This would allow more reasonable discussions in the public input. It is worth noting that it was presentations from local grassroots groups like No Pipe Dream and Save the Poudre that brought to light the misinformation put forward by the City of Thornton in its 1041 application presentations, last year. I have attended NISP open houses and have noted a propensity to state opinion and preferences as hard unassailable facts. For this reason I recommend that all 1041 applicants provide their presentations and answers to questions from both the Planning Commission and County Commissioners under oath.

I believe that until the relocation of US Highway 287 has been firmly resolved including a reliable vetting of the ability of the NISP participants to pay for the relocation in full, especially given the strain of the current economic crisis, it is premature to approve either Glade Reservoir or the associated pipelines. In a similar vein it is premature to approve a reservoir for which NISP does not currently own enough water to fill it.

Even if Glade Reservoir is approved, there is no compelling reason to convey water through pipelines in Norther Larimer County. As the Board of County Commissioners have already made clear, water quality for municipal users is not the overarching concern of Larimer County. NISP assertion that there are no viable alternatives to pipelines is false. Water could be conveyed down the Poudre River or through the existing canal infrastructure. NISP already plans to flow water from Glade Reservoir to a point thirteen miles down river to the Poudre River Intake which if done properly would negate a Northern Tier pipeline altogether. Claims of diminished water quality while relatively true are overblown. The South Platt Regional Opportunities Water Group (SPROWG) is proposing to pipe water from near the Colorado Nebraska state lines all the way back to the Denver Metro area for treatment and reuse. Clearly, if that water is economically treatable then water taken from the Poudre River south of Fort Collins should be in even better condition.

Additionally, a survey of the 15 NISP participants websites and associated Water Quality Reports reveal that all but one receive some or all of their water in one way or another from local watersheds in conjunction with Northern Water and the Colorado Big Thompson project. This begs the question, could water from Glade be fed into Horsetooth Reservoir and then distributed via existing infrastructure to service all 15 participants?

NISP has long had a preference for traversing private property in lieu of utilizing existing easements to reduce the requirement to coordinate with other utilities and ditch companies. This puts a huge burden on private property owners who have no choice when faced with eminent domain. Full disclosure, my wife and I own property which is currently on the NISP route. The Northern Tier Pipeline route in the vicinity of CR56 would require easements from a dozen properties instead of just a few or none if it stayed in existing utility, county road and access road easements. Many of the properties already have ditch and utility easements and don't need to be further encumbered. If a pipeline is ultimately approved then we would appreciate Larimer County leadership stipulating use of existing easements along CR 56 until past Elder Lake to make the turn south to Douglas Road.

Thank You for your Time and Consideration

Best Wishes

Patrick Crotzer
CAPT USN (RET)
4600 N Highway 1
patrick.crotzer@gmail.com

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

John Dettenwanger <jjdettenwanger@gmail.com> Mon, May 25, 2020 at 9:09 AM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

I'm a landowner and taxpayer residing in northern Larimer County, near the proposed location of Glade Reservoir. I strongly urge the Board of County Commissioners to deny the 1041 permit for the Northern Integrated Supply Project because it would forever impact the fundamental nature of the rural landscape in which we live, harm our quality of life and increase our taxes.

Northern Water's current application should be rejected on two significant points.

First, Northern Water is asking Larimer County to give them over 1200 acres of productive farm land and in exchange the only benefit they offer the county is the promise of "High Quality Recreation". Yet the county must invest 25% of the development cost and take on the liability of operating and maintaining the facilities.

It is a fact that Northern Water lacks almost 22,000 acre feet of water rights required to fill the reservoir before it could ever be used for "High Quality Recreation". On this fact alone, the application should be rejected until Northern Water has proven they have all the water rights to deliver on the projections. If the county was a bank, this would represent a high-risk unsecured loan. A bank would never make this kind of an agreement.

Secondly, even if Northern Water could guarantee they have the water rights to fill the reservoir, their modeling projections on water levels are significantly flawed.

Northern Water's hydrological modeling over a 56-year interval (1950-2005) reveals numerous multi-year periods where water levels at Glade would have been too low to provide access for motorized boating. During droughts (which are predicted to increase in frequency and duration in response to climate warming), boat access would be curtailed for multiple years. Northern's simulation indicates that Glade water levels would have been adequate for boating during the peak recreation season (May-August) in 41 (73%) of those years, and below the proposed boat ramp in the other 15 (27%) years.

Save Rural NoCo's hydrological modeling over a 70-year interval (1950-2019), starting with a lower initial volume, and using historic data to simulate post 2019 conditions, suggests that the initial fill could take many years, and decades could pass before Glade refilled to full capacity following extreme water drawdowns. Over this 70-year interval, we estimated that Glade water levels during the peak recreation season would have been adequate for boating in only 43 (62%) of those years, and below the proposed boat ramp in the other 27 (38%) years.

The extreme low water levels predicted in Northern Water's hydrological modeling correspond to the onset of what has recently been coined the "millennial drought". In the last year of Northern's simulation (2005), storage volumes dropped precipitously, resulting in water levels that would've been more than 160 feet below the high-water line! And they have not recovered yet.

The potential adverse impacts of extreme low water levels at Glade are enormous. However, such conditions are not acknowledged in the FEIS, despite being predicted by Northern's own hydrological modeling. The omission of recent streamflow data (previous 15 years) and the reliance on historical water supplies to predict storage volumes at Glade, denies the public and the County valuable information on refill characteristics at Glade following severe water drawdowns.

Since the reservoir would not fill, and likely would not be full during much of its life, the project would look like an abandoned muddy puddle much of the time, and the recreational facilities would be mostly empty. Larimer County taxpayers would pay for the upkeep of the unused recreational facilities. The project ruins the aesthetics of the valley and hogbacks – a unique and beautiful landscape – for a project that would provide little or no benefit to Larimer County and

in fact would negatively impact its residents and its coffers.

Because of the financial commitments the county would take on, the county should perform a critical analyses of the Northern Water assumptions and data before approving this application.

Sincerely,

--
Mr John Dettenwanger
jjdettenwanger@gmail.com
1197 Shadow Ridge Rd
Laporte, CO 80535

Save Rural NoCo Member

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: Thornton and NISP, Oh My!

1 message

John Kefalas <kefalajm@co.larimer.co.us> Mon, May 25, 2020 at 4:25 PM
To: Rob Helmick <helmicrp@co.larimer.co.us>, Lesli Ellis <ellislk@larimer.org>, Laurie Kadrich <kadriclm@co.larimer.co.us>

Rob,

Please include this email in the public record. Thank you.

John Kefalas
County Commissioner, District 1

Commissioners' Office
200 W Oak St | 2nd Floor
PO Box 1190, Fort Collins, CO 80522-1190
W: (970) 498-7001
Cell: (720) 254-7598
jkefalas@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Michael Anthony** <manthony@skybeam.com>
Date: Mon, May 25, 2020 at 8:28 AM
Subject: Thornton and NISP, Oh My!
To: <jkefalas@larimer.org>

Dear Commissioner Kefalas,

Thank you for all the hard work you do on behalf of the citizens of Larimer County.

I am writing to express my views on two very large projects Larimer County will soon be facing: The Thornton water pipeline and the NISP project.

Regarding the Thornton pipeline, I would just like to reiterate my previous position that a pipeline through north Fort Collins will provide no benefits to its citizens and be very destructive and disruptive. Furthermore, it is not often that we get the chance to restore a badly damaged ecosystem so easily by just requiring Thornton to convey it's water through the Poudre River. If Thornton refuses to convey the water in the river, then I suggest they retrieve it where they bought it, on the farms. Municipalities all over the country deal with treating much "dirtier" water. Alternatively, perhaps Thornton should consider building a community where they have the water instead of the other way around. This concept would bring life back to the small towns they destroyed by buying the agricultural water and drying up the farms along with a sustainable way of life.

Concerning NISP: Please bear in mind (and keep bears in mind) the total environmental costs of this project. How many millions (billions?) of tons of carbon dioxide will be released into the atmosphere to construct the dams and pipelines? To what end? To encourage more residential development which will require more carbon, dams and pipelines to support the never ending cycle.

Horsetooth Reservoir was the right choice at the right time but times have changed and now is the time to adapt to the change. Somewhere, sometime, the old thinking must stop and new thinking must begin. Now may be the time and here the place. A small spark can start a massive change (a tipping point). A single county's decision to rethink "business as usual" and consider the long term sustainability of a community can encourage others to follow. I hope that is the spark Larimer County chooses to make, not one that creates another all consuming wildfire of rampant urban development.

Thank you for your time.

Respectfully,

Michael Anthony

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 Application

1 message

Jeanne Strathman <jeannestrathman@aol.com> Tue, May 26, 2020 at 9:08 PM
To: rhelmick@larimer.org

Dear Rob,

As a resident of the Eagle Lake neighborhood, I am writing you to ask that Larimer County not approve the 1041 Application that is before you for a pipeline through the county by Northern Water (NISP). The issues revolving around this application and the reasons it should be denied closely mirror that of the City of Thornton 1041 pipeline application that was rejected by the Board of County Commissioners.

Specifically, here are some of the reasons the County rejected the Thornton application and should do so as well with the NISP application:

1) According to the Land Use Code criteria quoted by the Board of Commissioners, the proposal is inconsistent with the county Master Plan affecting land use and development, specifically that the route will be traversing through significant amounts of private property and through yards in the Eagle Lake neighborhood. Private easements will have to be obtained through eminent domain. Affected residents will not be permitted to construct permanent structures or plant landscape material with deep roots (trees, wind blocks, etc) on their property due to the pipeline easement and maintenance requirements. Affected residents will be subject to continual intrusion on their land by maintenance crews checking on the pipeline in perpetuity. This is a gross infringement of their right to a peaceful existence on their property and our right to restrict non-resident traffic on our privately owned roads.

2) In addition, according to Northern Water's Construction Approach document, they are anticipating using HOA owned private roads for construction traffic throughout the five segments of construction on the pipeline near and through our neighborhood.

The timeline of the cumulative impact to us is anticipated to be 59 weeks from start to finish for all the segments! They are asking to use our narrow, non-public grade roads for heavy truck traffic and daily construction crew traffic on our private roads dozens of residents use daily to enter and exit our subdivision. This is an unacceptable burden on us and again is a gross infringement on our neighborhood and our rights to a peaceful existence that is inconsistent with the Master Plan's stated goal of "maintaining and enhancing our county's quality of life and to be fundamentally fair to all our citizens and to respect their individual rights." A quiet residential neighborhood with children playing, residents coming and going, and retirees enjoying the peaceful time they've earned is not a place for construction staging for a project that has no benefit for its residents and even minimal benefit to Larimer County as a whole. The concept and thought of using our roads for this purpose is untenable.

3) The NISP 1041 application negatively impacts public health and safety in our neighborhood. Our private roads are narrow roads and not constructed to handle large, semi-tractor trailer traffic loaded with pipe sections and construction materials for pipeline construction. The roads were not built to handle the volume of traffic or the load. Having these vehicles on our roads creates a safety hazard for children, bicyclists, walkers and resident traffic entering and leaving driveways. In addition, some of our older residents with health issues are at risk due to the constant coming and going of non-resident truck traffic. Noise levels, pollution from diesel vehicles, and anxiety from interruptions to our peaceful existence can all lead to increased health problems for all residents.

4) In the Land Use Code criteria for consideration by the County, Criteria C states its purpose is to "Promote the economic stability of existing land uses that are consistent with the Master Plan and protect

them by incompatible or harmful land uses." The proposed pipeline is certainly an incompatible and harmful use of the land in our neighborhood.

We recently annexed three parcels to our HOA (the TIPS Development) whose owner was required by the County to development certain aspects of the land (drainage, roads, etc) to be approved by the County before being allowed to offer the plots for sale and final residential development. The owner has spent thousands of dollars to prepare this land, yet the proposed pipeline path crosses near or on some of the new parcels rendering them virtually unsellable until the pipeline is built and completed. No buyer will pay a premium price for a parcel with the amount of disruption, uncertainty of building site and septic placement, and ongoing nuisance this project will cause to these three parcels for well over a year. The County is in effect killing the owner's ability to sell his parcels and recoup his already substantial investment that the County has made him invest to get the land ready for development. This is not "promoting the economic stability of existing land uses" (ie. Residential development) or "protecting incompatible and harmful land uses".

Other residents in our neighborhood who may be contemplating or are in the process of listing their property are also economically negatively impacted by the proposed pipeline. Buyers will use every reason to lower the price on a sale and a year or more of construction traffic, noise, dirt and dust flying in the neighborhood are good leverage points for them to either not buy at all, or attempt to attain a lower selling price than normal. The County is truly hurting the economic stability of the whole neighborhood with this proposal and hundreds of thousands of dollars in values may be lost if the application is approved.

5) Northern Water has presented other reasonable siting and design alternatives that do not include bisecting resident's property or cutting through our neighborhood that they have dismissed due to cost or more difficult construction conditions like their N2.4 (north of Reservoir #3) and N2.5 routes (Douglas Road). The Board of County Commissioners rejected reasoning that expense or difficulty of construction were disqualifying reasons for rejecting routes over ones that impacted private property owners and individual rights in the Thornton pipeline application. Northern's preferred N2.1 route severely impacts our rights as property owners and citizens and should similarly be dismissed by the Commissioners when there are viable alternate routing options.

6) Another issue of grave concern to the Commissioners in the Thornton application was the construction and pipeline proximity to occupied dwellings. Proximity of construction and construction impact along with the long-term detriment to property owners was a primary concern. The Northern Water proposal includes a 100' easement – a 40' construction easement and a 60' permanent easement. If the pipeline were to be placed on the property line between the two residences the proposed N2.1 routing prefers, that will put the easement only 30 feet or less from one of the residences. The disruption and imposition on private property this close to an occupied dwelling is unacceptable when there are route alternatives that do not cross private property between two dwellings.

7) The other major point that should either cause the county to reject the application or defer a decision until later is the Thornton pipeline issue now pending before the courts. The proposed routing of their pipeline has almost identical routing alternatives to Northerns. Both entities are in the review process at the same time with construction timelines that are similar. Multiple times in the record for Larimer County in the proceedings with Thornton, both Thornton, Northern Water, and the County mentioned or agreed that co-location of the two pipelines along their nearly identical paths made sense and should be pursued. It has been discussed between all three parties on numerous occasions and should be part of the discussion now.

In fact, one of the objections the Board of County Commissioners expressed to deny the Thornton pipeline by only submitting an application for one of their proposed pipelines in isolation from their planned future ones was that, **"Thornton deprives the Board and public of the opportunity to consider cumulative impacts and the effectiveness of mitigation. A route that may be appropriate for a single pipeline may be inappropriate for additional pipelines. If this information is not considered now, future pipelines may not be able to co-locate which would result in the disorderly development of Thornton's project and compound the impacts on Larimer County through multiple different pipelines in separate locations."**

How is this not the case with the proposed Northern pipeline and Thornton's pipeline, both of which are looking at nearly identical routing alternatives? This is not just an issue of "disorderly development and compounding of the impacts" on Larimer County – it is the disorderly development and compounding of the impacts on Eagle Lake in a much shorter timeframe than the proposed build out of the future Thornton pipelines. And how is the reverse not true – that a route that may be inappropriate for a single pipeline due to cost and difficulty of construction may be entirely appropriate for the combined resources

of two pipelines from two well-funded entities with capable engineering that will minimize the impacts not only on Larimer County but the Eagle Lake neighborhood that is the target of two separate pipelines?

The precedent for this is Section A.2 of the Land Use Code itself that says the Code is intended to:

"A. Provide for the physical development of the county in order to:

1. Preserve the character and quality of rural and urban areas;

2. Foster convenient, harmonious and workable relationships among land uses; and

3. Achieve the principles and strategies described in the master plan."

This alone should allow the County to consider co-location as part of the process in both the Thornton and Northern Water 1041 applications. In addition, the Colorado Supreme Court noted that the purpose of the 1041 statute is to allow state and local governments to "supervise land use which may have an impact on the people of this state beyond the immediate scope of the project." Colorado Land Use Commission v. Board of County Comm'rs of Larimer County, 604 P.2d 32, 34 (Colo. 1979). The reference to impacts "beyond the immediate scope of the project" suggests that the Commissioners can and should consider the relationship between the project under consideration and other projects. Such sensitivity would definitely further the statute's apparent purpose of "protection of the utility, value, and future" of land, which the statute states is in the public interest. C.R.S. § 24-65.1-101(1)(a).

For these reasons, I ask the Planning Commission and the Board of County Commissioners reject the Northern Water 1041 application until such time that there is resolution to the Thornton 1041 application so that both pipelines can apply for a co-location routing option where both entities can share costs and choose routes they might not otherwise consider around residential areas. Our specific properties and the Eagle Lake neighborhood should not have to shoulder the burden of these two projects for the sake of Larimer County.

Stan and Jeanne Strathman

4451 Eagle Lake Drive

Fort Collins, CO 80524

May 26, 2020

Comments: Northern Integrated Supply Project 1041

I started paying attention to this pipe situation about 3 years ago after my neighbor mentioned some people were on his property looking at possibly putting in a big pipe line. I ended up at a meeting about the Thornton pipe and realized the neighbor had been talking about another pipe project. Finally someone clarified that there were two pipes being proposed and I had heard about NISP. The pipe directly affects me and my property and yet I was not included in the notification process.

Since then I have attended meetings that I felt I needed to be at to look out for my interests. I am not part of any group; I will limit my comments to just that area of the Northern Tier Pipeline I have expertise, knowledge, and concerns about. My father was a water geologist with the federal government and would take me along when he was doing field work trying to solve water problems. A lot of the problems he showed me are similar to what I see in the report here.

I attended the public open house at the Drake Center several months ago and discussed with NISP personnel my concerns at that time. They urged me to fill out a card because what I was telling them had not been brought up before. I was told that it would be passed on to an engineer or someone with the project and I would be contacted. The company representatives at the meeting said they wanted to work with me.

Months later and I have heard from no one. They have submitted their plan and no changes that address my concerns were made. You would think that when they are trying. Clearly this is telling in terms of the response I/we will get after their plan has been approved.

Many years ago, when I was in high school science class, we were taught the final report/outcome of an investigation is only as good as the data collected and used to make a conclusion. I have looked at two reports: No. 12 Ground water modeling report, and just page 10 (of 32) of No. 10 Northern Tier Pipeline. The information in both reports, regarding the ½ mile section near my house, is seriously wrong. The

No. 12 report shows the proposed route for the pipe running along the south edge of Windsor #8 Annex reservoir. At the west point, ground water depth is stated to be at 10 feet. The proposed pipe heads south east to a point where it connects to the 900 block of Grey Rock. The ground water depth is shown at 15 feet and going to 30 feet deep by the time it crosses Co. Rd. 13.

This is absolutely incorrect. Three separate soils tests done in the Grey Rock area, done prior to building homes, show the ground water depth at 5 ft. 6 in. and running across the top of a layer of bedrock that sits at 8 feet.

We have determined during the 10 years we have lived at 989 Grey Rock that there is in fact a gravel bed on top of the bed rock that conveys water from beneath Annex #8 to the south east, *just where the NIPS pipe is slated to go.*

When we built our house, we raised the house foundation out of the ground and installed 2 sump pumps because of the water situation. Since moving in I have had to add three more large pumps to keep the water out of the area under our house. In the summer months when the reservoir is full, we have to pump 6000 gallons of water a day to keep the area semi dry.

The location and direction of the pipe line will make the situation much worse. This proposed location is not where the pipe line should be run.

Along Co. Rd. 56 would be a better choice. It would be more difficult running it between the two reservoirs but if something went wrong the water would be contained in the lower of the two reservoirs and not flood surrounding homes.

My second concern is information that I see in Report #10, page 10 out of 32. Again my concerns are just in my area, not other areas. There are issues with the accuracy of what is being reported. Other accuracy issues may be present throughout the report but I don't know that.

Issue 1: Grey Rock, west from Co. Road 13 is a self-maintained, narrow lane on a county road easement. The # 10 document shows the lane

going through to Colorado Route 1. *It does not go through;* there is a several hundred foot privately owned section that the owner will not allow others to use. When the pipe is being put in, both east and west from Co. Rd. 13, which will completely block access to all of those homes during the period of construction. Fire protection will also be blocked. There is no alternative access into these properties, as was discussed during the open house.

Issue 2: Our utilities for our homes, water, gas, electric, and phones which run in the street easement will all be destroyed with the present pipe location. A more rural pipe location would likely not affect near as many homes.

Issue 3. Ditches on the map are not accurately shown. The people doing the work did not spend the needed time checking their facts. In one case, a ditch I see marked as existing has not carried water for at least 40 years. It ran through the back corner of our old house in NE Fort Collins and had been filled in 40 years ago. Current North Poudre ditches, at least two, are not shown. Both would be affected by the proposed pipeline route. Piping was recently installed in one of those ditches two years ago; it would be destroyed by the installation of the new pipe. The second is a concrete ditch that would be expensive to replace after the construction equipment broke it up.

Third concern: Revegetation of the area where the pipe will be run. Looks good on paper with nice pictures to back up the idea. Real life is a whole different situation. I will use my own example from just a couple of years ago when some neighbors decided to show up on my property and put in a plastic pipe line on their small ditch.

They did not notify Larimer county government, apply for permits, or put it in correctly. They ran their pipe through the county culvert pipes under the roads that were there to handle run off water. They used our road material to back fill around the pipe and did not replace it. When the pipe laying was finished, they did not level out the back fill over the pipe and refused to pay to cover any of the revegetation cost. The

county was made aware of what was going on and in the end did nothing to help or correct the situation.

My neighbors and I were responsible for purchasing our own grass seed, leveling the ground, planting the seed, and watering it Since the county has a history of not helping in these situations, I envision a similar outcome with this pipe revegetation project, only on a much grander scale.

Where is the water coming from for all of the property owners whose land was destroyed? This is an arid climate and many years there is not enough rainfall to bring the seed up and keep it alive while the roots grow and spread to support it. Even if there is sufficient moisture, to get it started it will take years without some supplemental water to return the pastures back to the original condition. You will be looking at a 50 mile long, 100ft. wide weed patch, in violation of the County weed ordinances.

In conclusion you are making decisions that will greatly affect people's lives without accurate information about what conditions exists where the pipe line is being proposed. Here's a solution: run the pipe line along County Rd. 56 until just little past its junction with County Road 13 and then turn diagonally southeast through open fields.

Much of this land is under the control of Thornton and they should be willing to help make it happen. It would avoid several road crossing problems and wet land issues.

Thank you for your time and consideration of my comments.

Karl Swenson

989 and 901 Grey Rock

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 application

1 message

Nancy Terry <nterry@pmglending.com> Wed, May 27, 2020 at 9:50 PM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>
Cc: Nancy Terry <nterry@pmglending.com>

Dear Rob,

I'm a resident of Eagle Lake. We bought our lot in 1991 and built in 1992.

This is not meant to be flip. it's a sincere question: Did people from NISP ever drive down Hood Lane (a/k/a "the ditch road") before they proposed it be used as a staging site for the pipeline installation? When I think of heavy machinery and materials rumbling down the ditch road – the same ditch road that is immediately next to *and higher than the residence below?* It simply is too dangerous. If a truck were to go off the road it would land on top of the Hauan residence. I know citizens' safety is of paramount concern to the County in approving any route!

That fact alone should make it a non-starter, but if more is needed any plan to access the ditch road from Eagle Lake Dr. is also unmanageable.

- the gate opening is too small. Trucks can't thread between the stone and wrought iron privacy gates and the stone center median. I've watched trucks try to squeeze between the gates too many times. The openings are too tight.

- the turn onto Hood Ln. from Eagle Lake Dr. is too sharp, greater than 90 degrees. And the bridge is immediately preceding. Trucks would necessarily need to jockey back and forth to get onto the ditch road.

- The ditch road itself is not safe for heavy equipment. Charlie Meserlian has obviously spent much material, labor and money on maintaining the ditch road. But it is an ongoing effort. The bank has eroded in several places under the road. A heavy truck just slightly right of center could cave in the entire road and land in the ditch.

- Eagle Lake has private roads. The County declined to accept the maintenance of the streets in Eagle Lake when the subdivision was developed. Eagle Lake's HOA has done an excellent job of maintaining our roads. Why should we accept allowing NISP to use our roads? Private roads should be respected by NISP and the County. *I can picture NISP's trucks instead choosing to use the Eagle Lake South entrance, as it is more negotiable. It also would mean trucks would drive though the entire neighborhood, on our private roads that we maintain with our money.*

The County should decline NISP's 1041 application for the same reason Thornton's 1041 was denied: County Commissioners first sent Thornton back to the drawing board because they (the County) said Thornton had not sufficiently researched other routes. The County denied the final 1041 application citing "the project's anticipated impact on private lands." Thornton's preferred route along Douglas Rd. was largely in the *public right-of-way or road easements.* NISP's 1041 application is *primarily through private land*: Hood Lane, owned by Hauan, Tips and Miserlian, Eagle Lake, owned by our neighborhood, through the Bieritz and Helgeson lots, across Tips' land, impacting his three

new lots, just north of Belcher's lot, etc. And the planned route presented by NISP now is the same route they identified 3 or 4 years ago when we first learned of NISP's plans. Where is their serious vetting of alternative routes?

NISP's 1041 should also be denied because the County should demand that NISP and Thornton co-locate if their pipelines are to run through Larimer County essentially during the same time and along similar paths. To not do so amounts to "planning malpractice." To require Larimer County residents in general, and Eagle Lake homeowners specifically, to shoulder the burden of other cities' and counties' desires for more growth is not acting in the interests of your own constituents: the people whom you are elected or hired to represent.

In this new age of Covid-19 perhaps we can learn that *more growth* should not be seen as inevitable and always desirable. People have a right to keep their communities "as they are".

Respectfully submitted,

Nancy Terry

Nancy Terry
Loan Originator
NMLS #291957
nterry@pmglending.com
View My Website
3665 John F Kennedy Pkwy
Fort Collins, CO 80525

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Rob Helmick <helmicrp@co.larimer.co.us>

NISP

1 message

Charmaine Stavedahl <stavedahlc@gmail.com> Wed, May 27, 2020 at 1:29 PM
To: Rob Helmick <helmicrp@co.larimer.co.us>, jkefalas@larimer.org, Steve Johnson <swjohnson@larimer.org>, Tom Donnelly <donnelt@co.larimer.co.us>, pcboard@larimer.org

I am writing this for inclusion in the review packet for NISP.
I am against the NISP 1041 proposal for multiple reasons, but I will speak to only one, my biggest concern.
I read the first proposal several years ago and was most alarmed at the fact that the Glade Reservoir site is situated over a toxic plume. I have seen very little further mention of this until Tom Sale sent in his 42 page review of NISP.
Page 7-9:
"Pushing the Missile Site Chlorinated Solvent Plume into Domestic Drinking Water Wells."
"...DoD Nuclear Missile Site at the base of the Glade Dam created a large plume of CARCINOGENIC CHLORINATED SOLVENTS in the ground water that currently passes out beneath the proposed fore bay for Glade."
Apparently NISP installed over 20 monitoring wells in 2019 located throughout the plume, but no public records exist sharing any data from these wells. Apparently, NISP has some concerns here.
The following pages show maps of the plume and the location of the wells within the plume.
Why would any municipality want to purchase water from such a tainted location? Is this the reason this information has been buried these last few years? I have seen no public comment on this issue until Mr. Sale sent his review.
I cannot understand why this project continues to progress and be considered viable. I consider this criminal behavior, putting the health of so many at such risk.
Do not allow NISP to become a reality.
Charmaine Stavedahl
No Pipe Dream

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 Permit Application; Project No. 20-ZONE 2657

1 message

Mikesky, Alan E <amikesky@iupui.edu> Wed, May 27, 2020 at 2:15 PM
To: "tdonnelly@larimer.org" <tdonnelly@larimer.org>, "jkefalas@larimer.org" <jkefalas@larimer.org>, "swjohnson@larimer.org" <swjohnson@larimer.org>, "rhelmick@larimer.org" <rhelmick@larimer.org>

Dear Commissioners Kefalas, Johnson, Donnelly and Senior Planner Helmick,

I write this le er to voice my opposion t o the NISP project. To be clear, I recognize the importance of water acquision and s torage to meet the growing needs of Colorado and its ciz ens. However, I am opposed to the NISP and its proposed outdated, shortsighted, inefficient, environmentally destrucv e and costly plan to address northern Colorado's present and future water needs. So as not to take too much of your valuable me, m y comments will be summav e and brief.

First and most importantly, NISP planners have not presented a thorough discussion of viable alternav es in their proposal. This is one of the key criteria that "must" be met for the approval of a 1041 permit. There is a reason why they have skirted doing a thorough review and assessment of alternav e plans. The reason is that there are be er opons f or meeng northern Color ado's present and future water needs. Building dams for reservoir water storage is outdated, infrastructurally costly (i.e., construcon and main tenance), inefficient (i.e., water evaporav e losses), and environmentally disrupv e. These are all reasons why dam projects are actually on the decline naonally and in ternaonally .

Second, I hope the polic al clout of Colorado's water organizaons and NISP 's historical longevity (i.e., 20+ years) and sizable monetary outlay to date (i.e, > $50 million) in no way cast biases that would influence anything other than very careful scrun y of the proposal. NISP's proposal is not the answer to our water needs and it is me t o abandon this outdated and inferior plan.

Third, the suggeson tha t there will be a recreaonal bene fit to Larimer county ciz ens as a reason for support is a thinly veiled distracon and ar guably not a benefit at all. First it will take years to complete the dam and then to actually fill Glade reservoir. Once in operaon, the Glade r eservoir will undergo large fluctuaons in w ater levels, potenally e ven greater than Horsetooth reservoir, to meet water needs. Water level fluctuaons neg av ely affect reservoir use and its offering as a consistent recreaonal and ec onomic asset to Larimer county and its residents. In addion, the support ser vices (i.e., operaonal, main tenance and emergency) of the proposed recreaon ar ea will be costly to Larimer county residents. As frequent boang user s of Horsetooth reservoir, my wife and I have experienced early closures or restricv e boang use of Satanka Cove due to budgetary issues. Addionally , similar to what occurs at Horsetooth, low water levels will make Glade reservoir narrow and dangerous. In fact, in Horsetooth reservoir we stop boang during low water levels because of the effect on the width of the reservoir and its effect on water use (boang , jet skis, paddle boarding, kayaking, etc.) density and safety. As a result, the economic and recreaonal bene fits of Glade reservoir to Larimer county residents will be years in the offing, operaonally expensive, and recreaonally inc onsistent.

In conclusion, a thorough discussion of viable alternav es has not been addressed and as a result, I urge you to vote to reject this applicaon. Ther e are significantly be er alternav es than what is proposed by NISP. Dam construcon has bec ome obsolete and the NISP 20+ years plan is now outdated. Please do not allow the inera of the NISP 's longevity and historical costs to play a role in your consideraon as t o its role

in meeng Color ado's present and future water needs.

Sincerely,
Alan Mikesky, Ph.D.
Larimer County Resident
County Road 29C Resident

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Water Pipeline

1 message

Liz Spencer <lizrspencer@gmail.com> Thu, May 28, 2020 at 4:46 PM
To: rhelmick@larimer.org

Hi Mr Helmick,

I'm writing as a resident of Eagle Lake who is concerned about the proposed Northern Water pipeline route through my neighborhood. In my opinion, it does not make any sense to consider letting a company bulldoze through a private neighborhood when

1. there are routes just slightly north which would avoid much private property.
2. there is another pipeline in the works which may be routed down public roadways. This same routing could be used for both projects at the same time, minimizing disruption to the area and the use of private lands.
3. the access to the currently proposed route is not conducive to large trucks and construction equipment. In fact, it may not even be physically possible, which makes me wonder how much research Northern Water did into the proposed route. It is very doubtful that what they currently propose would work.

Please consider these things when reviewing Northern Pipeline's proposal. There are better ways to go about building this pipeline, it will just take a bit more work to figure out the best ways.

Thank you for your time,
Liz Spencer
416 Deerfield Cir.

1899

Rob Helmick <helmicrp@co.larimer.co.us>

NISP Pipeline

1 message

palopez48@aol.com <palopez48@aol.com> Thu, May 28, 2020 at 5:35 PM
Reply-To: palopez48@aol.com
To: "rhelmick@larimer.org" <rhelmick@larimer.org>

Rob Helmick,
I am a resident at 4533 Eagle Lake South in the Eagle Lake subdivision and have been for twenty years. My residence is on the NE shore of reservoir #3. For the past two years, we have been involved in listening to the many different opinions offered for the placement of the Thornton pipeline whose water would be drawn from reservoir #3. No final decision has yet been made on this pipeline but regardless of which option is selected, our neighborhood is certain to suffer substantial financial and quality-of-life losses as a result.

The NISP pipeline is now contemplated to also pass through our neighborhood by going between reservoirs, under our streets, and through some of the home's private property. These two projects together stand to destroy our beautiful neighborhood. Many alternative ideas have been offered that involve different routes or pipeline co-locating. I would hope that the parties involved can use their great wisdom and come to a solution that does not cause such a hardship to one neighborhood.

Respectfully,

Pedro Lopez
4533 Eagle Lake South

1900

Rob Helmick <helmicrp@co.larimer.co.us>

Proposed NISP Pipeline Construction Plan through Eagle Lake Subdivision

1 message

Patrick Mcguigan <mcguigan62@yahoo.com> Thu, May 28, 2020 at 3:36 PM
To: Rob Helmick <rhelmick@larimer.org>
Cc: Patrick Mcguigan <mcguigan62@yahoo.com>

Dear Mr. Helmick,

I'm writing you today to express our strong opposition to the pipeline route being proposed by Northern Integrated Supply Projects through the Eagle Lake Sub Division where my wife and I have lived for the past 23 years.

Our objection to this proposed pipeline route is that it plows right through our Eagle Lake Subdivision and requires our neighbors to surrender easement construction and maintenance rights through their property. The second concern we have is the fact that NISP is seeking permission from Larimer County to utilize our privately maintained roads to accommodate what will clearly be an enormous amount of truck and trailer traffic moving up and down our streets for a very considerable amount of of time. Piecing together the estimated construction and restoration time frames for each segment of this project results in a total period of disruption to our neighborhood of 59 weeks. I think we can all safely assume the actual total time will be considerably longer than that if this project is approved.

We have a quiet community here in Eagle Lake where younger children can safely use their tricycles and bicycles and other non motorized devices on our roads. Our Seniors feel safe using these roads for their daily exercise walks. Many people who walk and/or cycle our streets are not even residents of Eagle Lake. We allow this kind of activity to take place in the spirit of good community relations. Our gates are open from 5:00 each morning until 11:00 each night. The amount of truck and trailer activity required to complete the portion of this project through our neighborhood presents a major safety issue to our seniors, our children, our guests, and to all other residents of Eagle Lake. There is no question as to the high probability of serious injury, or potentially worse, if this project is allowed to proceed as proposed. We add to that the environmental concerns we have with all the dust, the constant truck noise and emissions, and the obvious wear and tear on our roadways which are neither wide enough nor strong enough to withstand the impact of this much transport weight for such a prolonged period of time.

Along with most of our neighbors, we are both grateful and relieved that the second 1041 proposal from the City of Thornton which essentially followed this same path now being proposed by NISP, was unanimously rejected by the Larimer County Commissioners. At the same time, most of us were greatly disappointed with the rejection of the first 1041 application submitted by the City of Thornton which would have routed their pipeline entirely through public utility easement land as opposed to the utilization of any residential private property. Isn't the whole idea of county owned public easements adjacent to county owned roads intended to accommodate projects such as these?

Our understanding is that there is adequate existing easement width along the Douglas Road corridor to accommodate "both" the Thornton and NISP pipelines. Given that both projects will likely be approved someday in one fashion or another, it makes total sense to us for these two projects to be "viewed" by the Commissioners as a single impact project

with an eye toward identifying the least intrusive route available. In that vein, we're seriously hoping the county will take a strong second look at the previously proposed Douglas Road option, re-evaluate it's impacts compared to every other known option on the table, and subsequently encourage NISP to consider a coordinated effort with the City of Thornton to achieve their mutual needs and goals without forcing unnecessary, disruptive, and damaging intrusions through residential areas such as Eagle Lake.

Thank you for your time and attention.

Patrick and Carol McGuigan
4547 Eagle Lake South
Fort Collins, CO 80524
970-443-3910

1902

Rob Helmick <helmicrp@co.larimer.co.us>

Northern water pipe line

1 message

Jim Keller <jfkellerdds@gmail.com> Thu, May 28, 2020 at 3:57 PM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>

I reside at 5017 Eagle Lake Dr. I Purchased and moved to this property 2 1/2 years ago to enjoy the peaceful friendly and scenic neighborhood and enjoy reservoir three which this property abuts. I am very perturbed, disturbed and saddened by the prospect of Thorton and NISP pipeline project impacting this lifestyle that I expected in my early retirement years. There would be extreme negative affects on our neighborhood including pollution from noise,exhaust and visually. Also the property values would be hurt greatly. To realize that this process would take more than a year is horrible to say the least.
I hope very much that you will reject this project. I feel there are better alternative routes for the pipeline. First being the Douglas Road route or the route north of reservoir three out of our neighborhood.

Thank you for considering these remarks
James Keller

Rob Helmick <helmicrp@co.larimer.co.us>

Proposed NISP 1041 Application

1 message

Reif,John <John.Reif@colostate.edu> Thu, May 28, 2020 at 7:31 PM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>
Cc: Kathy Reif <goldenbaxter@q.com>, "mheiden@eaglelakefchoa.com" <mheiden@eaglelakefchoa.com>

Rob Helmick, Senior Planner

Larimer County Community Development Division

200 W. Oak Street

Suite 3100

PO Box 1190

Fort Collins, CO 80521

Dear Mr. Helmick:

We wish to add our names to the other residents of Eagle Lake to ask that Larimer County not approve the 1041 Application that is before you for a pipeline through the county by Northern Water (NISP). The issues revolving around this application and the reasons it should be denied closely mirror that of the City of Thornton 1041 pipeline application that was rejected by the Board of County Commissioners. The information provided below was developed by the Eagle Lake HOA. We are in complete agreement with the points made in that document, which are reproduced below.

Specifically, here are some of the reasons the County rejected the Thornton application and should do so as well with the NISP application:

1. According to the Land Use Code criteria quoted by the Board of Commissioners, the proposal is inconsistent with the county Master Plan affecting land use and development, specifically that the route will be traversing through significant amounts of private property and through yards in the Eagle Lake neighborhood. Private easements will have to be obtained through eminent domain. Affected residents will not be permitted to construct permanent structures or plant landscape material with deep roots (trees, wind blocks, etc) on their property due to the pipeline easement and maintenance requirements. Affected residents will be subject to continual intrusion on their land by maintenance crews checking on the pipeline in perpetuity. This is a gross infringement of their right to a peaceful existence on their property and our right to restrict non-resident traffic on our privately owned roads.
2. In addition, according to Northern Water's Construction Approach document, they are anticipating using HOA owned private roads for construction traffic throughout the five segments of construction on the pipeline near and through our neighborhood.

The timeline of the cumulative impact to us is anticipated to be 59 weeks from start to finish for all the segments! They are asking to use our narrow, non-public grade roads for heavy truck traffic and daily construction crew traffic on our private roads dozens of residents use daily to enter and exit our subdivision. This is an unacceptable burden on us and again is a gross infringement on our neighborhood and our rights to a peaceful existence that is inconsistent with the Master Plan's stated goal of "maintaining and enhancing our county's quality of life and to be fundamentally fair to all our citizens and to respect their individual rights." A quiet residential neighborhood with children playing, residents coming and going, and retirees enjoying the peaceful time they've earned is not a place for construction staging for a project that has no benefit for its residents and even minimal benefit to Larimer County as a whole. The concept and thought of using our roads for this purpose is untenable.

3) The NISP 1041 application negatively impacts public health and safety in our neighborhood. Our private roads are narrow roads and not constructed to handle large, semi-tractor trailer traffic loaded with pipe sections and construction materials for pipeline construction. The roads were not built to handle the volume of traffic or the load. Having these vehicles on our roads creates a safety hazard for children, bicyclists, walkers and resident traffic entering and leaving driveways. In addition, some of our older residents with health issues are at risk due to the constant coming and going of non-resident truck traffic. Noise levels, pollution from diesel vehicles, and anxiety from interruptions to our peaceful existence can all lead to increased health problems for all residents.

4) In the Land Use Code criteria for consideration by the County, Criteria C states its purpose is to "Promote the economic stability of existing land uses that are consistent with the Master Plan and protect them by incompatible or harmful land uses." The proposed pipeline is certainly an incompatible and harmful use of the land in our neighborhood.

We recently annexed three parcels to our HOA (the TIPS Development) whose owner was required by the County to development certain aspects of the land (drainage, roads, etc) to be approved by the County before being allowed to offer the plots for sale and final residential development. The owner has spent thousands of dollars to prepare this land, yet the proposed pipeline path crosses near or on some of the new parcels rendering them virtually unsellable until the pipeline is built and completed. No buyer will pay a premium price for a parcel with the amount of disruption, uncertainty of building site and septic placement, and ongoing nuisance this project will cause to these three parcels for well over a year. The County is in effect killing the owner's ability to sell his parcels and recoup his already substantial investment that the County has made him invest to get the land ready for development. This is not "promoting the economic stability of existing land uses" (ie. Residential development) or "protecting incompatible and harmful land uses".

Other residents in our neighborhood who may be contemplating or are in the process of listing their property are also economically negatively impacted by the proposed pipeline. Buyers will use every reason to lower the price on a sale and a year or more of construction traffic, noise, dirt and dust flying in the neighborhood are good leverage points for them to either not buy at all, or attempt to attain a lower selling price than normal. The County is truly hurting the economic stability of the whole neighborhood with this proposal and hundreds of thousands of dollars in values may be lost if the application is approved.

5. Northern Water has presented other reasonable siting and design alternatives that do not include bisecting resident's property or cutting through our neighborhood that they have dismissed due to cost or more difficult construction conditions like their N2.4 (north of Reservoir #3) and N2.5 routes (Douglas Road). The Board of County Commissioners rejected reasoning that expense or difficulty of construction were disqualifying reasons for rejecting routes over ones that impacted private property owners and individual rights in the Thornton pipeline application. Northern's preferred N2.1 route severely impacts our rights as property owners and citizens and should similarly be dismissed by the Commissioners when there are viable alternate routing options.
6. Another issue of grave concern to the Commissioners in the Thornton application was the construction and pipeline proximity to occupied dwellings. Proximity of construction and construction impact along with the long-term detriment to property owners was a primary concern. The Northern Water proposal includes a 100' easement – a 40' construction easement and a 60' permanent easement. If the pipeline were to be placed on the property line between the two residences the proposed N2.1 routing prefers, that will put the easement only 30 feet or less from one of the residences. The disruption and imposition on private property this close to an occupied dwelling is unacceptable when there are route alternatives that do not cross private property between two dwellings.
7. The other major point that should either cause the county to reject the application or defer a decision until later is the Thornton pipeline issue now pending before the courts. The proposed routing of their pipeline has almost identical routing alternatives to Northerns. Both entities are in the review process at the same time with construction timelines that are similar. Multiple times in the record for Larimer County in the proceedings with Thornton, both Thornton, Northern Water, and the County mentioned or agreed that co-location of the two pipelines along their nearly identical paths made sense and should be pursued. It has been discussed between all three parties on numerous occasions and should be part of the discussion now.

In fact, one of the objections the Board of County Commissioners expressed to deny the Thornton pipeline by only submitting an application for one of their proposed pipelines in isolation from their planned future ones was that, **"Thornton deprives the Board and public of the opportunity to consider cumulative impacts and the effectiveness of mitigation. A route that may be appropriate for a single pipeline may be inappropriate for additional pipelines. If this information is not considered now, future pipelines may not be able to co-locate which would result in the disorderly development of Thornton's project and compound the impacts on Larimer County through multiple different pipelines in separate locations."**

How is this not the case with the proposed Northern pipeline and Thornton's pipeline, both of which are looking at nearly identical routing alternatives? This is not just an issue of "disorderly development and compounding of the impacts" on Larimer County – it is the disorderly development and compounding of the impacts on Eagle Lake in a much shorter timeframe than the proposed build out of the future Thornton pipelines. And how is the reverse not true – that a route that

may be inappropriate for a single pipeline due to cost and difficulty of construction may be entirely appropriate for the combined resources of two pipelines from two well-funded entities with capable engineering that will minimize the impacts not only on Larimer County but the Eagle Lake neighborhood that is the target of two separate pipelines?

The precedent for this is Section A.2 of the Land Use Code itself that says the Code is intended to:

“A. Provide for the physical development of the county in order to:

1. Preserve the character and quality of rural and urban areas;

2. Foster convenient, harmonious and workable relationships among land uses; and

3. Achieve the principles and strategies described in the master plan.”

This alone should allow the County to consider co-location as part of the process in both the Thornton and Northern Water 1041 applications. In addition, the Colorado Supreme Court noted that the purpose of the 1041 statute is to allow state and local governments to “supervise land use which may have an impact on the people of this state beyond the immediate scope of the project.” Colorado Land Use Commission v. Board of County Comm’rs of Larimer County, 604 P.2d 32, 34 (Colo. 1979). The reference to impacts “beyond the immediate scope of the project” suggests that the Commissioners can and should consider the relationship between the project under consideration and other projects. Such sensitivity would definitely further the statute’s apparent purpose of “protection of the utility, value, and future” of land, which the statute states is in the public interest. C.R.S. § 24-65.1-101(1)(a).

For these reasons, we ask the Planning Commission and the Board of County Commissioners reject the Northern Water 1041 application until such time that there is resolution to the Thornton 1041 application so that both pipelines can apply for a co-location routing option where both entities can share costs and choose routes they might not otherwise consider around residential areas. Our specific properties and the Eagle Lake neighborhood should not have to shoulder the burden of these two projects for the sake of Larimer County.

Sincerely,

John S. Reif, D.V.M.,

Kathleen D. Reif

4638 Eagle Lake S

Fort Collins, CO 80524

Rob Helmick, Senior Planner
Larimer County Community Development Division
200 W. Oak Street
Suite 3100
PO Box 1190
Fort Collins, CO 80521

Dear Rob,

As a resident of the Eagle Lake neighborhood, I am writing you to ask that Larimer County not approve the 1041 Application that is before you for a pipeline through the county by Northern Water (NISP). The issues revolving around this application and the reasons it should be denied closely mirror that of the City of Thornton 1041 pipeline application that was rejected by the Board of County Commissioners.

Specifically, here are some of the reasons the County rejected the Thornton application and should do so as well with the NISP application:

1) According to the Land Use Code criteria quoted by the Board of Commissioners, the proposal is inconsistent with the county Master Plan affecting land use and development, specifically that the route will be traversing through significant amounts of private property and through yards in the Eagle Lake neighborhood. Private easements will have to be obtained through eminent domain. Affected residents will not be permitted to construct permanent structures or plant landscape material with deep roots (trees, wind blocks, etc) on their property due to the pipeline easement and maintenance requirements. Affected residents will be subject to continual intrusion on their land by maintenance crews checking on the pipeline in perpetuity. This is a gross infringement of their right to a peaceful existence on their property and our right to restrict non-resident traffic on our privately owned roads.
2) In addition, according to Northern Water's Construction Approach document, they are anticipating using HOA owned private roads for construction traffic throughout the five segments of construction on the pipeline near and through our neighborhood. **The timeline of the cumulative impact to us is anticipated to be 59 weeks from start to finish for all the segments!** They are asking to use our narrow, non-public grade roads for heavy truck traffic and daily construction crew traffic on our private roads dozens of residents use daily to enter and exit our subdivision. This is an unacceptable burden on us and again is a gross infringement on our neighborhood and our rights to a peaceful existence that is inconsistent with the Master Plan's stated goal of "maintaining and enhancing our county's quality of life and to be fundamentally fair to all our citizens and to respect their individual rights." A quiet residential neighborhood with children playing, residents coming and going, and retirees enjoying the peaceful time they've earned is not a place for construction staging for a project that has no benefit for its residents and even minimal benefit to Larimer County as a whole. The concept and thought of using our roads for this purpose is untenable.
3) The NISP 1041 application negatively impacts public health and safety in our neighborhood. Our private roads are narrow roads and not constructed to handle large, semi-tractor trailer traffic loaded with pipe sections and construction materials for pipeline construction. The roads were not built to handle the volume of traffic or the load. Having these vehicles on our roads creates a safety hazard for children, bicyclists,

walkers and resident traffic entering and leaving driveways. In addition, some of our older residents with health issues are at risk due to the constant coming and going of non-resident truck traffic. Noise levels, pollution from diesel vehicles, and anxiety from interruptions to our peaceful existence can all lead to increased health problems for all residents.

4) In the Land Use Code criteria for consideration by the County, Criteria C states its purpose is to "Promote the economic stability of existing land uses that are consistent with the Master Plan and protect them by incompatible or harmful land uses." The proposed pipeline is certainly an incompatible and harmful use of the land in our neighborhood.

   We recently annexed three parcels to our HOA (the TIPS Development) whose owner was required by the County to development certain aspects of the land (drainage, roads, etc) to be approved by the County before being allowed to offer the plots for sale and final residential development. The owner has spent thousands of dollars to prepare this land, yet the proposed pipeline path crosses near or on some of the new parcels rendering them virtually unsellable until the pipeline is built and completed. No buyer will pay a premium price for a parcel with the amount of disruption, uncertainty of building site and septic placement, and ongoing nuisance this project will cause to these three parcels for well over a year. The County is in effect killing the owner's ability to sell his parcels and recoup his already substantial investment that the County has made him invest to get the land ready for development. This is not "promoting the economic stability of existing land uses" (ie. Residential development) or "protecting incompatible and harmful land uses".

   Other residents in our neighborhood who may be contemplating or are in the process of listing their property are also economically negatively impacted by the proposed pipeline. Buyers will use every reason to lower the price on a sale and a year or more of construction traffic, noise, dirt and dust flying in the neighborhood are good leverage points for them to either not buy at all, or attempt to attain a lower selling price than normal. The County is truly hurting the economic stability of the whole neighborhood with this proposal and hundreds of thousands of dollars in values may be lost if the application is approved.

5) Northern Water has presented other reasonable siting and design alternatives that do not include bisecting resident's property or cutting through our neighborhood that they have dismissed due to cost or more difficult construction conditions like their N2.4 (north of Reservoir #3) and N2.5 routes (Douglas Road). The Board of County Commissioners rejected reasoning that expense or difficulty of construction were disqualifying reasons for rejecting routes over ones that impacted private property owners and individual rights in the Thornton pipeline application. Northern's preferred N2.1 route severely impacts our rights as property owners and citizens and should similarly be dismissed by the Commissioners when there are viable alternate routing options.

6) Another issue of grave concern to the Commissioners in the Thornton application was the construction and pipeline proximity to occupied dwellings. Proximity of construction and construction impact along with the long-term detriment to property owners was a primary concern. The Northern Water proposal includes a 100' easement – a 40' construction easement and a 60' permanent easement. If the pipeline were to be placed on the property line between the two residences the proposed N2.1 routing prefers, that will put the easement only 30 feet or less from one of the residences. The

disruption and imposition on private property this close to an occupied dwelling is unacceptable when there are route alternatives that do not cross private property between two dwellings.

7) The other major point that should either cause the county to reject the application or defer a decision until later is the Thornton pipeline issue now pending before the courts. The proposed routing of their pipeline has almost identical routing alternatives to Northerns. Both entities are in the review process at the same time with construction timelines that are similar. Multiple times in the record for Larimer County in the proceedings with Thornton, both Thornton, Northern Water, and the County mentioned or agreed that co-location of the two pipelines along their nearly identical paths made sense and should be pursued. It has been discussed between all three parties on numerous occasions and should be part of the discussion now.
In fact, one of the objections the Board of County Commissioners expressed to deny the Thornton pipeline by only submitting an application for one of their proposed pipelines in isolation from their planned future ones was that, **"Thornton deprives the Board and public of the opportunity to consider cumulative impacts and the effectiveness of mitigation. A route that may be appropriate for a single pipeline may be inappropriate for additional pipelines. If this information is not considered now, future pipelines may not be able to co-locate which would result in the disorderly development of Thornton's project and compound the impacts on Larimer County through multiple different pipelines in separate locations."**
How is this not the case with the proposed Northern pipeline and Thornton's pipeline, both of which are looking at nearly identical routing alternatives? This is not just an issue of "disorderly development and compounding of the impacts" on Larimer County – it is the disorderly development and compounding of the impacts on Eagle Lake in a much shorter timeframe than the proposed build out of the future Thornton pipelines. And how is the reverse not true – that a route that may be inappropriate for a single pipeline due to cost and difficulty of construction may be entirely appropriate for the combined resources of two pipelines from two well-funded entities with capable engineering that will minimize the impacts not only on Larimer County but the Eagle Lake neighborhood that is the target of two separate pipelines?
The precedent for this is Section A.2 of the Land Use Code itself that says the Code is intended to:

"A. Provide for the physical development of the county in order to:
1. Preserve the character and quality of rural and urban areas;
2. Foster convenient, harmonious and workable relationships among land uses; and
3. Achieve the principles and strategies described in the master plan."

This alone should allow the County to consider co-location as part of the process in both the Thornton and Northern Water 1041 applications. In addition, the Colorado Supreme Court noted that the purpose of the 1041 statute is to allow state and local governments to "supervise land use which may have an impact on the people of this state beyond the immediate scope of the project." Colorado Land Use Commission v. Board of County Comm'rs of Larimer County, 604 P.2d 32, 34 (Colo. 1979). The reference to impacts "beyond the immediate scope of the project" suggests that the Commissioners can and should consider the relationship between the project under consideration and other projects. Such sensitivity would definitely further the statute's

apparent purpose of “protection of the utility, value, and future” of land, which the statute states is in the public interest. C.R.S. § 24-65.1-101(1)(a).

For these reasons, I ask the Planning Commission and the Board of County Commissioners reject the Northern Water 1041 application until such time that there is resolution to the Thornton 1041 application so that both pipelines can apply for a co-location routing option where both entities can share costs and choose routes they might not otherwise consider around residential areas. Our specific properties and the Eagle Lake neighborhood should not have to shoulder the burden of these two projects for the sake of Larimer County.

Jeff & Christy Meyer
416 Heron Cove
Fort Collins, CO 80524

1910

Rob Helmick <helmicrp@co.larimer.co.us>

NISP Pipeline proposal

1 message

Sean Shelley <spshelley@aol.com> Thu, May 28, 2020 at 9:44 PM
Reply-To: Sean Shelley <spshelley@aol.com>
To: "rhelmick@larimer.org" <rhelmick@larimer.org>
Cc: "MHeiden@eaglelakefchoa.com" <MHeiden@eaglelakefchoa.com>

Dear Rob,

As a resident of Eagle Lake Subdivision, I am deeply concerned about the 1041 proposal which NISP has presented. NISP has tried to put this through at a time when our county, state, and country have been fighting a pandemic and a devastated economy. I believe they have taken advantage of a time when people are dealing with life and death and very serious concerns about what lies ahead. NISP is trying to squeeze this 1041 in between the pandemic and the election hoping we are so distracted they can get away with it without our input. This must not happen. The construction plan they added at the last minute to the 1041 (I am assuming the county staff recognized it was not there and it was added) is an unacceptable plan for Eagle Lake. No neighborhood should be expected to deal with the devastation of property, property values, roads, and the environment that this proposal would cause.
When NISP was present at the Thornton meetings, they talked about co-locating their pipeline with the Thornton pipeline. This could be done North of Eagle Lake on agricultural land and there is also the Douglas Road right of way which could work for co-location. These two locations must be studied and presented. The proposal before us is the first one they came up with before co-location was discussed. It was not acceptable then. It is not acceptable now.

Our way of life here in Eagle Lake is very special. All of us worked hard to be able to build here. The environment off of the lakes and behind our homes, is home to all types of wildlife. We want to protect and maintain our homes and land. The pipeline proposal would destroy our roads and our property values would come down. NISP must look at other places for this pipeline. Co-location is the answer for the NISP and Thornton pipelines.
I respectfully ask you to reject the NISP 1041.

Sincerely,

Rebecca Shelley

Rob Helmick <helmicrp@co.larimer.co.us>

RE: NISP Pipeline 1041 Application

1 message

Serena <serenaservicesco@gmail.com> Thu, May 28, 2020 at 9:17 PM
To: rhelmick@larimer.org

Rob Helmick, Senior Planner
Larimer County Community Development Division
200 W. Oak Street
Suite 3100
PO Box 1190
Fort Collins, CO 80521

Sent by email on May 28, 2020 to: rhelmick@larimer.org

Dear Rob,

We are Terry and Serena Bieritz.
We have lived at 4835 Eagle Lake Drive in Fort Collins 80524 for 10 years.
We are in our 70's and this is our retirement home.
We both worked full time for 50 years to save for a happy and peaceful retirement.
Our home is located in Segment 4 of the NISP "Construction Approach" document.
That document states they expect to interrupt our lives for 16 weeks of construction.
From the south wall of our home to the southern property line is 92.5 feet.
That south wall is where our master bedroom and office are located on the first floor.
That south wall is where two more bedrooms are located on the second floor.
That south wall is where the finished portion of our basement is located.
Another south wall on the first floor is our sunroom which is all glass on 3 sides.
These rooms constitute the majority of our daily living area.
From our south wall to our southern property line is 92.5 feet.
NISP proposes an easement of 100 feet running west to east along the ENTIRE south side of our property, from our back yard through our front yard to the street.
That path includes fruit trees, irrigation, our septic system, and underground utilities.
That is in essence ONE-THIRD of our 2.6 acre lot!!!
We would not be able to plant trees or build anything EVER AGAIN on that easement.
We are concerned about subsidence issues as a result of drilling so close to our home.
How would YOU feel if NISP was disrupting your parents' lives and taking their property?
NISP should not be allowed to plow through someone's yard in a private neighborhood. PERIOD
There are many empty lots of 10 to 100 acres North of our neighborhood, some of which are for sale right now. They can easily find another route with no improvements.
PLEASE do not allow NISP to ruin our retirement years and disrupt our neighborhood.

You are welcome to come and see our lot for yourself.... call us at 970.672.3772 ... leave a message and we will return your call.

And by the way, Northern Water has never contacted us to discuss their plans.

As a resident of the Eagle Lake neighborhood, I am writing you to ask that Larimer County not approve the 1041 Application that is before you for a pipeline through the county by Northern Water (NISP). The issues revolving around this application and the reasons it should be denied closely mirror that of the City of Thornton 1041 pipeline application that was rejected by the Board of County Commissioners.

Specifically, here are some of the reasons the County rejected the Thornton application and should do so as well with the NISP application:

• According to the Land Use Code criteria quoted by the Board of Commissioners, the proposal is inconsistent with the county Master Plan affecting land use and development, specifically that the route will be traversing through significant amounts of private property and through yards in the Eagle Lake neighborhood. Private easements will have to be obtained through eminent domain. Affected residents will not be permitted to construct permanent structures or plant landscape material with deep roots (trees, wind blocks, etc) on their property due to the pipeline easement and maintenance requirements. Affected residents will be subject to continual intrusion on their land by maintenance crews checking on the pipeline in perpetuity. This is a gross infringement of their right to a peaceful existence on their property and our right to restrict non-resident traffic on our privately owned roads.

• In addition, according to Northern Water's Construction Approach document, they are anticipating using HOA owned private roads for construction traffic throughout the five segments of construction on the pipeline near and through our neighborhood.

The timeline of the cumulative impact to us is anticipated to be 59 weeks from start to finish for all the segments! They are asking to use our narrow, non-public grade roads for heavy truck traffic and daily construction crew traffic on our private roads dozens of residents use daily to enter and exit our subdivision. This is an unacceptable burden on us and again is a gross infringement on our neighborhood and our rights to a peaceful existence that is inconsistent with the Master Plan's stated goal of "maintaining and enhancing our county's quality of life and to be fundamentally fair to all our citizens and to respect their individual rights." A quiet residential neighborhood with children playing, residents coming and going, and retirees enjoying the peaceful time they've earned is not a place for construction staging for a project that has no benefit for its residents and even minimal benefit to Larimer County as a whole. The concept and thought of using our roads for this purpose is untenable.

3) The NISP 1041 application negatively impacts public health and safety in our neighborhood. Our private roads are narrow roads and not constructed to handle large, semi-tractor trailer traffic loaded with pipe sections and construction materials for pipeline construction. The roads were not built to handle the volume of traffic or the load. Having these vehicles on our roads creates a safety hazard for children, bicyclists, walkers and resident traffic entering and leaving driveways. In addition, some of our older residents with health issues are at risk due to the constant coming and going of

non-resident truck traffic. Noise levels, pollution from diesel vehicles, and anxiety from interruptions to our peaceful existence can all lead to increased health problems for all residents.

4) In the Land Use Code criteria for consideration by the County, Criteria C states its purpose is to “Promote the economic stability of existing land uses that are consistent with the Master Plan and protect them by incompatible or harmful land uses.” The proposed pipeline is certainly an incompatible and harmful use of the land in our neighborhood.

We recently annexed three parcels to our HOA (the TIPS Development) whose owner was required by the County to development certain aspects of the land (drainage, roads, etc) to be approved by the County before being allowed to offer the plots for sale and final residential development. The owner has spent thousands of dollars to prepare this land, yet the proposed pipeline path crosses near or on some of the new parcels rendering them virtually unsellable until the pipeline is built and completed. No buyer will pay a premium price for a parcel with the amount of disruption, uncertainty of building site and septic placement, and ongoing nuisance this project will cause to these three parcels for well over a year. The County is in effect killing the owner’s ability to sell his parcels and recoup his already substantial investment that the County has made him invest to get the land ready for development. This is not “promoting the economic stability of existing land uses” (ie. Residential development) or “protecting incompatible and harmful land uses”.

Other residents in our neighborhood who may be contemplating or are in the process of listing their property are also economically negatively impacted by the proposed pipeline. Buyers will use every reason to lower the price on a sale and a year or more of construction traffic, noise, dirt and dust flying in the neighborhood are good leverage points for them to either not buy at all, or attempt to attain a lower selling price than normal. The County is truly hurting the economic stability of the whole neighborhood with this proposal and hundreds of thousands of dollars in values may be lost if the application is approved.

• Northern Water has presented other reasonable siting and design alternatives that do not include bisecting resident’s property or cutting through our neighborhood that they have dismissed due to cost or more difficult construction conditions like their N2.4 (north of Reservoir #3) and N2.5 routes (Douglas Road). The Board of County Commissioners rejected reasoning that expense or difficulty of construction were disqualifying reasons for rejecting routes over ones that impacted private property owners and individual rights in the Thornton pipeline application. Northern’s preferred N2.1 route severely impacts our rights as property owners and citizens and should similarly be dismissed by the Commissioners when there are viable alternate routing options.

• Another issue of grave concern to the Commissioners in the Thornton application was the construction and pipeline proximity to occupied dwellings. Proximity of construction and construction impact along with the long-term detriment to property owners was a primary concern. The Northern Water proposal includes a 100’ easement – a 40’ construction easement and a 60’ permanent easement. If the pipeline were to be placed on the property line between the two residences the proposed N2.1 routing prefers, that will put the easement only 30 feet or less from one of the residences. The disruption and imposition on private property this close to an occupied dwelling is unacceptable

when there are route alternatives that do not cross private property between two dwellings.

• The other major point that should either cause the county to reject the application or defer a decision until later is the Thornton pipeline issue now pending before the courts. The proposed routing of their pipeline has almost identical routing alternatives to Northerns. Both entities are in the review process at the same time with construction timelines that are similar. Multiple times in the record for Larimer County in the proceedings with Thornton, both Thornton, Northern Water, and the County mentioned or agreed that co-location of the two pipelines along their nearly identical paths made sense and should be pursued. It has been discussed between all three parties on numerous occasions and should be part of the discussion now.

In fact, one of the objections the Board of County Commissioners expressed to deny the Thornton pipeline by only submitting an application for one of their proposed pipelines in isolation from their planned future ones was that, ”Thornton deprives the Board and public of the opportunity to consider cumulative impacts and the effectiveness of mitigation. A route that may be appropriate for a single pipeline may be inappropriate for additional pipelines. If this information is not considered now, future pipelines may not be able to co-locate which would result in the disorderly development of Thornton’s project and compound the impacts on Larimer County through multiple different pipelines in separate locations.”

How is this not the case with the proposed Northern pipeline and Thornton’s pipeline, both of which are looking at nearly identical routing alternatives? This is not just an issue of “disorderly development and compounding of the impacts” on Larimer County – it is the disorderly development and compounding of the impacts on Eagle Lake in a much shorter timeframe than the proposed build out of the future Thornton pipelines. And how is the reverse not true – that a route that may be inappropriate for a single pipeline due to cost and difficulty of construction may be entirely appropriate for the combined resources of two pipelines from two well-funded entities with capable engineering that will minimize the impacts not only on Larimer County but the Eagle Lake neighborhood that is the target of two separate pipelines?

The precedent for this is Section A.2 of the Land Use Code itself that says the Code is intended to:

“A. Provide for the physical development of the county in order to:
1. Preserve the character and quality of rural and urban areas;
2. Foster convenient, harmonious and workable relationships among land uses; and
3. Achieve the principles and strategies described in the master plan.”

This alone should allow the County to consider co-location as part of the process in both the Thornton and Northern Water 1041 applications. In addition, the Colorado Supreme Court noted that the purpose of the 1041 statute is to allow state and local governments to “supervise land use which may have an impact on the people of this state beyond the immediate scope of the project.” Colorado Land Use Commission v. Board of County Comm’rs of Larimer County, 604 P.2d 32, 34 (Colo. 1979). The reference to impacts “beyond the immediate scope of the project” suggests that the Commissioners can and should consider the relationship between the project under

consideration and other projects. Such sensitivity would definitely further the statute's apparent purpose of “protection of the utility, value, and future” of land, which the statute states is in the public interest. C.R.S. § 24-65.1-101(1)(a).

For these reasons, we ask the Planning Commission and the Board of County Commissioners to reject the Northern Water 1041 application until such time that there is resolution to the Thornton 1041 application so that both pipelines can apply for a co-location routing option where both entities can share costs and choose routes they might not otherwise consider around residential areas. Our specific properties and the Eagle Lake neighborhood should not have to shoulder the burden of these two projects for the sake of Larimer County.

Terry and Serena Bieritz

1916

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041

1 message

Sean Shelley <spshelley@aol.com> Thu, May 28, 2020 at 8:52 PM
Reply-To: Sean Shelley <spshelley@aol.com>
To: "rhelmick@larimer.org" <rhelmick@larimer.org>
Cc: "MHeiden@eaglelakefchoa.com" <MHeiden@eaglelakefchoa.com>

Dear Rob,

My wife Becky and I live at 4641 Eagle Lake South in the Eagle Lake Subdivision. Here are our objections to the 1041 application as it relates to our neighborhood:

1. 1.No route North or South of our subdivision was studied or presented in this application. There is agricultural land North of Reservoir 3 that would make it possible to co-locate both NISP and Thornton's pipeline and they could share the cost. There is also the possibility of the pipeline using the Douglas Road right of way. These two options should be studied and presented because what they have proposed, is the worst plan possible for our subdivision.
2. 2. No interaction or presentation meetings about NISP's construction have been presented to our neighborhood. When the Thornton pipeline application was going though the review process, the NISP Representatives made it clear to us that they would work with the county and would plan to co-locate their pipeline with Thornton's pipeline. The route they are proposing now is the same one they came up with before discussions of co-location. Therefore, they are planning to use our private roads with no concern whatsoever for the property values of our 92 homes or the safety of residents consisting of young families and retired families who walk and bike these private streets.

3. 3. NISP's construction plan is not feasible because they cannot access the property in the manner NISP's construction plan is presented. Our roads are private and they would have to be completely rebuilt after the construction of this pipeline. Hood Lane is not feasible because of stability and the inability to make turns with heavy equipment.

4. 4. NISP's plan calls for an easement of a hundred feet between two houses that are 135 feet apart. There could be damage to these homes from the vibrations and heavy equipment which will be used.

5. 5. No safety, environmental or private road access plan has been presented. JUST TRUST US is not a plan. If NISP is able to spend millions of dollars and decades of time getting permits from Washington and Denver, and plans to spend billions to build the project, they must be required to spend the necessary time with our neighborhood before a route is approved by the County.

The pipeline needs to go on a public right of way or agricultural land before tearing through neighborhoods. The construction plan was not put in the original application. It was added at the last minute. NISP knew the neighborhood would object so one has to assume that the construction plan was left out on purpose but the County Staff required them to add the construction plan. What else has NISP tried to hide to get approval for the 1041?
We respectfully ask that this application for the 1041 be rejected.

Sincerely,

Sean and Rebecca Shelley

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Water pipeline proposed through Eagle Lake is completely unacceptable.The residents of Eagle Lake are ready to fight this untenable option for the pipeline.

1 message

Charles Sarran <putty575@gmail.com> Thu, May 28, 2020 at 9:08 PM
To: rhelmick@larimer.org

Certainly another routing alternative must be given consideration.

Thank You

Charles and Joyce Sarran
421 Deerfield Circle
Fort Collins, CO

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 Permit application; Project No. 20-ZONE 2657

1 message

Brent Hawley <bhawleys@frii.com> Thu, May 28, 2020 at 2:21 PM
To: Rob Helmick <rhelmick@larimer.org>

From: Brent Hawley

6521 Placer Ct Bellvue, Colo 80512

970-213-5939 bhawley@frii.com

May 27, 2020

To: Larimer County Planning Commission

The purpose of this letter is to ask you to please consider better alternatives to the NISP 1041 permit application: Project No. 20-ZONE 2657. There is **one** reason that the NISP proposal exists, **WATER,** water for the future development of the northern Front Range. I am strongly against the current project plan. As it stands, there are better ways to provide the water at a fraction of the financial and environmental cost.

The Northern Colorado Water Conservancy District has been a key player in the development of water supply in the northern Front Range over the last 85 years. What we take for granted today would not exist if it weren't for their efforts, and I applaud them for that.

Historically, when water supply development plans were designed, usually a dam was at the heart of the plan. We know now that some dams haven't worked out as conceived. In the past 30 years, over 1000 dams have been destroyed in the United States due to high maintenance costs, public safety, and restoration of free flowing rivers. With the seemingly insurmountable barriers to dam building apparent these days, it would seem obvious that different ways of achieving the same goals would be welcome to the planning process. I believe that the right combination of alternatives could provide the water needed for the future population growth on the northern Front Range, done at a fraction of the financial and environmental cost of the proposed NISP project. Unfortunately, large players in the water planning process don't want to hear about cheaper and less damaging options. They have staked their claim on the old school methods, put years and untold millions of dollars into planning and land purchases, and don't want to give alternatives a fair consideration. They say they have – but I don't agree.

This letter is mostly focused on point D-2 of the Larimer County "General requirements for approval of 1041 permit application".

"The applicant has presented reasonable siting and design alternatives or explained why no reasonable alternatives are available".

WATER CONSERVATION

Water Conservation is much more than low flow shower heads, and xeriscaping. It is more about how to use less, and hopefully be a way of life for new growth in a semi-arid environment. Conservation is how to keep what you already have and make the wisest use of it. In my opinion, the northern front range of Colorado **already has** the developed water it will need for the future. It needs to be developed better and smarter, sometimes thinking outside the traditional "box".

Significant Water Losses in Agricultural Irrigation

There are several methods and technologies that when used together, can provide this water at minimal environmental impact, and at a fraction of the financial cost of Glade reservoir. One of the most obvious methods of achieving the water goals of the future is to capture the water lost in **agricultural water irrigation.**

I am a shareholder in North Poudre Irrigation Company (NPIC), a water delivery company that is comprised of hard working, dedicated employees. NPIC's 2019 annual report states that the percentage of water loss due to leaks and evaporation in their system (shrinkage) was calculated at 47%, equaling 39,272 acre feet. NPIC is no different than all of the other 100+ irrigation companies in northern Colorado. Most of the irrigation ditches were built 60 – 100 years ago, and they are all a source of significant water losses.

Ditch companies work tirelessly to improve their systems and reduce shrinkage, but none of them have adequate funds to sizably reduce their losses. Add it all up and there is a staggering amount of water that never gets delivered. What happens to this water? Essentially it escapes the system and goes back into the earth or evaporates.

How to reduce these losses and use the captured volume as part of the NISP goal?

I propose that a "win-win" relationship be established between irrigation companies and the NISP participants (11 towns and 4 water districts). Develop a program for giving financial grants to the irrigation companies to accurately study their water systems, quantify real percentage and volume losses, and design and build the repairs to tighten up shrinkage losses. This would require a water systems engineering association to manage. This program would be financed by the NISP participants. A financial balance is proposed between participating irrigation companies, NISP participants, grants awarded, and the resulting water conserved. A defined percentage of the captured water would go to the NISP partners, and the

remainder of the captured water to be retained by the participating ditch companies.

Summary: The stated goal in the NISP plan is to provide 40,000 acre feet of reliable water for their participating partners. The concept of reducing large water losses in irrigation could probably supply all of the water needed for the future growth of the northern Front Range at a significantly lower cost and environmental impact to building Glade Reservoir**.**

There are additional methods of water management that could add to water savings. They are summarized below.

Rotating Fallow Agreements

About 80% of water on the Front Range goes to agriculture, however this water generates only 20% of the economy. Using rotating fallow agreements, farmers with irrigation water rights could enter into an agreement with their water supplier and NISP to remove a portion of their farmable land from production for one year. That same portion of their water would be then available for NISP. The farmer is paid by NISP the financial value that the removed land would have generated from crop yield. This arrangement would be voluntary to the farmer. This practice would free up considerable water for future growth and doesn't cost the farmer.

Native water rights

New housing subdivisions would utilize existing untreated agricultural water for landscape needs. This does require a second plumbing system to be installed during the house construction process. There is no need to use treated potable water for landscaping. As a result, this practice would significantly reduce the load on water treatment plants. This practice is mentioned in the NISP proposal.

Aquifer Storage and Recovery (ASR)

About 98% of all fresh water on planet Earth is located underground. Because it is out of sight, this water is typically not recognized by most people. The technology of ASR is well developed and used around the world, at construction costs far below that of a new reservoir. Water stored underground is not subject to losses from evaporation like what occurs with reservoir storage. The evaporative losses on Horsetooth Reservoir, at 24" per year, equal 3800 acre feet per year. At current water market value of $40,000 per acre foot, this evaporative loss has a value of $150 million. Using ASR, through a network of subsurface wells, water is stored underground in the geologic strata, to be pumped out and recovered when called for. A large scale example of this application in Colorado is in South West Denver. The denial of the Two Forks Dam project in 1990 did not result in the doom of the towns of Centennial, Highlands Ranch, and Parker. A network of 54 deep water ASR wells was built and life goes on in these towns.

SITE LOCATION

Please refer to the paper written by Dr Tom Sale. He outlines in detail several reasons why the Glade Reservoir site location has major geologic problems that were never mentioned in the US Army Core design. A quick summary of those problems includes:

*** The actual dam construction site sits on top of 2 major geologic faults. The faults are stable but will consist of unconsolidated rubble that will act as a freeway for water loss. You might consider them as a “crack in the bath tub”.

*** The sedimentary strata that comprises the Glade valley is vertically oriented with many layers being very permeable to water flow. It is predicted that water losses due to seepage will be significant.

*** The existing Munroe gravity irrigation ditch currently runs through the Glade valley. The NISP plan puts the ditch in a large steel and concrete pipe secured to the existing ground. When the proposed reservoir is full, the pipe would be submerged by about 80 feet of water. As Dr Sale states: “It is not a matter of if – it’s just a matter of when the pipe fails”. One must consider the worst case scenario in reviewing any structural design. Failure of this pipe could result in all of the water above the pipe draining out of the reservoir, resulting in flooding the valley below. This is basic plumbing – simple as that – only on a giant scale.

*** Missile Silo Toxic Waste Site. The following is from the paper by Dr Tom Sale:

“Historical operations at a DoD Nuclear Missile Site at the base of the Glade Dam created a large plume of carcinogenic chlorinated solvents in groundwater that currently passes out beneath the proposed forebay for Glade. With leakage of water beneath the proposed dam and from the forebay, is seems likely the chlorinated solvent plume will be pushed into domestic water supply wells along County Road 29C . Furthermore, it is anticipated that select portions of the material in the forebay may be hazardous, creating numerous issues including air quality impact and appropriate disposal of excavated materials.”

This paper by Dr Sale is a must read.

The following comment is not part of site considerations or alternatives (point D-2)

Recreation

Northern Water is using the proposed Glade reservoir recreation to sell the project to the Larimer County decision makers. As I study the projected water dynamics of the design, the reservoir would rarely be full enough for quality boating experiences. From Save Rural NOCO website: “The NISP Final Environmental Impact Statement (FEIS) claims overall economic benefits from recreation at Glade will range from $13 to $30 million per year. For comparison, recreation at Horsetooth generated $2.5 million in 2019. Even by generous estimates, visitation at Glade will be roughly half of that at Horsetooth. The FEIS provides no evidence to support Northern’s overinflated recreation value at Glade”. Don’t be fooled by the smoke and mirror deception presented by Northern Water’s recreation sales pitch.

Summary

In conclusion, the topics discussed above can supply the water goals in the NISP plan without building Glade reservoir. The alternative components are truly an “integrated supply project”. They can be built in incremental stages and captured water can be available when any stage is complete. This approach does not put a huge financial load on the participants compared to the extreme cost of building Glade. The Glade approach would force the participating towns to fuel real estate development to pay for their share of Glade. This doesn’t make sense.

The proposed NISP/Glade project uses old methods and attitudes to steal water from a precious river and put it behind a new dam. NISP is asking Larimer County to sacrifice a truly unique and beautiful valley, enjoyed by all who drive through it. They say the benefit to Larimer County is recreation and water for some in south east Larimer County. I say the recreation is a smokescreen, and the water can be obtained in the conservation and wise technologies discussed above. This is too high a price for Larimer County to pay mostly for the benefit of Weld County.

I ask the Larimer County planning commission and county commissioners to vote NO on the 1041 permit for NISP.

Thank you for considering my request.

Respectfully,

Brent Hawley

Submitted on behalf of Save Rural Noco

This alone should allow the County to consider co-location as part of the process in both the Thornton and Northern Water 1041 applications. In addition, the Colorado Supreme Court noted that the purpose of the 1041 statute is to allow state and local governments to "supervise land use which may have an impact on the people of this state beyond the immediate scope of the project." Colorado Land Use Commission v. Board of County Comm'rs of Larimer County, 604 P.2d 32, 34 (Colo. 1979). The reference to impacts "beyond the immediate scope of the project" suggests that the Commissioners can and should consider the relationship between the project under consideration and other projects. Such sensitivity would definitely further the statute's apparent purpose of "protection of the utility, value, and future" of land, which the statute states is in the public interest. C.R.S. § 24-65.1-101(1)(a).

For these reasons, I ask the Planning Commission and the Board of County Commissioners reject the Northern Water 1041 application until such time that there is resolution to the Thornton 1041 application so that both pipelines can apply for a co-location routing option where both entities can share costs and choose routes they might not otherwise consider around residential areas. Our specific properties and the Eagle Lake neighborhood should not have to shoulder the burden of these two projects for the sake of Larimer County.

Harry & Linda Sheline
438 Pelican Bay
Fort Collins, CO 80524
918-629-4322

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Water (NISP) & Thornton 1041 Pipeline Application Concerns

1 message

Harry Sheline <hlsheline@gmail.com> Thu, May 28, 2020 at 11:42 AM
To: rhelmick@larimer.org
Cc: Harry & Linda Sheline <hlsheline@gmail.com>, Lin Sheline <lindamsheline@gmail.com>

May 28, 2020

Rob Helmick, Senior Planner
Larimer County Community Development Division
200 W. Oak Street
Suite 3100
PO Box 1190
Fort Collins, CO 80521

Dear Rob,

As a resident of the Eagle Lake neighborhood, I am writing you to ask that Larimer County not approve the 1041 Application that is before you for a pipeline through the county by Northern Water (NISP). The issues revolving around this application and the reasons it should be denied closely mirror that of the City of Thornton 1041 pipeline application that was rejected by the Board of County Commissioners.

Specifically, here are some of the reasons the County rejected the Thornton application and should do so as well with the NISP application:

- According to the Land Use Code criteria quoted by the Board of Commissioners, the proposal is inconsistent with the county Master Plan affecting land use and development, specifically that the route will be traversing through significant amounts of private property and through yards in the Eagle Lake neighborhood. Private easements will have to be obtained through eminent domain. Affected residents will not be permitted to construct permanent structures or plant landscape material with deep roots (trees, wind blocks, etc) on their property due to the pipeline easement and maintenance requirements. Affected residents will be subject to continual intrusion on their land by maintenance crews checking on the pipeline in perpetuity. This is a gross infringement of their right to a peaceful existence on their property and our right to restrict non-resident traffic on our privately owned roads.
- In addition, according to Northern Water's Construction Approach document, they are anticipating using HOA owned private roads for construction traffic throughout the five segments of construction on the pipeline near and through our neighborhood.

  The timeline of the cumulative impact to us is anticipated to be 59 weeks from start to finish for all the segments! They are asking to use our narrow, non-public grade roads for heavy truck traffic and daily construction crew traffic on our private roads dozens of residents use daily to enter and exit our subdivision. This is an unacceptable burden on us and again is a gross infringement on our neighborhood and our rights to a peaceful existence that is inconsistent with the Master Plan's stated goal of "maintaining and enhancing our county's quality of life and to be fundamentally fair to all our citizens and to respect their individual rights." A quiet residential neighborhood with children playing, residents coming and going, and retirees enjoying the peaceful time they've earned is not a place for construction staging for a project that has no benefit for its residents and even minimal benefit to Larimer County as a whole. The concept and thought of using our roads for this purpose is untenable.

  3) The NISP 1041 application negatively impacts public health and safety in our neighborhood. Our private roads are narrow roads and not constructed to handle large, semi-tractor trailer traffic loaded with pipe sections and construction materials for pipeline construction. The roads were not built to handle the volume of traffic or the load. Having these vehicles on our roads creates a safety hazard for children, bicyclists, walkers and resident traffic entering and leaving driveways. In addition, some of our older residents with health issues are at risk due to the constant coming and going of non-resident truck traffic. Noise levels, pollution from diesel vehicles, and anxiety from interruptions to our peaceful existence can all lead to increased health problems for all residents.

  4) In the Land Use Code criteria for consideration by the County, Criteria C states its purpose is to "Promote the economic stability of existing land uses that are consistent with the Master Plan and protect them by incompatible or

harmful land uses." The proposed pipeline is certainly an incompatible and harmful use of the land in our neighborhood.

We recently annexed three parcels to our HOA (the TIPS Development) whose owner was required by the County to development certain aspects of the land (drainage, roads, etc) to be approved by the County before being allowed to offer the plots for sale and final residential development. The owner has spent thousands of dollars to prepare this land, yet the proposed pipeline path crosses near or on some of the new parcels rendering them virtually unsellable until the pipeline is built and completed. No buyer will pay a premium price for a parcel with the amount of disruption, uncertainty of building site and septic placement, and ongoing nuisance this project will cause to these three parcels for well over a year. The County is in effect killing the owner's ability to sell his parcels and recoup his already substantial investment that the County has made him invest to get the land ready for development. This is not "promoting the economic stability of existing land uses" (ie. Residential development) or "protecting incompatible and harmful land uses".

Other residents in our neighborhood who may be contemplating or are in the process of listing their property are also economically negatively impacted by the proposed pipeline. Buyers will use every reason to lower the price on a sale and a year or more of construction traffic, noise, dirt and dust flying in the neighborhood are good leverage points for them to either not buy at all, or attempt to attain a lower selling price than normal. The County is truly hurting the economic stability of the whole neighborhood with this proposal and hundreds of thousands of dollars in values may be lost if the application is approved.

- Northern Water has presented other reasonable siting and design alternatives that do not include bisecting resident's property or cutting through our neighborhood that they have dismissed due to cost or more difficult construction conditions like their N2.4 (north of Reservoir #3) and N2.5 routes (Douglas Road). The Board of County Commissioners rejected reasoning that expense or difficulty of construction were disqualifying reasons for rejecting routes over ones that impacted private property owners and individual rights in the Thornton pipeline application. Northern's preferred N2.1 route severely impacts our rights as property owners and citizens and should similarly be dismissed by the Commissioners when there are viable alternate routing options.
- Another issue of grave concern to the Commissioners in the Thornton application was the construction and pipeline proximity to occupied dwellings. Proximity of construction and construction impact along with the long-term detriment to property owners was a primary concern. The Northern Water proposal includes a 100' easement – a 40' construction easement and a 60' permanent easement. If the pipeline were to be placed on the property line between the two residences the proposed N2.1 routing prefers, that will put the easement only 30 feet or less from one of the residences. The disruption and imposition on private property this close to an occupied dwelling is unacceptable when there are route alternatives that do not cross private property between two dwellings.
- The other major point that should either cause the county to reject the application or defer a decision until later is the Thornton pipeline issue now pending before the courts. The proposed routing of their pipeline has almost identical routing alternatives to Northerns. Both entities are in the review process at the same time with construction timelines that are similar. Multiple times in the record for Larimer County in the proceedings with Thornton, both Thornton, Northern Water, and the County mentioned or agreed that co-location of the two pipelines along their nearly identical paths made sense and should be pursued. It has been discussed between all three parties on numerous occasions and should be part of the discussion now.

In fact, one of the objections the Board of County Commissioners expressed to deny the Thornton pipeline by only submitting an application for one of their proposed pipelines in isolation from their planned future ones was that, **"Thornton deprives the Board and public of the opportunity to consider cumulative impacts and the effectiveness of mitigation. A route that may be appropriate for a single pipeline may be inappropriate for additional pipelines. If this information is not considered now, future pipelines may not be able to co-locate which would result in the disorderly development of Thornton's project and compound the impacts on Larimer County through multiple different pipelines in separate locations."**

How is this not the case with the proposed Northern pipeline and Thornton's pipeline, both of which are looking at nearly identical routing alternatives? This is not just an issue of "disorderly development and compounding of the impacts" on Larimer County – it is the disorderly development and compounding of the impacts on Eagle Lake in a much shorter timeframe than the proposed build out of the future Thornton pipelines. And how is the reverse not true – that a route that may be inappropriate for a single pipeline due to cost and difficulty of construction may be entirely appropriate for the combined resources of two pipelines from two well-funded entities with capable engineering that will minimize the impacts not only on Larimer County but the Eagle Lake neighborhood that is the target of two separate pipelines?

The precedent for this is Section A.2 of the Land Use Code itself that says the Code is intended to:

"A. Provide for the physical development of the county in order to:

1. Preserve the character and quality of rural and urban areas;
2. Foster convenient, harmonious and workable relationships among land uses; and
3. Achieve the principles and strategies described in the master plan."

1926

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 Application Objections

1 message

Larry Stroud <larsvicski@gmail.com> Fri, May 29, 2020 at 10:53 AM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>
Cc: "mheiden@eaglelakefchoa.com <mheiden@eaglelakefchoa.com>" <mheiden@eaglelakefchoa.com>, Gmail 2 <larsvicski@gmail.com>

Dear Mr. Helmick,

Thank you very much for the opportunity to express our very strong objections to the NISP proposed route from Hwy 1 traversing west to Travis Road and beyond. Please share this information with the Commissioners for their consideration.

The proposed route appears to be the shortest and least expensive route for NISP. It is not, however, a route that offers the least impact to the northern neighborhoods and to the best of my knowledge, as a resident of Eagle Lake Subdivision, I have had no invitation to or involvement in working with them to select a route with the least residential impacts and their preferred route seems to indicate little thought with regard to the physical feasibility or the ramifications of the disruption to residents.

To be specific:

1. Any route through a subdivision that involves either the bed of a pipeline or construction vehicle access should patently be rejected when there are other less impactful solutions in this northern area. Just look at a map.
2. The proposed route proposes a pipeline bed that closely impacts several residences within one- hundred and fifty feet of it's path. That's too close.
3. The construction vehicle access utilizing the ditch road on the east side of Eagle Lake is physically very difficult, if not impossible and would also be disruptive to several residences and require extensive road improvements to even be physically possible.

Other possible options to mitigate residential impact:

1. Instead of staging east to west (Hwy 1 to Travis Rd), consider staging west to east (County Rd 19 toward Hwy 1) and then at Travis Rd head north around Rocky Ridge with construction traffic and pipeline bed in tandem. This offers the least impact to residences from both the construction of pipe bed itself to the logistics of construction vehicle access.
2. Consider other less dense and impactful northern routes.

The NISP Application requires much more thought toward residential impacts and their preferred route should be rejected at this time in favor of finding other less impactful solutions even if there additional costs involved to do so. Thank you for you consideration.

Larry and Vicki Stroud

4536 Eagle Lake Dr.

Fort Collins, Co 80524

Sent from Mail for Windows 10

BCC 08/17/20 NISP

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Eagle Lake Project

1 message

Lance Astrella <lance@astrellalaw.com> Fri, May 29, 2020 at 10:36 AM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>

Mr. Helmick:

In the event that the County approves of NISP's plans to unnecessarily construct its project within the Eagle Lake Subdivision, including the use of private roads, NISP should be required to submit for approval reasonable and customary plans to the County for approval, including the following:

Fire Mitigation Plan

This is particularly important for the safety of the residents and protection of their property in light of the fact that construction will take place in dry grasslands and adjacent lands that contain vast amounts of dead and dry timber and brush. Strong winds in the area consistently blow toward the subdivision.

Emergency Response Plan

This is important due to the high fire danger.

Proof of Insurance

Adequate insurance coverage is essential in light of fire danger, construction traffic and attractive nuisance.

Security Plan

Security for equipment and materials which may attract thieves and result in theft of property and danger to the residents.

Noise Mitigation Plan

This should restrict the time of operations and noise mitigation devices on equipment.

Weed Control

Due to weeds in the area to be excavated and weed contamination on rolling stock, a comprehensive weed control program should be implemented.

Fencing

A plan to safely fence the excavation area when operations are not taking place, including nighttime.

Staging Area

No material shall be stored nor equipment placed in the subdivision.

Storm Water

Plan to control run off within the subdivision.

Worker ID

All contractors and subcontractors should be required to wear visible identification.

Traffic Plan

This should include traffic control from public access to Eagle Lake private roads. It should include 10 MPH speed limits for heavy equipment.

Reclamation Plan

A detailed reclamation plan should be provided for Eagle Lake Subdivision including reestablishing irrigation and natural vegetation to pre-existing condition and remediation of subsidence over time.

Employee Rules

No employees, contractors or subcontractors shall be permitted to have alcohol, marijuana, illegal drugs, firearms or pets on the property. No smoking will be permitted. There should be a liquidated damages payment for each violation.

Dust Control Plan

Due to high winds in the area, construction dust can accumulate on the exterior and in the interior of houses.

Compensation

NISP should be required to compensate affected residences for exterior dirt, duct cleaning and necessary interior cleaning of houses affected by construction dust and dirt.

Roads

Subdivision roads shall be used only when necessary. A road use plan should be submitted identifying time specific traffic volumes for each phase of construction.

NISP should repair roads after construction is completed, including placing a new top coat on the Eagle Lake roads used by NISP.

A road usage fee of $_____ per day of use should be imposed.

Room and Board

Compensation should be paid for room and board for residents and pets whose quiet enjoyment of their property is disrupted.

There appear to be several alternatives available to NISP. If NISP chooses to disrupt Eagle Lake Subdivision and use its private roads, the foregoing requirements are reasonable to protect the health and safety of the community and to compensate for use and damages of private property.

Respectfully submitted,

Lance Astrella

520 Eagle Lake Court

1930

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 application - Eagle Lake neighborhood

1 message

Jean Grove <jgrove@bajabb.com>
To: rhelmick@larimer.org

Fri, May 29, 2020 at 6:09 PM

Rob Helmick, Senior Planner

Larimer County Community Development Division

200 W. Oak Street Suite 3100

Fort Collins CO 80521

rhelmick@larimer.org

Dear Mr. Helmick:

As a resident of the Eagle Lake neighborhood, we are writing you to ask that Larimer County not approve the NISP 1041 Application that would route a pipeline through our neighborhood. We strongly object to being held hostage by a few who object to minor inconvenience with installation of pipelines in the public right-of-way along Douglas Road. Contrast that minor inconvenience with years of disruption in our neighborhood and the loss of private property control and value in perpetuity. Would these people like a pipeline through their property? I suspect not.

The reasons for denying this application by NISP are the same for our objection to the City of Thornton application to route its pipeline through our neighborhood. These reasons include:

- Taking private property to route this pipeline is against Larimer County's own stated land use goals and runs contrary to every accepted legal position on private property rights as well as judicious governance and best development practices. Considering that legitimate alternatives that don't include confiscation of private property exist, these alternatives must be given exclusive consideration over all others.

- The home owners of Eagle Lake and Terry Lake did not purchase their properties for the convenience of either NISP or the City of Thornton. Neither did Larimer County plat these additions for the convenience of NISP or Thornton. Because these two entities failed to properly plan their future needs should not impose penalties on those that made and executed in a timely and appropriate manner.

    - For totally illogical and unsupportable reasons the NISP project proposes using privately owned property to build a pipeline instead of using the public right-of-way along Douglas Road, which they previously had agreed to do. That would be a wrong decision.

        - We expect Larimer County's professional staff and the Commissioners, our elected representatives, to defend our property rights as individuals and as a privately owned housing subdivision. The Eagle Lake developer followed all requirements and codes and invested considerable time and money to develop this neighborhood. My husband and I invested considerable time and money to buy property here and to build our house following every code and requirement of the HOA, the County and the State. This is our one and only home in which we have lived since 1993 and hope to enjoy for the remainder of our days.

        - All of our neighbors have the right to expect the County Commissioners, our elected representatives, to represent us, Larimer County property tax payers, not the NISP project and not the City of Thornton.

- The proposed route is contrary to the planning staff's recommendations and flies in the face of the reasoned arguments made by them. It is obvious that improvements will be made to Douglas road at some time. As staff pointed out, the cost of these improvements would be lessened by having the pipeline(s) use the existing right of way.

- This approach minimizes the time that Douglas Road users would be inconvenienced due to non-simultaneous road improvements and pipeline projects. This also begs the question of why Thornton and NISP can't use common right-of-way.

- This approach would completely eliminate any discussion of "eminent domain", which looms large over the existing proposal (and Thornton proposal).

- It eliminates disturbance to the "domestic tranquility" of the home owners in loss of Eagle Lake neighborhood property value, eliminates the continued interruption of property owner's privacy over the lifetime of the property and allows the owners the full use of their property concerning landscaping and recreational use.

- The disruption that this proposed NISP project brings will have significant effects on people being able to enjoy or even to sell their property and likely affect its value. Our neighbors, whose property is directly affected should not have to even be dealing with this disruption and neither should those of us who have had homes here for over 25 years. Many of us are retired and find it unconscionable that we are to lose 59 weeks (1 YEAR) of our retirement for the inappropriate confiscation of our property when better alternatives are available.

- Having these waterline routes proposed creates so much insecurity in fact and in feeling for our present and future wellbeing that faith is being lost in our governmental agencies.

    - Why are the NISP and Thornton proposals not required to be considered concurrently? It is unbelievable that two similar projects, along similar routes, with potential multiple year disruptions each are not required to plan and execute concurrently.

    - This is a waste of taxpayers' money and inconvenience, a misuse of NISP's and Thornton's resources and a perfect example of waste and poor planning wherein the individual once again loses their rights to the money.

- The impact on the Eagle Lake neighborhood would be extreme disruption from construction activities for an estimated 59 weeks, traffic disrupting access to our own homes, **not** just a little extra time accessing a public road. This acquisition of private property is unjustifiable when there are other, better options, including the public right-of-way along Douglas Road.

Respectfully,

Tom and Jean Grove

4964 Eagle Lake Drive

1932

Rob Helmick <helmicrp@co.larimer.co.us>

NISP comment

1 message

jeff lindquist <westhermes@yahoo.com> Fri, May 29, 2020 at 5:18 PM
To: rhelmick@larimer.org

Hi Rob. Hope all is well with you and your family. All good here with our family in Eagle Lake. I am writing a short email (I am sure you received many from my neighbors) to remind you that using private property in Eagle Lake when so many other / better alternatives are available is not acceptable to me. Whether it is Douglas Road or land further north I hope that you will use good judgment and move this project so that it does not come through this beautiful area.

Jeff Lindquist
427 Deerfield Circle
FT Collins, CO
303 819 9038

1933

Rob Helmick <helmicrp@co.larimer.co.us>

Eagle Lake/NISP

1 message

Pelloquin, Amy <Amy.Pelloquin@uchealth.org> Fri, May 29, 2020 at 3:34 PM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>

Good afternoon.

My family and I moved to Fort Collins several years ago after looking at many communities around Colorado. We chose Fort Collins for many reasons, but one of those was the obvious foresight and planning that Larimer County and Fort Collins employed in developing this area. The bike lanes, neighborhoods and low impact commercial signage all indicated a well thought out plan emphasizing that quality of life for its citizens is paramount.

I have unfortunately been involved in the NISP and Thornton pipeline debacle for the past year as this has directly impacted my neighborhood and my house. While I do see the need for water delivery through the general area, the proposed route is almost ludicrous in terms of local impact on your citizens. The current proposal has this running directly by houses with possible plans for additional pipes if needed. These easements would take up large portions of individual lots and come unacceptably close to actual buildings. There are many undeveloped areas just north of our neighborhood that this pipeline could be run through that would cause little to no disruption (or dramatically less) to local citizens.

This has nothing to do with the “Save the Poudre” campaign as this is not about whether or not the reservoir will be placed, or whether the reservoir will be a benefit or hindrance to this community. This is only concerning where the pipeline will go. This is about putting the rights of the constituents that you serve as a first priority, and protecting these rights to not have our homes and neighborhoods disrupted for months, along with unnecessary easements to save an outside entity time and money.

Progress is important but not at the expense of the citizens who call Fort Collins and Larimer Country home. Disrupting residential homes and neighborhoods based solely on what is most convenient for NISP constitutes placing the welfare of your constituents far below the welfare of an outside entity. Please uphold the reasons that my family chose Fort Collins as our home.

Sincerely

Amy Fitzgerald Pelloquin
MD FACP

Rob Helmick <helmicrp@co.larimer.co.us>

Do Not Approve NISP 1041 Project No. 20-ZONE 2- Save Our Rural Northern Colorado

1 message

Mary-Jo Briguglio <infinitelyoung60@gmail.com> Fri, May 29, 2020 at 3:33 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

We are landowners residing in the area of the proposed Glade reservoir that have many concerns with the proposed Glade Project and the negative impacts that would occur if the project moves forward.

The primary benefits of this proposed reservoir would be enjoyed by the 15 subscriber towns or agencies that receive the proposed Glade water. Most of these towns and agencies are outside Larimer County. The most obvious and intense costs would be borne by local and other surrounding communities.

In general, our concerns are that the scope and scale of this proposed project, if approved, would have significant, detrimental, and permanent impact on our rural community, environment, and lifestyle we enjoy today and desire to have in the future. Additionally, do any of you live in the area that will be highly impacted by the development of this reservoir?

Specifically, our rural environment we believe would be negatively impacted in the following ways:

1) Noise - The rerouted highway over the most eastern hogback would have an unobstructed view from residences in the foothills, there would be no middle hogback to block truck and auto noise. The NISP publications suggest that recreation would include motorboats and jet skis. Boats and skis are loud, they would likely be louder than current road traffic.

2) Light Pollution – This rural area enjoys fairly dark skies. The proposed recreational activities would generate significant exterior lighting for boats, facilities, camping, pumping facilities, traffic, etc. and headlights from traffic coming down the hogback on the rerouted 287 would shine into the adjacent private property. This could destroy the enjoyment of our night skies. We already hear some noise from highway 287.

3) New development - We do not know what sort of development would occur near and north of proposed Glade. The rerouted highway 287 would invite more residential development on the plains. The reservoir would invite more development in the adjacent foothills and valleys. It's not inconceivable that more commercial development catering to visitors would encroach into currently uncommercialized lands, forever altering the rural nature of the area.

4) Trespass – Plans for proposed Glade project almost 400,000 visitors per year. This would include boaters, campers, fishers and hikers and bikers, among others. There is every reason to believe that not all these visitors would stay within the confines of designated recreational areas. Some visitors are likely to explore the inviting foothills that border the reservoir and trespass, however inadvertently, on our private property.

5) Wildlife – Proposed Glade would become a significant barrier to the permanent and migratory herds of deer and elk that reside in our area and would be disruptive to other wildlife. In a world where wildlife and nature are under stress, and is diminishing generally owing to human activities, should we be contributing to those activities for unnecessary purposes? We encourage the county to find alternatives that don't result in the significant loss of open space and wildlife habitat that this project would cause.

6) Wildfires – In this century three major wildfires burned over 100,000 acres on and around Glade. Two of the three forest fires were caused by careless people. Can we rely on the >1000 daily visitors to proposed Glade to be careful?

7) Emergency response – The recreation on the proposed reservoir is projected to be almost 400,000 visitors per year. Such a large increase in recreationalists would likely increase the number of emergency calls thereby further stretching emergency response agency resources. Costs would be borne by Larimer County taxpayers, and emergency services

that are diverted to Glade would not be readily available to serve the local communities.

8) Air quality – Because Glade would have junior water rights, the water level of the proposed reservoir would be highly variable, unlike Horsetooth. The water level frequently would drop precipitously, often changing proposed Glade Reservoir to Glade Mudflats, and could stay that way for years. The large “bathtub ring” that would materialize around the reservoir would become dry soil that would blow in our strong winds causing air quality and visual concerns. The hundreds or thousands of vehicles that would travel to the area emit gases, particulates, and ozone precursors (i.e., health hazards).

9) Climate change – the pumps, the construction vehicles, the recreational vehicles: the project would result in considerable burning of fossil fuels, forever, and the emission of greenhouse gases. The pumping stations alone would emit the equivalent of adding 7000 GHG emitting cars at a time when Colorado is implementing zero emissions vehicle standards.

10) State Land Usage - The large area of state land west of the proposed reservoir is devoted to hunting and cattle grazing. The state and federal lands in this region of northern Colorado provide abundant and easily accessible opportunities for recreation, which we gratefully utilize. Impacts to use of or access to the state land is a negative impact to our communities.

11) Aesthetic - The drive from Livermore to Laporte would no longer be through the heritage rangeland and the familiar hogbacks. Since the proposed reservoir would likely be only partially filled much of the time, instead of beautiful hogbacks and grassy foothills, our viewshed would be marred by the barren sides (bathtub ring) and murky surface of a partially filled reservoir.

12) Lack of combined Project evaluation/coordination - There is no apparent coordination of the NISP or the proposed Seaman’s expansion or the Halligan expansion. All these projects surround our properties and would leave us on a peninsula of land cut from the rural environment we now enjoy. We met with the City of Greeley in August 2018 and learned that they are not planning to cooperate with other cities due to “challenges” and are proceeding on an expansion of Seamen’s reservoir from 5,000 to 80,000 acre-feet. In the 21st century, surface storage just doesn’t make sense; this is a semi-arid climate that is getting drier. Alternatives are available and should be seriously considered.

13) Social justice - While the benefits of proposed Glade would be enjoyed by people who live and work far from the reservoir site, the costs would be borne by those whose quality of life would be severely lessened.

14) Conservation and Alternatives – Conservation is not begin adequately considered. While the Colorado Front Range is land-rich for development, it is semi-arid and thus water-limited. About 2/3 of the Poudre is already taken out, and Glade would take another 40% of what’s left. Yet another reservoir is nothing but a temporary fix for a small portion of the state’s water needs; but one with permanent, destructive impacts on a large part of rural northern Colorado. The time is way past due for developing long-term solutions based on state-of-the-art technologies and widespread education on the absolute necessity to conserve water, and to stop relying on 19th century solutions for 21st century challenges.

15) Small ranches and farms that provide food for our local community. There are many ranches that would be significantly impacted by this project. Additionally there are farms that supply food to local restaurants the pollution alone from rerouting 287 would substantially affect the quality of this food.

16) How many of you live in this area and realize the impact it has? It's bad enough that you all allowed the gravel pit to potentially be approved in Laporte when none of you live in that quaint town, now you want to destroy the surrounding lands.

The Larimer County Commissioners MUST save our rural communities and be GREAT stewards of our natural resources by saying NO Glade Reservoir!

Sincerely,
Mary-Jo Briguglio

--
Ms Mary-Jo Briguglio
infinitelyoung60@gmail.com
3263 West County Road 60
Fort Collins, United States 80524

Save Rural NoCo Member

1936

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

Della Garelle <dgarelle@gmail.com> Fri, May 29, 2020 at 10:46 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

I'm a land and home owner residing in northern Larimer County, near the proposed location of ill fated Glade Reservoir. It's massive dam, forebay, pumps, pipelines, campgrounds, parking lots, boat ramps, and other facilities are a huge mistake.. It is not needed, wasteful, and damaging not only to the Poudre river, but to many other habitats and a beautiful natural glade. We strongly urge the Board of County Commissioners to deny the 1041 permit for the Northern Integrated Supply Project because it would forever impact the fundamental nature of the rural landscape in which we live and harm our quality of life.

We choose to live in northern Colorado for its beautiful natural landscapes, its wild and scenic rivers, it's clean air and quiet surroundings, its wildlife, its opportunities for peacful enjoyment of this area.These are key to our quality of life; key pieces that would be lost if this project is constructed and operated as proposed. Our land, our water, and our communities would be harmed by this wrong-headed project.
Any benefits of the project would only be for monetary gain for developers and realtors outside Larimer County.

It is unacceptable that our rural northern Colorado communities shoukd bear the negative impacts and untold risks of this massive and ill-conceived project, the biggest ever proposed for Larimer County.

If construction is executed as planned, there would be at least seven years of heavy construction impacting our communities. The intrusion would turn the hundreds of acres of the landscape into a construction zone and permanently take away the attractiveness, the clean air, the quiet – the things we depend on for health and happiness and property values.

Northern Water is trying to buy up farms in northern Colorado to make up a more than 50% shortfall in the water rights needed for a successful project. In addition, recent and projected prolonged droughts have and will affect the amount of water available from the Poudre River and other sources. For us, this means that we would endure the years and years of construction, and the irreparable loss of the unique landscape in which we live, all for just a hope of excess water sometime in the future. Larimer County should deny this project, which is likely to fail to meet its obligations. Less expensive and less destructive alternatives to preserving water supply should be undertaken instead.

Encouraging almost 400,000 visitors per year to this area would alter it from the quiet, rural and sparsely populated landscape we sought and invested in, to a busy recreational area with noise, dust, traffic, trash, accidents, and fires. Noise from recreation on a potential reservoir would exceed state standards, would be heard miles away, and would significantly disrupt our community and wildlife. For most owners, this entire debacle would cause property values to decline.

That's if the reservoir ever fills for any reasonable amount of time before immediately being drained for money The photographs Northern Water shows of a beautiful full reservoir are misleading at best, because the reservoir would rarely, if ever, look like that. It would generally look like a stinking barren mud plain and abandoned industrial facility marring the landscape.

This project ruins the aesthetics of the valley and hogbacks – a unique and beautiful landscape – for a project that would provide little or no benefit to Larimer County and in fact would negatively impact its residents and its coffers.

The project would also contribute to climate change. Over 30,000 tons per year of CO2 would be emitted by engines to pump water from the Poudre into Glade. Other greenhouse gases would also be produced, both during construction and operation. Air pollution would also occur due to the project, including gases that form ozone, a severe health hazard.

Dust blown from the barren shorelines would be swept up the valley on the area's strong winds and seep into our homes and further degrade our lives. The EIS states that it would take an 80-mph wind to generate any fugitive dust from the shorelines of the operating reservoir, an assertion that doesn't pass the laugh test for anyone living in this rural landscape. What else have they got wrong?

We are very concerned about the potential for fire. We live in a high fire hazard zone and we take many precautions with our homes and properties to protect against fires. Many visitors, who would be visiting in summer when the land is hottest and driest, would not be aware of how easy it is to cause a wildfire in this landscape. Some would be careless with campfires, with cigarettes, with illegal fireworks, or with firearms, and wildfires would be inadvertently ignited. Their vehicles can also start fires. Unfortunately, arson is possible. Our climate is getting drier.

Larimer County must recognize the seriousness of all these issues and deny this permit. The county cannot put our homes, our property, our livestock and our way of life at an increased and unacceptable risk of wildfire These increased risks would also cause increased demands on local emergency services, especially fire, medical, and law enforcement.

No project this big can be undertaken without significant and irreparable negative impacts. We ask Larimer County commissioners to be good stewards and deny this permit and prevent the loss of open space and wildlife habitat, increased risk of wildfires and other public safety hazards, increased demands on local volunteer emergency services, noise, light pollution, increased development, trash and traffic in ever-widening circles around the reservoir, reduced air quality, climate change, increased illegal activities such as trespass on adjacent private land, decreased property values, and the loss of unique visual and aesthetic values. The natural and rural quality of this land is critical to our lives, property values and stable communities.

Sincerely,
Dr. Della Garelle
93 Juniper ridge rf
Laporte, CO

--
Dr. Della Garelle
dgarelle@gmail.com
93 Juniper Ridge Rd
Laporte, CO 80535

Save Rural NoCo Member

1938

Rob Helmick <helmicrp@co.larimer.co.us>

NISP and Eagle Lake Statement

1 message

Chuck Spaeth <CSpaeth@mtechg.com> Fri, May 29, 2020 at 3:13 PM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>

Rob,

Please see attached response to the NISP/Eagle Lake issue.

Many thanks for your time and concideration,

Chuck

Chuck Spaeth | Project Manager

MTech Mechanical

303 802 8524 **DIRECT**

303 598 6738 **CELL**

303 650 4000 **MAIN**

303 650 2882 **SERVICE REQUESTS**

TRANSFORMING YOUR ENVIRONMENT

NISP Objection Letter Resident Talking Points v2d.docx
21K

NISP OBJECTION LETTER

Rob Helmick, Senior Planner
Larimer County Community Development Division
200 W. Oak Street
Suite 3100
PO Box 1190
Fort Collins, CO 80521

Or email to: rhelmick@larimer.org

Dear Rob,

Below is a Talking Point letter that by now, I am sure you have seen many times. My family and I live at 351 Deerfield Circle in Eagle Lakes and feel compelled to strongly join in with our objection to this proposed pipe route. The points below capture the major reasons to reject this path for the pipeline but in addition to these points is the foundation of what is right and wrong. Many years ago my wife had her home taken away by the State of Wyoming by eminent domain so this something we feel strongly about.

If the route through Eagle Lakes is approved, you are placing dollars ahead of what is right and just. In my opinion, there is way too much of this antiquated politics in action in our country. I ask you to think more enlightened; consider, people's rights, values and moral obligations above dollars. I believe there are alternate routes that would serve our values better. I know you have to make hard decisions but this is the time to make a hard decision, and tell Norther Water they need to spend more money on an alternate route.

As a resident of the Eagle Lake neighborhood, I am writing you to ask that Larimer County not approve the 1041 Application that is before you for a pipeline through the county by Northern Water (NISP). The issues revolving around this application and the reasons it should be denied closely mirror that of the City of Thornton 1041 pipeline application that was rejected by the Board of County Commissioners.

Specifically, here are some of the reasons the County rejected the Thornton application and should do so as well with the NISP application:

1) According to the Land Use Code criteria quoted by the Board of Commissioners, the proposal is inconsistent with the county Master Plan affecting land use and development, specifically that the route will be traversing through significant amounts of private property and through yards in the Eagle Lake neighborhood. Private easements will have to be obtained through eminent domain. Affected residents will not be permitted to construct permanent structures or plant landscape material with deep roots (trees, wind blocks, etc) on their property due to the pipeline easement and maintenance requirements. Affected residents will be subject to continual intrusion on their land by maintenance crews checking on the pipeline in perpetuity. This is a gross

infringement of their right to a peaceful existence on their property and our right to restrict non-resident traffic on our privately owned roads.

2) In addition, according to Northern Water's Construction Approach document, they are anticipating using HOA owned private roads for construction traffic throughout the five segments of construction on the pipeline near and through our neighborhood. **The timeline of the cumulative impact to us is anticipated to be 59 weeks from start to finish for all the segments!** They are asking to use our narrow, non-public grade roads for heavy truck traffic and daily construction crew traffic on our private roads dozens of residents use daily to enter and exit our subdivision. This is an unacceptable burden on us and again is a gross infringement on our neighborhood and our rights to a peaceful existence that is inconsistent with the Master Plan's stated goal of "maintaining and enhancing our county's quality of life and to be fundamentally fair to all our citizens and to respect their individual rights." A quiet residential neighborhood with children playing, residents coming and going, and retirees enjoying the peaceful time they've earned is not a place for construction staging for a project that has no benefit for its residents and even minimal benefit to Larimer County as a whole. The concept and thought of using our roads for this purpose is untenable.
3) The NISP 1041 application negatively impacts public health and safety in our neighborhood. Our private roads are narrow roads and not constructed to handle large, semi-tractor trailer traffic loaded with pipe sections and construction materials for pipeline construction. The roads were not built to handle the volume of traffic or the load. Having these vehicles on our roads creates a safety hazard for children, bicyclists, walkers and resident traffic entering and leaving driveways. In addition, some of our older residents with health issues are at risk due to the constant coming and going of non-resident truck traffic. Noise levels, pollution from diesel vehicles, and anxiety from interruptions to our peaceful existence can all lead to increased health problems for all residents.
4) In the Land Use Code criteria for consideration by the County, Criteria C states its purpose is to "Promote the economic stability of existing land uses that are consistent with the Master Plan and protect them by incompatible or harmful land uses." The proposed pipeline is certainly an incompatible and harmful use of the land in our neighborhood.

   We recently annexed three parcels to our HOA (the TIPS Development) whose owner was required by the County to development certain aspects of the land (drainage, roads, etc) to be approved by the County before being allowed to offer the plots for sale and final residential development. The owner has spent thousands of dollars to prepare this land, yet the proposed pipeline path crosses near or on some of the new parcels rendering them virtually unsellable until the pipeline is built and completed. No buyer will pay a premium price for a parcel with the amount of disruption, uncertainty of building site and septic placement, and ongoing nuisance this project will cause to these three parcels for well over a year. The County is in effect killing the owner's ability to sell his parcels and recoup his already substantial investment that the County has made him invest to get the land ready for development. This is not "promoting the economic stability of existing land uses" (ie. Residential development) or "protecting incompatible and harmful land uses".

   Other residents in our neighborhood who may be contemplating or are in the process of listing their property are also economically negatively impacted by the proposed pipeline. Buyers will use every reason to lower the price on a sale and a year or more of

construction traffic, noise, dirt and dust flying in the neighborhood are good leverage points for them to either not buy at all, or attempt to attain a lower selling price than normal. The County is truly hurting the economic stability of the whole neighborhood with this proposal and hundreds of thousands of dollars in values may be lost if the application is approved.

5) Northern Water has presented other reasonable siting and design alternatives that do not include bisecting resident's property or cutting through our neighborhood that they have dismissed due to cost or more difficult construction conditions like their N2.4 (north of Reservoir #3) and N2.5 routes (Douglas Road). The Board of County Commissioners rejected reasoning that expense or difficulty of construction were disqualifying reasons for rejecting routes over ones that impacted private property owners and individual rights in the Thornton pipeline application. Northern's preferred N2.1 route severely impacts our rights as property owners and citizens and should similarly be dismissed by the Commissioners when there are viable alternate routing options.
6) Another issue of grave concern to the Commissioners in the Thornton application was the construction and pipeline proximity to occupied dwellings. Proximity of construction and construction impact along with the long-term detriment to property owners was a primary concern. The Northern Water proposal includes a 100' easement – a 40' construction easement and a 60' permanent easement. If the pipeline were to be placed on the property line between the two residences the proposed N2.1 routing prefers, that will put the easement only 30 feet or less from one of the residences. The disruption and imposition on private property this close to an occupied dwelling is unacceptable when there are route alternatives that do not cross private property between two dwellings.
7) The other major point that should either cause the county to reject the application or defer a decision until later is the Thornton pipeline issue now pending before the courts. The proposed routing of their pipeline has almost identical routing alternatives to Northerns. Both entities are in the review process at the same time with construction timelines that are similar. Multiple times in the record for Larimer County in the proceedings with Thornton, both Thornton, Northern Water, and the County mentioned or agreed that co-location of the two pipelines along their nearly identical paths made sense and should be pursued. It has been discussed between all three parties on numerous occasions and should be part of the discussion now.
   In fact, one of the objections the Board of County Commissioners expressed to deny the Thornton pipeline by only submitting an application for one of their proposed pipelines in isolation from their planned future ones was that, **"Thornton deprives the Board and public of the opportunity to consider cumulative impacts and the effectiveness of mitigation. A route that may be appropriate for a single pipeline may be inappropriate for additional pipelines. If this information is not considered now, future pipelines may not be able to co-locate which would result in the disorderly development of Thornton's project and compound the impacts on Larimer County through multiple different pipelines in separate locations."**
   How is this not the case with the proposed Northern pipeline and Thornton's pipeline, both of which are looking at nearly identical routing alternatives? This is not just an issue of "disorderly development and compounding of the impacts" on Larimer County – it is the disorderly development and compounding of the impacts on Eagle Lake in a much shorter timeframe than the proposed build out of the future Thornton pipelines.

And how is the reverse not true – that a route that may be inappropriate for a single pipeline due to cost and difficulty of construction may be entirely appropriate for the combined resources of two pipelines from two well-funded entities with capable engineering that will minimize the impacts not only on Larimer County but the Eagle Lake neighborhood that is the target of two separate pipelines?
The precedent for this is Section A.2 of the Land Use Code itself that says the Code is intended to:

"A. Provide for the physical development of the county in order to:
1. Preserve the character and quality of rural and urban areas;
2. Foster convenient, harmonious and workable relationships among land uses; and
3. Achieve the principles and strategies described in the master plan."

This alone should allow the County to consider co-location as part of the process in both the Thornton and Northern Water 1041 applications. In addition, the Colorado Supreme Court noted that the purpose of the 1041 statute is to allow state and local governments to "supervise land use which may have an impact on the people of this state beyond the immediate scope of the project." Colorado Land Use Commission v. Board of County Comm'rs of Larimer County, 604 P.2d 32, 34 (Colo. 1979). The reference to impacts "beyond the immediate scope of the project" suggests that the Commissioners can and should consider the relationship between the project under consideration and other projects. Such sensitivity would definitely further the statute's apparent purpose of "protection of the utility, value, and future" of land, which the statute states is in the public interest. C.R.S. § 24-65.1-101(1)(a).

For these reasons, I ask the Planning Commission and the Board of County Commissioners reject the Northern Water 1041 application until such time that there is resolution to the Thornton 1041 application so that both pipelines can apply for a co-location routing option where both entities can share costs and choose routes they might not otherwise consider around residential areas. Our specific properties and the Eagle Lake neighborhood should not have to shoulder the burden of these two projects for the sake of Larimer County.

1943

Rob Helmick <helmicrp@co.larimer.co.us>

Eagle Lake Pipeline

1 message

Corey Tips <coreyatips@msn.com> Fri, May 29, 2020 at 7:08 PM
To: rhelmick@larimer.org

Hey Rob,
Hope you're doing well and staying healthy. I don't envy your position on this one. I'm sure I could find some common ground with NISP but that would put me at odds with pretty much all of my neighbors in Eagle Lake. So, I'll register my opposition to the proposed pipeline route through Eagle Lake in solidarity with the neighborhood.
Thanks,
Corey Tips

Rob Helmick <helmicrp@co.larimer.co.us>

Objection to Northern Water 1041 Application

1 message

Evelyn pierro <evelynpierro@gmail.com> Fri, May 29, 2020 at 3:48 PM
To: rhelmick@larimer.org

Dear Mr. Helmick,

We are writing to express some concerns about the 1041 application by Northern Water (NISP) currently under consideration. Some of the concerns are as follows:

1. The Thornton pipeline case is pending before the courts. It doesn't make sense to decide on one proposal when another one hasn't been finalized yet. Since both Thornton and NISP have similar construction timelines, and in agreement with the county stated during the Thornton discussion that co-location of the two pipelines should be pursued, the idea needs to remain part of the current discussion as well.

2. The Proximity of construction and construction impact along with the long-term detriment to property owners was a primary concern mentioned by the county in regard to the Thornton Pipeline. The Northern Water proposal includes a 100' easement – a 40' construction easement and a 60' permanent easement. If the pipeline were to be placed on the property line between the two residences the proposed N2.1 routing prefers, that will put the easement only 30 feet or less from one of the residences. The disruption and imposition on private property this close to an occupied dwelling seems unacceptable when there are route alternatives that do not cross private property between two dwellings.

3. According to the Land Use Code criteria quoted by the Board of Commissioners, the proposal is inconsistent with the county Master Plan affecting land use and development, specifically that the route will be traversing through significant amounts of private property and through yards in the Eagle Lake neighborhood.

4. According to Northern Water's Construction Approach document, they are anticipating using HOA owned private roads for construction traffic throughout the five segments of construction on the pipeline near and through the Eagle Lake neighborhood, with an anticipated timeline of 59 weeks. Not only are the non-public grade roads NOT designed to handle such ongoing wear and tear, but the additional impact of affecting the physical health of Eagle Lake residents due to all the construction pollution needs to be taken into account as well.

5. When rejecting the Thornton application, county commissioners did not consider additional expense or more difficult construction as valid reasons for cutting through neighborhoods when other routes are available. These arguments should not be considered in this case either. Please consider the impact to private property when making this decision.

Thank you very much for allowing me to give input on this very important matter.

Sincerely,

Evelyn & Dennis Pierro, Eagle Lake residents

1945

Rob Helmick <helmicrp@co.larimer.co.us>

NISP pipeline

1 message

Edward Slavik <theslaviks@msn.com> Fri, May 29, 2020 at 10:14 PM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>

Rob,

Once again the residents of Eagle Lake are faced with the prospect of a pipeline coming through our subdivision and disrupting our lives and properties. As with the Thornton pipeline, and for the same reasons, we are very opposed to the NISP plan. Two options were identified for Thornton that would not have such negative, long term impacts on our community. Either of those options were acceptable, especially the Douglas Road combined pipeline option that does not impact any private property, only causing short term inconvenience. NISP should be required to accept one of those options and respect the concerns of county homeowners.

Sincerely,

Ed and Donna Slavik
451 Deerfield Cir

Sent from my iPad

Sent from my iPad

1946

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

Pamela Scinto <pamscinto@hotmail.com> Fri, May 29, 2020 at 11:29 AM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

I'm a landowner residing in Belllvue, CO. (Larimer County). I have lived here since 1993 and have endured the construction of 2 pipelines, and the expansion of Graves Dairy/Noosa among other things. I have to say that none of these things have enhanced my quality of life. In fact, just the opposite, it has been an infringement on my privacy. Between the stench from Noosa and the noise from large construction equipment, my quality of life has been degraded. This once quiet, rural community is now disturbed by loud motorcycles late at night and a constant parade of trucks and vehicles spewing exhaust and littering Watson Lake. I know because that is where we walk. The trash cans are always overflowing; my husband picks up the cans to recycle and often gets a large bag full just from the west side.
I am pleading with the Board of County Commissioners to deny the 1041 permit for the NISP as it would forever impact the fundamental nature of the rural landscape in which we live and harm our quality of life. The Cache la Poudre River is Colorado's only designated wild and scenic river! Please ask yourselves who this project is going to benefit? Not I, for sure, and I pay the taxes here. I also pay for water. When I first moved here there was an abundance of irrigation water with which to water my landscape, now that has dried up..or gone to Greeley. My yard is dry and cracked and my plants are dying.

We choose to live in northern Colorado for its beautiful natural landscapes, its wild and scenic rivers, it's clean air and quiet surroundings, its wildlife, its opportunities for outdoor recreation on the abundant state and federal lands in the area. These are key pieces to our quality of life; key pieces that would be lost if this project is constructed and operated as proposed. Our land, water, and communities would be harmed by this project, and any benefits of the project would accrue to communities mostly outside Larimer County.

It is unacceptable that our rural northern Colorado communities must bear the impacts and unmitigable risks of this massive and ill-conceived project, the biggest ever proposed for Larimer County.

If construction is executed as planned, there would be seven years of heavy construction impacting our communities. We would be subjected to lots of heavy truck traffic, since the main artery to and from the reservoir site is Highway 287, which is also our main route; 6-days-a-week heavy traffic and heavy machinery operations, and the unwelcome, intrusive, and obnoxious presence of widespread and large-scale construction activity, noise, dust, and danger, over a long period of time. The intrusion would turn the hundreds of acres of the landscape into a construction zone, and take away the attractiveness, the clean air, the quiet – the things we depend on for health and happiness.

Northern Water is currently buying farms in northern Colorado to make up a more than 50% shortfall in the water rights needed for a successful project. In addition, recent prolonged droughts, which are becoming more common, have affected the amount of water that would be available from the Poudre River and other sources. For us, this means that we would endure the years and years of construction, and the irreparable loss of the unique landscape in which we live, all for an unfulfilled promise that "if they build it, the water would come" which is by no means guaranteed. The water shortage will only get worse as the climate dries, so Larimer County should deny this project, which will likely fail to meet its objectives. Less expensive, less destructive alternatives to water supply should be seriously considered.

Encouraging almost 400,000 visitors per year to this area would alter it from the quiet, rural and sparsely populated landscape we sought and invested in, to a busy recreational area with noise, dust, traffic, activity, accidents, and fires. Noise from motorboats on Glade would exceed state standards, would be heard miles away, and would significantly disrupt our lives. For some owners, the noise would cause property values to decline.

That's if the reservoir fills. The photographs Northern Water shows of a beautiful full reservoir are misleading at best, because the reservoir would rarely, if ever, look like that. It would generally look like an abandoned industrial facility

marring the area's aesthetics.

Since the reservoir would not fill, and likely would not be full during much of its life, the project would look like an abandoned muddy puddle much of the time, and the recreational facilities would be mostly empty. Who would pay for the upkeep of the unused recreational facilities, Larimer County taxpayers? The project ruins the aesthetics of the valley and hogbacks – a unique and beautiful landscape – for a project that would provide little or no benefit to Larimer County and in fact would negatively impact its residents and its coffers.

The project would also contribute to climate change. Over 30,000 tons per year of CO2 would be emitted by engines to pump water into Glade. Other greenhouse gases would also be produced, both during construction and operation. Air pollution would also occur due to the project, including gases that form ozone, a severe health hazard.

Dust blown from the barren shorelines would be swept up the valley on the area's strong winds and seep into our homes and further degrade our lives. The EIS states that it would take an 80-mph wind to generate any fugitive dust from the shorelines of the operating reservoir, an assertion that doesn't pass the laugh test for anyone living in this rural landscape. What else has have they got wrong? Are we to be the guinea pigs for some ill-conceived experiment?

We are very concerned about the potential for fire. We live in a high fire hazard, and we take many precautions with our homes and properties to protect against fires. Many visitors, who would be visiting in summer when the land is hottest and driest, would not be aware of how easy it is to cause a wildfire in this landscape. Some would be careless with campfires, with cigarettes, with illegal fireworks, or with firearms, and wildfires would be inadvertently ignited. Their vehicles can start fires. Unfortunately, arson is possible. Our climate is getting drier. Larimer County must recognize the seriousness of this issue and deny this permit. The county cannot simply hope for the best because our homes, our property, our animals would all be put at unacceptable risk of wildfire due to construction, high visitation, and incomplete understanding. These increased risks would also cause increased demands on local emergency services, especially fire, medical, and law enforcement.

No project this big can be undertaken without significant and irreparable impacts. We ask Larimer County to be a good steward and deny this permit and prevent the loss of open space and wildlife habitat, increased risk of wildfires and other public safety hazards, increased demands on local volunteer emergency services, noise, light pollution where now there is little, increased development and traffic in ever-widening circles around the reservoir, reduced air quality, climate change, increased illegal activities such as trespass on adjacent private land, decreased property values, and the loss of unique visual and aesthetic values. The natural and rural quality of this land is very important to our lives and communities.

Sincerely,
Pamela S. Scinto

--
Ms Pamela Scinto
pamscinto@hotmail.com
P.O. Box 54
Bellvue, CO 80512

Save Rural NoCo Member

1948

Rob Helmick <helmicrp@co.larimer.co.us>

Request for NISP Application Rejection

1 message

Gary Salomon <gms6655@me.com> Fri, May 29, 2020 at 11:40 AM
To: rhelmick@larimer.org

Rob Helmick, Senior Planner

Larimer County Community Development Division

200 W. Oak Street

Suite 3100

PO Box 1190

Fort Collins, CO 80521

Dear Rob,

As a resident of the Eagle Lake neighborhood, I am writing you to ask that Larimer County **not** approve the 1041 Application that is before you for a pipeline through the county by Northern Water (NISP). The issues revolving around this application and the reasons it should be denied closely mirror that of the City of Thornton 1041 pipeline application that was rejected by the Board of County Commissioners.

Specifically, here are some of the reasons the County rejected the Thornton application and should do so as well with the NISP application:

1) According to the Land Use Code criteria quoted by the Board of Commissioners, the proposal is inconsistent with the county Master Plan affecting land use and development, specifically that the route will be traversing through significant amounts of private property and through yards in the Eagle Lake neighborhood. Private easements will have to be obtained through eminent domain. Affected residents will not be permitted to construct permanent structures or plant landscape material with deep roots (trees, wind blocks, etc) on their property due to the pipeline easement and maintenance requirements. Affected residents will be subject to continual intrusion on their land by maintenance crews checking on the pipeline in perpetuity. This is a gross infringement of their right to a peaceful existence on their property and our right to restrict non-resident traffic on our privately-owned roads.

2) In addition, according to Northern Water's Construction Approach document, they are anticipating using HOA owned private roads for construction traffic throughout the five segments of construction on the pipeline near and through our neighborhood.

The timeline of the cumulative impact to us is anticipated to be 59 weeks from start to finish for all the segments! They are asking to use our narrow, non-public grade roads for heavy truck traffic and daily construction crew traffic on our private roads dozens of residents use daily to enter and exit our subdivision. This is an unacceptable burden on us and again is a gross infringement on our neighborhood and our rights to a peaceful existence that is inconsistent with the Master Plan's stated goal of "maintaining and enhancing our county's quality of life and to be fundamentally fair to all our citizens and to respect their individual rights." A quiet residential neighborhood with children playing,

residents coming and going, and retirees enjoying the peaceful time they've earned is not a place for construction staging for a project that has no benefit for its residents and even minimal benefit to Larimer County as a whole. The concept and thought of using our roads for this purpose is untenable.

3) The NISP 1041 application negatively impacts public health and safety in our neighborhood. Our private roads are narrow roads and not constructed to handle large, semi-tractor trailer traffic loaded with pipe sections and construction materials for pipeline construction. The roads were not built to handle the volume of traffic or the load. Having these vehicles on our roads creates a safety hazard for children, bicyclists, walkers and resident traffic entering and leaving driveways. In addition, some of our older residents with health issues are at risk due to the constant coming and going of non-resident truck traffic. Noise levels, pollution from diesel vehicles, and anxiety from interruptions to our peaceful existence can all lead to increased health problems for all residents.

4) In the Land Use Code criteria for consideration by the County, Criteria C states its purpose is to "Promote the economic stability of existing land uses that are consistent with the Master Plan and protect them by incompatible or harmful land uses." The proposed pipeline is certainly an incompatible and harmful use of the land in our neighborhood.

We recently annexed three parcels to our HOA (the TIPS Development) whose owner was required by the County to development certain aspects of the land (drainage, roads, etc) to be approved by the County before being allowed to offer the plots for sale and final residential development. The owner has spent thousands of dollars to prepare this land, yet the proposed pipeline path crosses near or on some of the new parcels rendering them virtually unsellable until the pipeline is built and completed. No buyer will pay a premium price for a parcel with the amount of disruption, uncertainty of building site and septic placement, and ongoing nuisance this project will cause to these three parcels for well over a year. The County is in effect killing the owner's ability to sell his parcels and recoup his already substantial investment that the County has made him invest to get the land ready for development. This is not "promoting the economic stability of existing land uses" (ie. Residential development) or "protecting incompatible and harmful land uses".

Other residents in our neighborhood who may be contemplating or are in the process of listing their property are also economically negatively impacted by the proposed pipeline. Buyers will use every reason to lower the price on a sale and a year or more of construction traffic, noise, dirt and dust flying in the neighborhood are good leverage points for them to either not buy at all, or attempt to attain a lower selling price than normal. The County is truly hurting the economic stability of the whole neighborhood with this proposal and hundreds of thousands of dollars in values may be lost if the application is approved.

5) Northern Water has presented other reasonable siting and design alternatives that do not include bisecting resident's property or cutting through our neighborhood that they have dismissed due to cost or more difficult construction conditions like their N2.4 (north of Reservoir #3) and N2.5 routes (Douglas Road). The Board of County Commissioners rejected reasoning that expense or difficulty of construction were disqualifying reasons for rejecting routes over ones that impacted private property owners and individual rights in the Thornton pipeline application. Northern's preferred N2.1 route severely impacts our rights as property owners and citizens and should similarly be dismissed by the Commissioners when there are viable alternate routing options.

6) Another issue of grave concern to the Commissioners in the Thornton application was the construction and pipeline proximity to occupied dwellings. Proximity of construction and construction impact along with the long-term detriment to property owners was a primary concern. The Northern Water proposal includes a 100' easement – a 40' construction easement and a 60' permanent easement. If the pipeline were to be placed on the property line between the two residences the proposed N2.1 routing prefers, that will put the easement only 30 feet or less from one of the residences. The disruption and imposition on private property this close to an occupied dwelling is unacceptable when there are route alternatives that do not cross private property between two dwellings.

7) The other major point that should either cause the county to reject the application or defer a decision until later is the Thornton pipeline issue now pending before the courts. The proposed routing of their pipeline has almost identical routing alternatives to Northern's. Both entities are in the review process at the same time with construction timelines that are similar. Multiple times in the record for Larimer County in the proceedings with Thornton, both Thornton, Northern Water, and the County mentioned or agreed that co-location of the two pipelines along their nearly identical paths made sense and should be pursued. It has been discussed between all three parties on numerous occasions and should be part of the discussion now.

In fact, one of the objections the Board of County Commissioners expressed to deny the Thornton pipeline by only submitting an application for one of their proposed pipelines in isolation from their planned future ones was that, **"Thornton deprives the Board and public of the opportunity to consider cumulative impacts and the effectiveness of mitigation. A route that may be appropriate for a single pipeline may be inappropriate for additional pipelines. If this information is not considered now, future pipelines may not be able to co-locate which would result in the disorderly development of Thornton's project and compound the impacts on Larimer County through multiple different pipelines in separate locations."**

How is this not the case with the proposed Northern pipeline and Thornton's pipeline, both of which are looking at nearly identical routing alternatives? This is not just an issue of "disorderly development and compounding of the impacts" on Larimer County – it is the disorderly development and compounding of the impacts on Eagle Lake in a much shorter timeframe than the proposed build out of the future Thornton pipelines. And how is the reverse not true – that a route that may be inappropriate for a single pipeline due to cost and difficulty of construction may be entirely appropriate for the combined resources of two pipelines from two well-funded entities with capable engineering that will minimize the impacts not only on Larimer County but the Eagle Lake neighborhood that is the target of two separate pipelines?

The precedent for this is Section A.2 of the Land Use Code itself that says the Code is intended to:

"A. Provide for the physical development of the county in order to:

1. Preserve the character and quality of rural and urban areas;

2. **Foster convenient, harmonious and workable relationships among land uses; and**

3. Achieve the principles and strategies described in the master plan."

This alone should allow the County to consider co-location as part of the process in both the Thornton and Northern Water 1041 applications. In addition, the Colorado Supreme Court noted that the purpose of the 1041 statute is to allow state and local governments to "supervise land use which may have an impact on the people of this state beyond the immediate scope of the project." Colorado Land Use Commission v. Board of County Comm'rs of Larimer County, 604 P.2d 32, 34 (Colo. 1979). The reference to impacts "beyond the immediate scope of the project" suggests that the Commissioners can and should consider the relationship between the project under consideration and other projects. Such sensitivity would definitely further the statute's apparent purpose of "protection of the utility, value, and future" of land, which the statute states is in the public interest. C.R.S. § 24-65.1-101(1)(a).

For these reasons, I am asking the Planning Commission and the Board of County Commissioners to reject the Northern Water 1041 application until such time that there is resolution to the Thornton 1041 application so that both pipelines can apply for a co-location routing option where both entities can share costs and choose routes they might not otherwise consider around residential areas. Our specific properties and the Eagle Lake neighborhood should not have to shoulder the burden of these two projects for the sake of Larimer County.

Thank you for your time and consideration on the matter.

Respectfully,

Gary Salomon

5025 Eagle Lake Drive

Fort Collins, CO 80524

Email: csu6655@gmail.com

Mobile: (972) 489-8588

Rob Helmick <helmicrp@co.larimer.co.us>

Objections to NISP 1041 Pipeline Application

1 message

Dan K <Dan2x@msn.com> Fri, May 29, 2020 at 12:04 PM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>

Dear Mr. Helmick,

As 20+ year residents of the Eagle Lake community, we want to express our strongest opposition to the approval of the NISP 1041 Pipeline application.

It is NOT reasonable or fair that our quiet community should shoulder the burden of the disruption and expense that the current proposed route of the NISP pipeline would cause**, so that the developers can access the least expensive route.**

In addition to the hardships of those land owners whose properties are directly affected,

a year-long construction project would not only cause harm to our lifestyle and environment but also create financial hardship for the entire Eagle Lake community due to immediate and permanently reduced property values.

We chose to move north and invest our retirement in the Eagle Lake community primarily to get away from the noise, congestion and pollution that was developing South of town. Now it appears that NIST wants to bring all of that to our doorstep! WHY? To save money at our expense and without any benefit to our community. NOT ACCEPTABLE!

It is our understanding:

That disrupting the serenity, financial stability and environmental quality of our neighborhood is inconsistent with the Larimer County Master Plan,

That there are other routes available that have significantly less impact on residential properties, and

That there is an opportunity to combine the NIST Pipeline project with the Thornton Pipeline to the benefit of both without having to cut through established neighborhoods.

For all of the above reasons we strongly object to the current route of the NIST 1041 proposal and request the proposal be denied.

Respectfully submitted,

Dan & Joyce Kiskis

457 Deerfield Circle

Fort Collins, CO 80523

970-493-2383

Sent from Mail for Windows 10

Rob Helmick <helmicrp@co.larimer.co.us>

The Northern Water pipeline project

1 message

Doug Gibson <dgibson66@gmail.com> Fri, May 29, 2020 at 12:07 AM
To: rhelmick@larimer.org

Rob,
As property owners of 4734 Eagle Lake Drive, we are vehemently opposed to the current plan to route the Northern Water pipeline through our neighborhood. There are other options that don't include tearing up our neighborhood, destroying our streets, and ruining the property values of our friends and neighbors. Please tell Northern Water that they need to find another solution.

--
Thanks,
Doug Gibson

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: Delay NISP meeting

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Sun, Mar 29, 2020 at 11:24 AM
To: John Kefalas <kefalajm@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioner Kefalas -- Forwarded for your information and consideration. Commissioners Johnson and Donnelly have requested that these duplicative messages be included in the public record without forwarding the emails to them as an intermediate step.

Rob -- Please include this message in the public record.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Kathie Dudzinski** <bikeski@mac.com>
Date: Sun, Mar 29, 2020 at 9:11 AM
Subject: Delay NISP meeting
To: <bocc@larimer.org>

Dear County Commissioners:
Please delay the NISP meeting during the coronavirus epidemic.
It is a matter of huge importance to the health of the Poudre River, and will have a great effect on the river as it flows through Larimer
County.
Please wait until residents will be able to participate in any hearing, so that you can duly represent us!
We elected you!
Thank you,
Kathie Dudzinski
3309 Canadian Parkway
Fort Collins, CO 80524
No Pipe Dream Supporter
Save the Poudre Supporter

Sent from my iPhone

1955

Rob Helmick <helmicrp@co.larimer.co.us>

NISP water project negative impact on Eagle Lake

1 message

Richard Nash <team.richard@gmail.com> Fri, May 29, 2020 at 5:27 AM
To: rhelmick@larimer.org

Hi Rob,

As a resident of Eagle Lake (address 4737 Eagle Lake Dr, Fort Collins, Co 80524) we are opposed to the NISP water project being routed through personal property in Eagle Lake subdivision. Utilities should use public right away such as roads etc. and not private land.

Regards,
Rich & Marylou Nash

1956

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Water 1041 Application

1 message

Tracy <tracyyoung@frii.com> Fri, May 29, 2020 at 3:29 PM
To: rhelmick@larimer.org

5133 Eagle Lake Drive
Fort Collins, CO. 80524
May 29, 2020

Rob Helmick, Senior Planner
Larimer County Community Development Division
300 W. Oak Street
Suite 3100
P. O. Box 1190
Fort Collins, CO. 80521

Re: Eagle Lake Subdivision

Dear Rob:

This letter concerns the 1041 Application that is before you for a pipeline through the County by Northern Water (NISP). I am asking you not to approve this application. The reasons for denial closely mirror that of the City of Thornton 1041 pipeline application which was rejected by the Board of County Commissioners.

This 1041 application is inconsistent with the County Master Plan because the route will be cutting through significant private property including residential yards in our neighborhood and will restrict use of the land in these easements to the detriment of the homeowners.

Another reason I am requesting denial of the application is that during construction Northern Water is anticipating using our subdivision's private roads for construction traffic. This time period is estimated to be 59 weeks. Our roads will be severely impaired due to all the construction traffic, not to mention that our quiet neighborhood will be totally disrupted. We are not going to benefit from this 1041 application so why should be suffer for it.

The County would severely damage the economic stability of our entire neighborhood with this proposal and hundreds of thousands of dollars in value may be lost if the application is approved.

For the above reasons, and numerous other reasons which I am sure have already been brought to your attention, I request that you deny this application.

Sincerely yours,

Ron Young, CCIM, CSM

Tracy Young

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041

1 message

Ralph Shinn <shinncpa@hotmail.com> Fri, May 29, 2020 at 6:15 AM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>, "shinncpa@yahoo.com" <shinncpa@yahoo.com>

Dear Mr. Helmick:

My name is Ralph Shinn. My wife and I are residents of Eagle Lake and proud homeowners of 5016 Eagle Lake Drive and have lived there for 6 years. When we moved to the neighborhood it was done with thoughts of retiring in this tranquil area close to town. We have saved for years to be able to acquire this home and were drawn to the area due to the many amenities provided, specifically Dixon Lake. We enjoy the wildlife, openness, and quietness of this neighborhood. With all due respect the proposed path of this pipeline will undoubtedly negatively affect our property values in and around the neighborhood and potentially impact our septic and bring about other known and unknown environmental hazards. What logical person or group with consider a path through a developed neighborhood when there are certainly more practical and preferable routes that would not create the negative impact that this route does? Running the pipeline north of our subdivision through open space areas with no development would be a much better, less disruptive, and a comparatively priced alternative.

When reviewing the tier Map and proposed line of the project this will run directly south and east of our property with excavation and other heavy equipment and will continue for a prolonged period of months. We understand eminent domain is a normal part of development but it must be contemplated and viewed from the shoes of the property owners whose lives, dreams, and hopes have been negatively impacted. This doesn't even mention the financial implications, mostly negative, to our and our neighbor's property value and resale potential.

We strongly urge you and the committee to consider alternative routes for this pipeline and put yourself in the place of us homeowners. Would you approve such a pipeline if it ran right through your back yard? I think not.

Respectfully submitted,

Ralph Shinn

Sent from Mail for Windows 10

1959

Rob Helmick <helmicrp@co.larimer.co.us>

NISP

6 messages

Dan and Melissa Savitske <dmsavitske@gmail.com> Sat, May 30, 2020 at 4:58 PM
To: pcboard@larimer.org, bocc@larimer.org

Board Members;

I am respectfully requesting that you do not approve the NISP. I am especially concerned that a proposed pipeline will be constructed through my private property and the only surface access to my home. I do not believe this project will benefit the citizens of Larimer County and it certainly will not benefit my family. 20,000 acres additional buy-and-dry is a detriment to the entire Western US,all to benefit Weld and Boulder county developers. I am also shocked that there has been absolutely no information outreach or contact with the landowners in the path of the proposed development.
Please refuse support to this ill-conceived project.
Daniel and Melissa Savitskie
1521 Grey Rock Dr.

Linda Hoffmann <hoffmalc@co.larimer.co.us> Sun, May 31, 2020 at 5:31 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information and consideration.

Rob -- Please include this message in the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

[Quoted text hidden]

Lesli Ellis <ellislk@co.larimer.co.us> Mon, Jun 1, 2020 at 8:43 AM
Reply-To: ellislk@larimer.org
To: Rob Helmick <helmicrp@co.larimer.co.us>

for the record

Lesli Ellis, AICP CEP
Community Development Director

Community Development Department
200 W Oak St, Fort Collins, 80521 | 3rd Floor
W: (970) 498-7690
ellislk@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Dan and Melissa Savitske** <dmsavitske@gmail.com>

1960

Rob Helmick <helmicrp@co.larimer.co.us>

NISP, etc.

6 messages

'Karen Kalavity' via Planning Commission Board <pcboard@co.larimer.co.us> Sat, May 30, 2020 at 3:45 PM
Reply-To: Karen Kalavity <integradesign1@yahoo.com>
To: "bocc@larimer.org" <bocc@larimer.org>, "pcboard@larimer.org" <pcboard@larimer.org>

These projects, such as NISP, the Thornton Pipeline, etc. are here to benefit ReMax, Lennar Homes and other real estate firms, not the people of Ft. Collins, or really, the people and environment of Colorado.

Stop the dams, stop the pipelines, stop the environmental damage, and most of all, stop the greedy nonsense!

Thanks,
Karen

Sean Dougherty <pcboardmember8@co.larimer.co.us> Sun, May 31, 2020 at 1:06 PM
To: Karen Kalavity <integradesign1@yahoo.com>
Cc: "bocc@larimer.org" <bocc@larimer.org>, "pcboard@larimer.org" <pcboard@larimer.org>

Thank you for your comments, Ms. Kalavity. We will take them into account when reviewing the 1041 application and how it may affect the residents of Larimer County.

Sean Dougherty
[Quoted text hidden]

Linda Hoffmann <hoffmalc@co.larimer.co.us> Sun, May 31, 2020 at 4:51 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information.

Rob -- Please include these messages in the public record.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

[Quoted text hidden]

Lesli Ellis <ellislk@co.larimer.co.us> Mon, Jun 1, 2020 at 8:43 AM
Reply-To: ellislk@larimer.org
To: Rob Helmick <helmicrp@co.larimer.co.us>

for the record

Lesli Ellis, AICP CEP
Community Development Director

Community Development Department

Date: Sat, May 30, 2020 at 4:58 PM
Subject: NISP
To: <pcboard@larimer.org>, <bocc@larimer.org>

[Quoted text hidden]

Katie Beilby <beilbykm@co.larimer.co.us> Mon, Jun 1, 2020 at 12:14 PM
To: Rob Helmick <helmicrp@co.larimer.co.us>

And a copy of this one?

Katie Beilby
Office Supervisor

Community Development Department
200 W Oak St, Fort Collins, 80522 | 3rd Floor
W: (970) 498-7719
beilbykm@larimer.org | www.larimer.org/planning

---------- Forwarded message ---------
From: **Dan and Melissa Savitske** <dmsavitske@gmail.com>
Date: Sat, May 30, 2020 at 4:58 PM
Subject: NISP
To: <pcboard@larimer.org>, <bocc@larimer.org>

[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us> Mon, Jun 1, 2020 at 12:51 PM
To: Katie Beilby <beilbykm@co.larimer.co.us>

Got it.
[Quoted text hidden]
--

Robert Helmick
Senior Planner

Community Development Department
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521
970-498-7682
rhelmick@larimer.org
https://www.larimer.org/planning

Matthew Lafferty <laffermn@co.larimer.co.us> Tue, Jun 2, 2020 at 11:44 AM
To: Rob Helmick <helmicrp@larimer.org>

FYI

---------- Forwarded message ---------
From: **Dan and Melissa Savitske** <dmsavitske@gmail.com>
Date: Sat, May 30, 2020 at 4:58 PM
Subject: NISP
To: <pcboard@larimer.org>, <bocc@larimer.org>

[Quoted text hidden]

200 W Oak St, Fort Collins, 80521 | 3rd Floor
W: (970) 498-7690
ellislk@larimer.org | www.larimer.org

[Quoted text hidden]

Katie Beilby <beilbykm@co.larimer.co.us> Mon, Jun 1, 2020 at 12:13 PM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Did you get a copy of this?

Katie Beilby
Office Supervisor

Community Development Department
200 W Oak St, Fort Collins, 80522 | 3rd Floor
W: (970) 498-7719
beilbykm@larimer.org | www.larimer.org/planning

---------- Forwarded message ---------
From: **'Karen Kalavity' via Planning Commission Board** <pcboard@co.larimer.co.us>
Date: Sat, May 30, 2020 at 3:45 PM
Subject: NISP, etc.
To: bocc@larimer.org <bocc@larimer.org>, pcboard@larimer.org <pcboard@larimer.org>

[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us> Mon, Jun 1, 2020 at 12:51 PM
To: Katie Beilby <beilbykm@co.larimer.co.us>

Yes, I did.
[Quoted text hidden]
--

Robert Helmick
Senior Planner

Community Development Department
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521
970-498-7682
rhelmick@larimer.org
https://www.larimer.org/planning

1963

Rob Helmick <helmicrp@co.larimer.co.us>

1041 Permit_Opposition to NISP

1 message

Preston Brown <pbrown.eco@gmail.com> Mon, Jun 1, 2020 at 3:54 PM
To: rhelmick@larimer.org, jkefalas@larimer.org, Steve Johnson <swjohnson@larimer.org>, tdonnelly@larimer.org, pcboardmember9@larimer.org, pcboardmember5@larimer.org, pcboardmember8@larimer.org, pcboardmember4@larimer.org, pcboardmember3@larimer.org, pcboardmember1@larimer.org, pcboardmember7@co.larimer.co.us, pcboardmember2@larimer.org, pcboardmember6@larimer.org, jshanahan@fcgov.com, cwebb@fcgov.com, nisp.eis@usace.army.mil

Dear Mr. Helmick, County Commissions, and Planning Commission,

I am submitting a letter to be included in the County's review of the proposed NISP project. As a fluvial geomorpholigst and river hydrologist, I am opposed to this project from its detrimental effects to river health.

Please see attached a letter directed to the Larimer County Commissioners, Planning Commission, and Planning Staff regarding the 1041 permitting process for the NISP project.

Please include this letter in the official notes for the meeting agendas going forward.

Preston Brown
Larimer County, CO

P_Brown Opposition to NISP.pdf
66K

June 01, 2020
Larimer County Board of County Commissioners
Larimer County Planning Staff
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521

RE: NISP 1041 Permit Application; Project No. 20-ZONE 2657

Dear Commissioner Johnson, Commissioner Kefalas, Commissioner Donnelly, and Planning Commission:

I am writing to express my opposition to the Northern Integrated Supply Project NISP and encourage the Larimer County Planning Commission and County Commissioners to reject the 1041 County permit for the project. Let me explain why I do not support this project and encourage you to reject the permit.

This annual spring "rise" on the Cache la Poudre River is a sacred event, a living pulse of water that lasts just about a month but refreshes and re-nourishes the entire river ecology. As the Poudre reaches Fort Collins these floodwaters spill the banks, filling secondary channels where frogs, birds, and fish rear and lay eggs. Fresh layers of sediments drop out over the floodplains, nourishing the deep, lush cottonwood forests and marshes.

Something unique about the Poudre is that despite roughly 2/3 of the flow already diverted out, there is still enough of a spring "rise" to flood the banks, clean out the river of lingering sediments, redeposit nutrients, and refresh the ecology. This is rare, nearly all of the rivers and creeks along Colorado's Front Range have been dammed or diverted where the natural rhythm of the spring "rise" is gone, turning the echoing drumbeat of the river into a muted whine.

The Poudre still has its spring heartbeat, but not for long if the Northern Colorado Water Conservancy District builds their gluttonous Northern Integrated Supply Project (NISP). If this project is built it will take 71% of the water out of the river during the spring "rise", flat-lining the river and putting it on life support.

My expertise is in river restoration and geomorphology, it's my job to know how river and stream mechanics respond to changes in flow. A major problem that NISP would have on the river is that by reducing the spring "rise", the river will not be able to redistribute and transport sediments out of the river channel where they can deposit onto floodplains and wetlands. By functionally limiting the peak flow and eliminating the annual flushing effect, those sediments will stack up in the channel year after year, eventually raising the channel higher and higher to a point that will create regular flooding problems. The annual flush is needed to improve hydraulic conveyance and move sediments downstream. Not allowing this annual pulse will create a clog, similar to a blood clot.

Additionally, if NISP were built and the sediments are not annually flushed out with large spring pulses, the water quality will greatly suffer. This will occur because the sediment and nutrients trapped in the channel will decompose and consume oxygen levels within the water, thereby decreasing dissolved oxygen available for fish and other wildlife. The annual spring "rise" is not "extra unused water", it's the force that cleans the river environment, flushing sediments and nutrients out and distributing them on floodplains.

Taking the last of the peak flow and storing it behind a dam to feed sprawling suburbs, while turning the river into a putrid algae-filled ditch, is not a good starting point.

This is not my vision for the Poudre River or the Northern Colorado region. Instead, my vision is to keep the wild character of the river, meet growing water needs, and retain the farmland and rustic character of the region. We don't need another river-destroying boondoggle like NISP that creates more urban sprawl. We need intelligent planning, water conservation, recycling, water sharing agreements between cities and farms, and water efficiency upgrades. These solutions have been done in places like Las Vegas where water use has gone down even through growth has skyrocketed. These methods are common and would be significantly cheaper than a billion-dollar dam, paid for by ratepayers.

Only 35 years ago, a 415 ft tall dam was proposed along highway 14 near the mouth of the Poudre Canyon. The Grey Mountain Reservoir proposal was pushed by Northern Water, the same agency pushing NISP. Thankfully Grey Mountain Dam was rejected by Larimer County, and I hope that NISP will be defeated too, but only with your help in rejecting the 1041 County Permit.

Please stand with the river and all the constituents in Larimer County that do not want to see our beloved river put on life support to feed the growth of cities in other Counties.

Thank you,

Preston Brown

Fort Collins, CO.

1966

Rob Helmick <helmicrp@co.larimer.co.us>

NISP

1 message

'barry feldman' via Planning Commission Board <pcboard@co.larimer.co.us> Thu, Jun 4, 2020 at 10:44 PM
Reply-To: barry feldman <latigob@yahoo.com>
To: "pcboard@larimer.org" <pcboard@larimer.org>

To: pcboard@larimer.org

From: Barry Feldman

Date 6/4/2020

Re: NISP

Dear commissioners:

I know you are receiving numerous emails on the subject of NISP 1041 process so I will keep this brief.

My wife and I have several issues with both the permitting process and the project itself.

The biggest concern about the process is the proposed idea of only allowing 2 minutes per speaker with no group presentations. Though I, and dozens of others I know, am more than willing to get up to the microphone and speak quickly to cram in my perspective on this process I think that it is best served to have one representative from each concerned group to take 10 – 15 minutes to present a more succinct, fact filled, less emotional presentation.

I know we all believe in strength in numbers but think that goal can be achieved quite well by being present, supporting ideas presented without the need to each march up to the microphone to be sure to be heard.

As for the project itself, a few key concerns are as follows:

1. The water issue is little different than for the Thornton pipeline. All the water is to be used after passing past Fort Collins. The water used will diminish the Poudre from the point of take out along with its beauty and recreational use. If it is taken out before going through Fort Collins that will greatly effect one of the cities – and surrounding communities – greatest assets. This includes the new, costly white water park and may negate its use completely.

2. There is to be a pipeline put in near Mulberry and Lemay to take some of the water out of the river and pipe east to meet the main pipeline and piped south crossing the river. Why not run all the water from Glade to the river east of town and take it out where the main line is designed to cross the river. Basically what was being insisted for the Thornton pipeline.

3. The currently proposed pipeline route is virtually all through private property, purposely avoiding going through any existing easements. Thus all new easements when plenty of existing ones could be used with less permanent impact to homeowners. As a personal note the existing route will be run down our west property line and then across the south portion of our property from west to east. We already have an easement on the north along CR 56 and an access easement along our east property line. We will lose any practical use of a horse corral and a portion of our riding arena. Lots of others have similar issues.

Running the water back into the Poudre and taking the water out of the river after Fort Collins is a win/win.

Please consider, Barry Feldman, 401 ECR 56

1967

Rob Helmick <helmicrp@co.larimer.co.us>

Your Upcoming NISP Decisions

2 messages

John M. Bartholow <john.m.bartholow@gmail.com> Fri, Jun 5, 2020 at 9:49 AM
To: pcboard@larimer.org
Cc: Board of County Commissioners <bocc@larimer.org>

Ladies and Gentlemen -

There are many, many angles to the decisions you must make regarding the Northern Integrated Supply Project. I only want to weigh in on one today, and that is the health effects of removing more water from the Cache la Poudre River. It is a very important angle indeed because we will pay the long term costs for years to come if NISP goes forward as planned.

I'm sure your "bias" is to make decisions based on sound science. Although there are umpteen pages of material in the myriad NISP documents, the pages that directly address the health effects of removing more water from the river are relatively few and, as the City of Fort Collins has clearly documented, are confusing at best and completely wrong at worst.

To the best of my knowledge, there are only two peer-reviewed articles directly addressing the science of how much water the Poudre River near Fort Collins actually needs to maintain some semblance of health. They are:

> Bartholow, J.M. 2010. Constructing an interdisciplinary flow regime recommendation. J. Am. Water Resources Association 1-15. DOI: 10.1111/j.1752-1688.2010.00461.x. Available online at http://onlinelibrary.wiley.com/doi/10.1111/j.1752-1688.2010.00461.x/abstract.
>
> Bestgen, K. & Poff, N. & Baker, D. & Bledsoe, B. & Merritt, D. & Lorie, M. & Auble, G. & Sanderson, J. & Kondratieff, B.. (2019). Designing flows to enhance ecosystem functioning in heavily altered rivers. Ecological Applications. 30. 10.1002/eap.2005. Available online at https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/eap.2005

Because I wrote the first article, I can speak most directly to its findings that clearly show that the Poudre is already badly depleted of water in every month of the year and actually needs more water (except during extreme flood events) to become sustainably healthy. We are fortunate that there are some efforts underway to supply more flows TO the river in critical times, but NISP would do just the opposite -- its net effect would be to take water FROM the river -- and the project, if implemented, would further compromise the struggling river we see today.

Thank you for your consideration. Stay safe!

John Bartholow

970-219-4093

Every year, more fresh water evaporates from reservoirs than is consumed by humans. ~I. Shiklomanov and UNESCO, 1999

Matthew Lafferty <laffermn@co.larimer.co.us> Fri, Jun 5, 2020 at 9:58 AM
To: Rob Helmick <helmicrp@larimer.org>

FYI
[Quoted text hidden]
--

Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning

Rob Helmick <helmicrp@co.larimer.co.us>

Kling Coppinger Comment Letter NISP 1041 Permit Application; Project No. 20-ZONE 2657

2 messages

Karyn Coppinger <kcoppinger31@gmail.com> Fri, Jun 5, 2020 at 1:20 PM
To: rhelmick@larimer.org, jkefalas@larimer.org, swjohnson@larimer.org, tdonnelly@larimer.org

Dear Commissioners, Planning Commission, and Mr. Helmick:

My husband and my comment letter is attached. Please confirm the receipt of this email and its 4-page attachment.

Thanks for the opportunity to comment, and see you at the hearings!

Karyn Coppinger and Craig Kling
Laporte

Coppinger_Kling NISP Comment Ltr 6_5_20.pdf
1267K

Rob Helmick <helmicrp@co.larimer.co.us> Fri, Jun 5, 2020 at 1:42 PM
To: Karyn Coppinger <kcoppinger31@gmail.com>
Cc: John Kefalas <jkefalas@larimer.org>, Steve Johnson <swjohnson@larimer.org>, Tom Donnelly <tdonnelly@larimer.org>

Received, thank you.
[Quoted text hidden]
--

Robert Helmick
Senior Planner

Community Development Department
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521
970-498-7682
rhelmick@larimer.org
https://www.larimer.org/planning

Coppinger/Kling Comment Letter
NISP 1041 Permit Application; Project No. 20-ZONE 2657

June 5, 2020

Larimer County Board of Commissioners
Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly

Larimer County Planning Commission
Robert Helmick

RE NISP 1041 Permit Application; Project No. 20-ZONE 2657

Dear Commissioners and Planning Commission:

Thank you for the opportunity to comment on the Northern Integrated Supply Project (NISP) and its 1041 permit application. My husband and I are landowners residing in northern Larimer County, near the proposed location of Glade Reservoir, it's massive dam, forebay, pumps, pipelines, campgrounds, parking lots, boat ramps, and other appurtenant facilities. We strongly urge the Board of County Commissioners to deny the 1041 permit for the NISP because it will irrevocably and irretrievably harm our quality of life and the fundamental nature of the rural landscape in which we live.

We choose to live in northern Colorado for its attractive natural landscapes, its wild and scenic rivers, it's clean air and quiet surroundings, its wildlife, its opportunities for outdoor recreation on the abundant existing public land in northern Colorado. These landscape attributes are key elements of our quality of life; elements that will be lost if this project is constructed and operated as proposed. We practice stewardship of our land, controlling weeds and maintaining the native vegetations, preventing fires, enabling wildlife use, preventing disturbance and pollution, to name a few. We grow vegetables. We work and recreate. We chose rural northern Colorado because it is unique and beautiful and relatively undisturbed.

Any benefits of the project would accrue to communities mostly outside Larimer County. We should not have to bear the impacts and unacceptable risks of this ill-conceived industrial and commercial complex. We have a clear, bleak picture of the project's far-reaching and permanent impacts to rural ways of life, but no explanation exists of why such impacts should ever occur.

Large portions of Colorado, including Larimer County and surrounds, are semi-arid, so while abundant land exists for development and growth, there is very limited water. NISP is a costly and wasteful approach to water supply. Alternatives, especially conservation (and public education about conservation) are paramount to insure viable long-term water supplies with less environmental harm.

NISP as its is currently planned is speculative and infeasible. In 2019 NISP announced that it was undertaking a farm-buying program to obtain 22,000 ac-ft of water from farm rights, over half of the water rights needed for the project, primarily in Weld County. Prior to 2019 NISP indicated they would not be buying farms to obtain water and the FEIS for the project stated that the buying alternative was not feasible because it could not meet the project purpose. But now they have switched to that very approach

for over half of the necessary water rights, without providing any additional environmental analysis or explanation of how it is now feasible. Since early 2019, the project has purchased about 160 acres. It is pure speculation that the remaining tens-of-thousands of acres would be purchased or purchased any time soon, nor has the additional cost been revealed. None of the infrastructure construction should be undertaken; the project likely would not be able to provide sufficient water to meet project goals, and certainly would not be able to provide water at the costs estimated for the project as proposed.

The purported recreation benefits also would not occur. Even if the water rights were somehow obtained in the near future, the hydrological modeling conducted by NISP failed to consider the effects of prolonged drought that occurred after 2005, the last year included in the applicant's modeling. Water levels in the reservoir would be well below the boat ramp in ~49% of years. And, droughts are becoming more severe, threatening water supplies. So, while the NISP propaganda, presented during public outreach, shows a full reservoir with happy sailboarders and fishermen, the facts are that the reservoir will frequently contain very little water and will be surrounded by an ugly, barren shorelines, and will be unsuitable for boating and unattractive for other types of recreation. Furthermore, the recreation proposal is financial folly, because not only would the county have to pay 25% of the recreational facility construction costs, it would be responsible for paying for the maintenance costs, and without sufficient entry fees, that burden will fall on the county, and likely the taxpayers.

The project is being piecemealed and the 1041 application lacks concrete mitigation commitments, so there is still high risk and many unknown effects, the consequences of which will irreparably harm the landscape we love. The application is rife with "to be determined" or "to be developed" and even states, in section 12, that the present project is "conceptual." The project may be conceptual, but the impacts would be real and shockingly harmful.

The relocation of over seven miles of a major federal highway was carved out of the application in mere months prior to the submittal of the 1041 application, whereas the applicant (and the county) had led the public to believe that it would be included. This smacks of slicing off the impacts of a huge construction project so that NISP doesn't have to accept responsibility for it. As the application says, the highway is an impediment to the project rather than part-and-parcel to years of construction and extreme alteration of the land.

Cultural resources would be lost. There are almost 100 eligible or potentially eligible sites. Many of these sites are eligible or potentially eligible for listing on the National Register of Historic Places, they are important to our history and culture, yet not, apparently, important enough to be dealt with prior to this monumental land use decision.

The project will cause air pollution, including massive amounts of fugitive dust and chemicals that are precursors to ozone, and Larimer County is often in a severe non-attainment situation with respect to ozone. How is it possible to entertain the idea of a project that could impair public health, but provide no public benefit? Mitigation for air pollution is punted to some later CDPHE process, so we are left wondering if we, our families, and friends would be harmed. Will we be told to "stay inside" during more and more of the gorgeous summer days? If so, why would we choose to live here?

The project has the potential to cause fires, both during construction and operations, especially if 400,000 visitors, with their fires, cigarettes, illegal fireworks, and firearms roaming around these fire-prone hills.

We take extreme care with fire, creating defensible space around our homes and avoiding activities that could start fires. But many wildfires are started by people, and visitors who don't understand, or blatantly disregard, the rules put us at extreme risk. Fire prevention and potential suppression costs are glossed over in the application materials, although Larimer County is extremely fire prone, and in the past decade or so, devastating fires have occurred immediately adjacent to the proposed Glade location. It is not appropriate for the county to authorize the project and simply hope for the best when millions of dollars of property damage and possibly lives are at stake.

It is unlikely (but as yet undisclosed) how encouraging almost 400,000 visitors (almost 80,000 vehicles during summer) would affect law enforcement and emergency services, some of which are all volunteer fire and EMS services. We are concerned about how much Larimer County's law enforcement and emergency services be stretched, and what would happen to the level of service to its residents if resources are diverted to the thousands messing around on Glade.

The project would bring noise and light pollution to an area where currently there is little such pollution. Should the reservoir ever fill, which is unlikely, motorboat noise would careen up the valley and into our community, affecting property values. We choose to live here because it is quiet, and at night, it is dark. One can hear the birds during the day, and the nighthawks, owls, and crickets during the night. We foster this on our land, by maintaining its native attributes. Deny this project so that there are still places where Larimer County citizens can enjoy these qualities of life.

Construction would take 5 to 7 years, according the application (although it varies, depending on whether you look at the application or FEIS, so we wonder, which is correct?). Most construction project experience delays, so it's safe to say that we will face a decade of construction impacts. Traffic, congestion, noise, dust, air pollution, helicopters—6 days per week, all daylight hours, and up to 500 workers. This is massive and it will be horrible for a long time. It is not acceptable that we should have to bear this severe burden for the (purported) benefit of cities and agencies far away and mostly outside Larimer County.

The project will contribute to climate changes. The engines from the pumping stations will emit thousands of tons per year of greenhouse gases. Colorado's current policy, signed into law by Governor Polis last year, calls for reductions in greenhouse gas emissions, so the project flies in the face of state policy. We despise the effects of climate change, we can see it evidenced by the outbreak of the pine bark beetle, which as devastated the forests throughout the Rocky Mountains, for example, to the loss of wildlife, etc. We applaud Colorado for its policy and remind Larimer County that it must consider how this project would hinder the state achieving its goals and deny this project.

Our yard is composed of native grasses that survive just fine in the natural climate. We are surrounded by native grasses, forbs, trees and shrubs. We vehemently object to a project to supply water to water lawns. We are aware that subdivisions are still requiring green lawns, and that much of Colorado's most precious resource is being used for this purpose. We say no, it's time to shift the collective thinking. We especially say no to the proliferation of reservoirs (Glade and the Seaman and Halligan expansions and who knows what's to come?) so that grass may grow in urban areas. It defies logic. It's an environmental disaster.

We also oppose the project because of its impacts on the Poudre River. It is a regional treasure, an important part of the very identity of northern Colorado, wild and scenic, and vital to the riparian, agricultural, foothills, and mountain landscapes. Taking more, as our climate dries, would ruin its health and strip us of its many precious benefits. To our great loss.

For the NISP project, the U.S. Army Corps on Engineers must comply with NEPA, and the state of Colorado has permitting requirements for water quality, but the land use issues and the protection of Larimer County citizens and our ways of life are ultimately and undeniably the county's responsibility, and the county must say "no" to NISP. It would be harmful. The county has outlined its vision for the county in the Comprehensive Plan, adopted in 2019, which shows the area proposed for Glade as Mountains and Foothills and Natural Resource. We applaud the county for this. Hook and Moore Glade is a unique and beautiful place, with grassy valleys surrounded by striking, tall, red, layers hogbacks. When we travel down valley, we are treated to the scenic mouth of Poudre Canyon and the productive, agricultural setting around Ted's Place. When we go north, we see striking views of the Rocky Mountain, the northern-most stand of pinyon pine in the western U.S., expansive rangeland, and eerie, wind-carved hoodoos of the Sherman Granite. All of this is valuable, and rare. Once these places are gone, they are gone.

We strongly urge the county to deny NISP. The project is speculative, the benefits cannot be achieved, and the impacts are far-reaching, permanent, harmful, and potentially devastating.

Sincerely,

Karyn D. Coppinger
Craig L Kling

Karyn Coppinger and Craig Kling
1080 Shadow Ridge Road
Laporte
Members of and submitted on behalf of Save Rural NoCo

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

NISP Public comments

1 message

Rose <rosew9252@msn.com> Fri, Jun 5, 2020 at 11:04 AM
To: "Rhelmick@Larimer.org" <Rhelmick@larimer.org>
Cc: "kcoppinger31@gmail.com" <kcoppinger31@gmail.com>

Mr. Helmick,

This le. er is to voice my opposion t o the NISP project for Glade Reservoir. I know others are subming detailed informaon on the poorly planned aspects of this pr oject, including lack of water rights to fill to reservoir, road, noise polluon and des trucon of the P oudre River water flow and wildlife migratory paths, so I will not reiterate those points.

I have been a 30+ year resident of Larimer County and would be directly affected by the construcon and long-term effects of this project. The entry to my area of residence is via HWY 287. The proposed re alignment of HWY 287 would feed traffic back on to the highway just south of our current entry point. This is already a hazardous spot, with no dedicated turn lane serious accidents occur o en. Why isn't the highway being re-routed to Owl Canyon Road (also a proposed route) where there's room (and the need) for a safely designed turn, exit design? The road re-alignment is another example of a poorly planned aspect of this enr e project.

The proposed NISP/Glade project would be the largest EVER construcon pr oject in Larimer county, yet is basically for the benefit of Weld County communies do wn river at the expense of Larimer County natural resources. The destrucon t o these resources, including historic Overland Trail path, Bellvue valley view sheds, natural habitat (including nesng eagles) riparian w aterways, wild life migraon pa ths and the quality of rural life would never be able to be reclaimed-gone FOREVER!

There are alternav es available that would deliver the water to growing Weld county communies tha t should be examined and implemented instead of NISP. Underground storage sites have been idenfied (in Larimer County) that would sas fy the water storage requirement--combined with increased conservaon measures such as xeriscaping, and the use of grey water storage /use within residenal and c ommercial buildings and parks need to be a part of future planning.

There ARE feasible alternav es to the project as proposed. Let's require NISP to find a soluon tha t does not create irreparable damage to the ciz ens and natural resources of Larimer County for the benefit of poorly planned growth in neighboring counes.

Respecully submi ed,

Rose Walker

Tara L Parr
6410 Placer Ct
Bellvue CO 80512
May 22 2020

Rob Helmick
Larimer County / Community Development

Dear Mr Helmick,
I am writing to give you my comments on the proposed NISP construction. There are those who believe extracting water from the Poudre River can be achieved without doing harm to the already much altered water shed. I have tried to inform myself of the merits of the NISP proposal and am concerned that it is more likely to become an environmental disaster than anything else. In our arid western location with several reservoirs already in place along the Poudre River water shed it might be better to rethink ways to acquire and manage water for future development. Research into various techniques for the procurement of water for people is underway and the future holds promise if entities like the Northern Colorado Water Conservancy District were to require it. In addition to my environmental concerns the construction of NISP will be long, disruptive, and extremely expensive. Even if banks and communities are willing to make financial commitment's for the costs and maintenance of NISP; I suspect that at some point all the taxpayers of the state of Colorado might find themselves paying for the project. The pipeline and road construction will make daily life in the area miserable and leave the landscape torn up and marred for many years and never to be restored to its present state.
Many thanks for your consideration of my comments.
Sincerely,
Tara

Rob Helmick, Senior Planner
Larimer County Community Development Division
200 W. Oak Street
Suite 3100
PO Box 1190
Fort Collins, CO 80521

Dear Rob,

As a property owner in the Eagle Lake neighborhood, I am writing you with my concerns regarding the 1041 Application for the Northern Water (NISP) pipeline plan. My understanding is NISP is proposing a pipeline route independent from the Thornton pipeline, which is also under consideration by the county. I attended multiple public hearings where county representatives stated that the Douglas Road route, which has established right of ways, is a viable option for the installation of a single pipeline, but not two. Traffic can be diverted and/or detoured so that those living along, or using, Douglas Road would have acceptable access. The problem with the installation of two pipelines is that significant sections of Douglas Road would have to be closed to traffic during construction.

I believe approval of the NISP 1041 Application that takes the pipeline through the Eagle Lake neighborhood, requiring seizure of private property through eminent domain, would and should be challenged in court. The county would be required to prove in court that no other viable option exists. I do not believe the county could prove this to be true.

I am asking the county to deny the 1041 Application for the NISP pipeline as proposed.

Sincerely,

Ted Zibell
5141 Eagle Lake Drive
Fort Collins, CO 80524

1976

Rob Helmick <helmicrp@co.larimer.co.us>

NISP - a better way

2 messages

DAVID ROY <david.roy@comcast.net> Fri, Jun 5, 2020 at 4:33 PM
Reply-To: DAVID ROY <david.roy@comcast.net>
To: pcboard@larimer.org, bocc@larimer.org, ccsl@fcgov.com

Good afternoon, Larimer County Commissioners;

Legacy. Politics. The environment.

Commissioners Johnson, Kefalas, and Donnelly; you will each have the incredible, once in a lifetime chance, to leave a shared legacy that future citizens will enjoy while protecting and preserving the Cache la Poudre River.

The Northern Integrated Supply Project, if approved and constructed as currently envisioned, will birth 600,000 Colorado citizens on the arid Eastern Plains of Northern Colorado, with the land use and transportation woes that number indicates.

As envisioned, it will also mean the death of one of the most cherished natural resources that Larimer County, in fact, the State of Colorado, has within its jurisdiction; the Cache la Poudre River.

The Cache la Poudre is too often called a 'working river'. It is a dying river. Much of the year, the river channel through Fort Collins is made up of only puddles. For too long, we have been blind to its degradation, because we had fields to irrigate, rooftops to build, and lawns to water.

The three of you can choose to be part of a shared legacy; you can protect and preserve the Cache la Poudre River, give citizens 75 years from now the chance to enjoy it, and improve the habitat that is critical for wildlife and nature to survive along the riparian corridor of the Cache la Poudre River.

The water for NISP is owned by Northern Water. You aren't. Each of you were elected to protect the health and safety of the citizens of Larimer County and the resources of Larimer County. There is no natural resource more precious and important to the citizens here than the Poudre River.

In your roles as elected officials, representing the wishes and values of the citizens of Larimer County, I request that you create legislation that mandates Northern Water run their water for citizens yet to live in Eastern Colorado, under rooftops yet to be built, down the Cache la Poudre River, instead of through a costly and disruptive pipeline.

A healthier Cache la Poudre River, enjoyed 75 years from now by our great grandchildren, is a legacy the three of you can work on together, across the aisle, doing what is best for Larimer County and for the citizens who live here now, and for those who will live here tomorrow.

Thank you for your positive consideration of my request for the three of you to do this meaningful work for the future of the Cache la Poudre River, Larimer County, and the citizens you represent.

Best regards,

David Roy
2 Term Fort Collins City Council Member
Fort Collins CO 80521

Linda Hoffmann <hoffmalc@co.larimer.co.us> Fri, Jun 5, 2020 at 4:56 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information and consideration.

Rob -- Please include this message in the public record.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us>

2 minute time limit on speaking at NISP public comment hearings

2 messages

Brent Hawley <bhawleys@frii.com> Fri, Jun 5, 2020 at 4:14 PM
To: Steve Johnson <swjohnson@larimer.org>, Tom Donnelly <tdonnelly@larimer.org>, John Kefals <jkefalas@larimer.org>, Rob Helmick <rhelmick@larimer.org>

To: Larimer County Commissioners and Rob Helmick

Topic: The unreasonable 2 minute time allowance for speaking at the NISP public hearings (instead of the usual 3 minute).

I am writing to voice my opposition to the change from 3 minute to 2 minute speaking time. In 2 minutes a speaker can barely introduce them selves and give the most simple point of view. In no way can any detail be expressed. I feel like you are trying to mute dissenting voices to the NISP project.

I hope you reconsider and revert to the usual 3 minute time allowance. If you are afraid these hearings would take too long, so be it. That reflects of the size of the project and the concerns of the public.

Thank you for your time.

Respectfully, Brent Hawley

6521 Placer Ct, Bellvue, Colo. 80512

email - bhawley@frii.com

Steve Johnson <johnsosw@co.larimer.co.us> Fri, Jun 5, 2020 at 4:23 PM
To: Brent Hawley <bhawleys@frii.com>
Cc: Steve Johnson <swjohnson@larimer.org>, Tom Donnelly <tdonnelly@larimer.org>, John Kefals <jkefalas@larimer.org>, Rob Helmick <rhelmick@larimer.org>, Lesli Ellis <ellislk@co.larimer.co.us>

Brent, given the large number of people that we expect to want to speak and the limitations on how many people can be in the room at one time due to the pandemic restrictions is the reason we are using a 2 minute time limit. This will enable us to have several groups to come in and speak and leave and another group replace them during each days hearing. We will utilize an online scheduling reservation system for those folks who do want to come in and speak in person. I believe the Planning Commission is using the same time limit. What we are encouraging people to do is to submit written comments by email. There is no limitation on the amount of material that you can submit in writing the head of the hearing. Also another advantage of doing this is that gives all of us a chance to review the material in advance. We also suspect that there will be a large number of people who might have health vulnerabilities to the virus who do not want to be in a crowd of people at this time. We're encouraging them to it written comments as well. Thank you for your email.
[Quoted text hidden]

1979

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: I support the NISP project

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Sat, Jun 6, 2020 at 5:28 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information and consideration.

Rob -- Please include this message in the public record.

---------- Forwarded message ---------
From: **Patrick Mahoney** <pfmahoney@yahoo.com>
Date: Fri, Jun 5, 2020, 10:18 PM
Subject: I support the NISP project
To: bocc@larimer.org <bocc@larimer.org>

I saw on Reddit.com/r/fortcollins that there is a form letter by the Sierra Club stating that we should write that we oppose the project.

I just wanted to say that having studied the project, read through a lot of the documentation, and actually surveyed the area where the reservoir would be placed with my wife and children and that we support the project - particularly if the water diversions to fill it are gradual so as to not affect the downstream habitats too much.

It seems like every couple of years the Poudre ends up flooding - in fact, there's a flooding issue that has impacted the Poudre River Trail from Windsor to Greeley right now - and I think having the option to store this water for future droughts that we know are coming is wise. Opponents will say that the solution is conservation but this to me seems like a short-sighted approach. I think a combination of conservation coupled with a solid plan for the future is the best option.

I consider myself an environmentalist, I own an electric car, and we have solar on our house. I am signed up for the green energy option from Fort Collins Utilities for electricity and I do spend time on the Poudre with my family. I am worried about the impact of the outflows but I do trust that the project will be implemented wisely and carefully and thoughtfully and I believe the NISP is necessary for the future.

Thanks
Patrick Mahoney
720 Roma Valley Dr.
Fort Collins, CO 80525
970-229-5950

1980

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: Northern Integrated Supply Project

2 messages

Linda Hoffmann <hoffmalc@co.larimer.co.us> Sun, Jun 7, 2020 at 2:11 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information and co

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Pam Sheeler (pam-88@hotmail.com) Sent You a Personal Message** <automail@knowwho.com>
Date: Fri, Jun 5, 2020 at 11:29 PM
Subject: Northern Integrated Supply Project
To: <bocc@larimer.org>

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

The NISP is an extremely expensive project that would cause great destruction; disrupt and displace residents around the proposed reservoir, residents along Highway 287, and residents along the proposed pipeline route; and it isn?t needed. There are many conservation actions that would provide all the water proposed to be delivered by Glade, including improved water efficiency by municipal districts, industry, and agriculture; public education and awareness programs; repairs to leaking ditches and pipelines, landscape irrigation improvements, and much more.

The NISP is a controversial project that is of great interest to many people in Larimer County who want full opportunity to comment on the permitting process and to appear at public hearings. Because of the scope and controversy surrounding this proposed project, the Commissioners should wait until the coronavirus pandemic has subsided enough to allow for full in-person public participation.

Sincerely,

Pam Sheeler
1868 Muddy Creek Cir
Loveland, CO 80538
pam-88@hotmail.com
(970) 635-0888

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: Northern Integrated Supply Project

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Sun, Jun 7, 2020 at 2:18 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information and consideration. There are 83 messages in this string.

Rob -- Please include these messages in the public record for the application. Again, I'm not sure how they will come through. There are 83 in the string.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Megan Thorburn (meganthor@yahoo.com) Sent You a Personal Message** <automail@knowwho.com>
Date: Sun, Jun 7, 2020 at 12:41 PM
Subject: Northern Integrated Supply Project
To: <bocc@larimer.org>

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

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The NISP is a controversial project that is of great interest to many people in Larimer County who want full opportunity to comment on the permitting process and to appear at public hearings. Because of the scope and controversy surrounding this proposed project, the Commissioners should wait until the coronavirus pandemic has subsided enough to allow for full in-person public participation.

Sincerely,

Megan Thorburn

3401 Lancaster Drive
Fort Collins, CO 80525
meganthor@yahoo.com
(970) 412-9410

Rob Helmick <helmicrp@co.larimer.co.us>

Cache La Poudre River vs. NISP

2 messages

Nancy York <nyork@verinet.com> Mon, Jun 8, 2020 at 2:50 PM
To: pcboard@larimer.org
Cc: jkefalas@larimer.org, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>

To all concerned,

A very real fact stated by the International Panel on Climate Change (IPCC) is that should our world society fail to cut greenhouse gas emissions (GHG) by almost 50% before 2030 and not reach net zero emission by 2050, we will not keep temperatures below a livable 1.5°C. The world is on course for a catastrophic 3.2°C of warming by the end of the century. The time for correction in now and our time is short.

I don't know if the environment impact statement (EIS) assessed NISP's GHG emissions but logically, given the amount of cement and fossil fuel used to construct it, the miles of new highway, and the energy used to pump/fill the reservoir with river water, it will be enormous. There isn't time for NISP as far a mitigation of the climate is concerned.

Drought and evaporation must be taken into account. The City of Fort Collins commissioned a water supply vulnerability study that considered a range of risks that could plausibly impact the City's future water supplies. The study concluded that "climate change is the most important vulnerability" facing Fort Collins' water supplies and probably all of Colorado's. Northern Water does not have the water rights to fill Glade during low water years, so where will they get the water. Farms? Scientists tell us that higher temperatures will result in lower crop yields. Please read and ponder Save Rural NoCo's hydrological modeling before making this life changing decision regarding NISP, a ramification which will affect so many lives and life itself.

I have played in the Poudre all of my 82 years. As a kid the Poudre was the destination for adventure - hunting snakes with my brother, riding logs after a big flood in mirky water. Later fishing with my mom and dad, rafting and inner tubing, playing with my dog. It would be an utter shame that girls and boys and dogs and folks would miss out, that the natural wildness of the trees and grasses would lose vitality for the lack of sufficient river water.

We know the world is changing but we must do all we can to preserve life. Please vote to find NISP unacceptable.

Sincerely,
Nancy York

Matthew Lafferty <laffermn@co.larimer.co.us> Tue, Jun 9, 2020 at 8:21 AM
To: Rob Helmick <helmicrp@larimer.org>

fyi
[Quoted text hidden]
--

Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

1984

Rob Helmick <helmicrp@co.larimer.co.us>

No More Dams or Pipelines for the Poudre!

1 message

Trish Babbitt <chaang61@gmail.com> Mon, Jun 8, 2020 at 12:26 PM
To: pcboard@larimer.org, bocc@larimer.org

Dear Larimer County Planning Board & Commissioners,

I am very concerned about some terribly destructive proposals being considered by our planning board & county commissioners concerning the potential for more damming and building of pipelines to carry water out of our precious, overworked Poudre River. As I watch President Trump allow for more and more destruction on many of our formerly protected lands and waters, I fear that some of our local officials are feeling pressured to follow our president's detrimental choices in comparable ways.

Over the past 30 years 1,355 dams were removed in the US. In fact, in 2018, 82 dams were taken down, and in 2019, 90 more were demolished, thereby restoring thousands of miles of wildlife habitat. (Jessie Thomas-Blate, 2/20/19). The trend to remove dams began to increase as well-educated leaders came to realize how much damage dams have caused to wildlife habitats and how much more potential damage there could be if they are not removed. Also, over the past 30 years, growing numbers of people have learned why **we should NOT to build more dams** throughout the United States. Unfortunately, here in northern Colorado, there seems to be a push to build more dams and pipelines to provide water for problematic uses, as is evident with the proposals to dam and pipe the life out of our precious Poudre River.

How is it that certain land developers and government officials are even able to discuss the possibility of damming & building pipelines from Poudre River water when it has national heritage status and when there is so much evidence that damming and piping the Poudre will cause so much harm to the river and its surrounding habitats? (This is the same type of question I ask as I learn of the destruction of formerly protected lands and waters throughout the USA.) I know that in the past many Fort Collins citizens and elected officials have shown progressive thinking in various realms; I hope our current elected officials will listen to their concerned constituents and choose to protect our Poudre and its surrounding wildlife habitats now.

Countless individuals as well as members of community organizations such as the *Sierra Club, Save the Poudre, Save Rural NoCo, & No Pipe Dream* have been working hard to educate elected officials as to why we need to preserve our precious river. While I absolutely share the concerns that many people in these groups hold, I also have other concerns that are often not discussed.

Our elected officials frequently say that we need to dam and pipe our Poudre River to accommodate the masses of people whom they believe will be moving to northern Colorado in the coming years. They lead people to believe that this water will be used for daily uses such as cooking, bathing, and caring for our (maybe?) xeriscaped outdoor areas. Unfortunately, they rarely (if ever) address the huge amount of our water that will be allotted for unsustainable meat and dairy production in northern Colorado.

Our Covid-19 crisis has given some people a tiny glimpse of the terrible conditions in which meat processing workers have been working in Greeley, as well as other meat processing plants throughout the country. Unfortunately, it didn't reveal how much water is used to process meat (and dairy) items that were deemed "essential". While protesters are finally beginning to make their voices heard in the *Black Lives Matter* movement, as videos have shown social injustices happening in real time, "Ag-Gag" laws prevent concerned citizens from revealing the egregious social and environmental injustices that occur in the agriculture industry, especially animal agriculture and which are happening now in northern Colorado. Do we really need to build dams and pipelines that will destroy our river habitats and also perpetuate outdated and cruel working conditions for workers and animals in our animal agriculture industries?

I can't help but believe that animal agriculture lobbyists are pressuring our elected officials to dam and pipe our Poudre River as a way of preserving the unsustainable meat production practices & worker abuses that have been hidden in Greeley from the general public for years. When I asked a NISP representative a few years ago about future-plans for agriculture in Northern Colorado, he said that in a few years all agriculture operations would be moved to Nebraska and Kansas! I can't help but wonder how many local agriculture workers are aware of this plan, and how many government officials and corporate farm operations are in on this secret? It seems that if our elected officials vote to allow our Poudre River to be dammed and piped in the ways that are currently being proposed, it won't be much of a stretch for those in power to continue the pipelines to Nebraska and Kansas to enable corporate farming operations to continue using our water in some very objectionable ways, as the Poudre River and surrounding areas dry up and die.

It is my hope that all of you will listen carefully to the very valid concerns being voiced and act prudently in the decisions you make about the fate of this river. Please don't allow for any further exploitation of this valuable river which has been overworked and could suffer greatly—as could the abundant wildlife that depends on it—if developers et.al. are given permission to build more dams and pipelines, as are currently being proposed.

Sincerely,

Patricia K. Babbitt, 309 Scott Ave., Fort Collins, CO 80521

1986

Rob Helmick <helmicrp@co.larimer.co.us>

No More Dams or Pipelines for the Poudre!

3 messages

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Sincerely,

Patricia K. Babbitt, 309 Scott Ave., Fort Collins, CO 80521

Linda Hoffmann <hoffmalc@co.larimer.co.us> Mon, Jun 8, 2020 at 5:41 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information and consideration.

Rob -- Please include this message in the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

[Quoted text hidden]

Matthew Lafferty <laffermn@co.larimer.co.us> Tue, Jun 9, 2020 at 8:22 AM
To: "Helmick, Rob" <rhelmick@larimer.org>

fyi

---------- Forwarded message ---------
From: **Trish Babbitt** <chaang61@gmail.com>
Date: Mon, Jun 8, 2020 at 12:26 PM
Subject: No More Dams or Pipelines for the Poudre!
To: <pcboard@larimer.org>, <bocc@larimer.org>

[Quoted text hidden]

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Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Reject/Disapprove NISP 1041 Application

1 message

Patrick Crotzer <patrick.crotzer@gmail.com> Mon, Jun 8, 2020 at 10:51 AM
To: pcboard@larimer.org

Larimer County Planning Commission
As you prepare for the upcoming Planning Commission Hearings and follow on County Commissioners' meetings I wanted to provide a couple of general observations and questions as well as questions more focused on the CR 56 area.

I don't believe limiting comments to two minutes per person will allow in-depth information to be exchanged with the Planning Commission and the County Commissioners. There should be a way for people to yield time to a larger group so that more detailed information than "not in my backyard" comments can be made. This would allow more reasonable discussions in the public input. It is worth noting that it was presentations from local grassroots groups like No Pipe Dream and Save the Poudre that brought to light the misinformation put forward by the City of Thornton in its 1041 application presentations, last year. I have attended NISP open houses and have noted a propensity to state opinion and preferences as hard unassailable facts. For this reason I recommend that all 1041 applicants provide their presentations and answers to questions from both the Planning Commission and County Commissioners under oath.

I believe that until the relocation of US Highway 287 has been firmly resolved including a reliable vetting of the ability of the NISP participants to pay for the relocation in full, especially given the strain of the current economic crisis, it is premature to approve either Glade Reservoir or the associated pipelines. In a similar vein it is premature to approve a reservoir for which NISP does not currently own enough water to fill it.

Even if Glade Reservoir is approved, there is no compelling reason to convey water through pipelines in Norther Larimer County. As the Board of County Commissioners have already made clear, water quality for municipal users is not the overarching concern of Larimer County. NISP assertion that there are no viable alternatives to pipelines is false. Water could be conveyed down the Poudre River or through the existing canal infrastructure. NISP already plans to flow water from Glade Reservoir to a point thirteen miles down river to the Poudre River Intake which if done properly would negate a Northern Tier pipeline altogether. Claims of diminished water quality while relatively true are overblown. The South Platt Regional Opportunities Water Group (SPROWG) is proposing to pipe water from near the Colorado Nebraska state lines all the way back to the Denver Metro area for treatment and reuse. Clearly, if that water is economically treatable then water taken from the Poudre River south of Fort Collins should be in even better condition.

Additionally, a survey of the 15 NISP participants websites and associated Water Quality Reports reveal that all but one receive some or all of their water in one way or another from local watersheds in conjunction with Northern Water and the Colorado Big Thompson project. This begs the question, could water from Glade be fed into Horsetooth Reservoir and then distributed via existing infrastructure to service all 15 participants?

NISP has long had a preference for traversing private property in lieu of utilizing existing easements to reduce the requirement to coordinate with other utilities and ditch companies. This puts a huge burden on private property owners who have no choice when faced with eminent domain. Full disclosure, my wife and I own property which is currently on the NISP route. The Northern Tier Pipeline route in the vicinity of CR56 would require easements from a dozen properties instead of just a few or none if it stayed in existing utility, county road and access road easements. Many of the properties already have ditch and utility easements and don't need to be further encumbered. If a pipeline is ultimately approved then we would appreciate Larimer County leadership stipulating use of existing easements along CR 56 until past Elder Lake to make the turn south to Douglas Road.

Thank You for your Time and Consideration

Best Wishes
Patrick Crotzer
CAPT USN (RET)
patrick.crotzer@gmail.com

Dear Commissioners Kefalas, Johnson, and Donnelly,

I write to you today about the Northern Integrated Supply Project, a plan to provide Poudre River water to promote growth in 15 communities east and south of Fort Collins. I realize it is the purpose of Northern Water to plan and implement projects to meet the future water needs of Northern Colorado. However, the Glade Reservoir project will primarily benefit developers and people outside Larimer County who presently don't even live in this area. This project is looking to accommodate future growth based on an insecure water supply. The drought conditions we see today are predicted to worsen over the next several decades, and building a reservoir that exceeds the capacity of the Poudre River to fill is not sensible or sustainable. Three major problems I see are:

1. the proposed pipeline which will disrupt local communities, and possibly open the door to Thornton's pipe dream to siphon Poudre River water from the mouth of the canyon. This should not be allowed, as the flow through Fort Collins is needed to flush the river and keep it healthy. Also, it will impact the new water park recently completed in Old Town Fort Collins, which relies on a healthy flow to achieve its purpose.

2. Relocating Highway 287 further east to Taft Road, disrupting the lives and properties of the many residents who chose to live in rural Larimer County.

3. Diminishing the natural resources and peaceful environment in rural Larimer County by allowing uncontrolled growth, which will increase pollution and noise due to more traffic through our neighborhoods.

All of these aspects threaten the quality of life rural Larimer residents chose for their lifestyle in this location. Some have been here for many generations. You County Commissioners have the power and tools to preserve our County. Ask yourselves who will benefit and who will pay the price for this project. Please say no to growth, and deny the NISP 1041 permit.

Sincerely,

Patricia Haley-Miller

1991

Rob Helmick <helmicrp@co.larimer.co.us>

NISP

3 messages

'Dolores Williams' via Planning Commission Board <pcboard@co.larimer.co.us> Mon, Jun 8, 2020 at 10:22 PM
Reply-To: Dolores Williams <tinytornado@mac.com>
To: pcboard@larimer.org
Cc: bocc@larimer.org

To allow the Poudre River to become a stinking ditch through Fort Collins to supply water to cities like Erie, etc. should not happen. There has to be a limit to development in this desert area while buying up farms to take their water is short-sighted at best. Drying farmland should not be allowed. Some day we might need the farms to feed our nation.

People will keep coming as long as we build homes, etc. But there should be limit to the destruction to our area because people keep selling farms for residential and commercial use. Hate should be the limit and people should move elsewhere.

Also, we need to stop watering acres of lawns. Conservation must be in the mix so we don't dry up the Poudre River.

Dolores Williams
415 Mason Court 7A
Fort Collins, CO 80524

Matthew Lafferty <laffermn@co.larimer.co.us> Tue, Jun 9, 2020 at 8:18 AM
To: Rob Helmick <helmicrp@larimer.org>

fyi
[Quoted text hidden]
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Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

Linda Hoffmann <hoffmalc@co.larimer.co.us> Tue, Jun 9, 2020 at 4:00 PM
To: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Please include this message in the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Dolores Williams** <tinytornado@mac.com>
Date: Mon, Jun 8, 2020 at 10:22 PM
Subject: NISP
To: <pcboard@larimer.org>
Cc: <bocc@larimer.org>

This message was sent by KnowWho, as a service provider, on behalf of an individual associated with Sierra Club. If you need more information, please contact Lillian Miller at Sierra Club at core.help@sierraclub.org or (415) 977-5500.

Linda Hoffmann <hoffmalc@co.larimer.co.us> Sun, Jun 7, 2020 at 2:14 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information and consideration. My emai shows 100 messages in this string; I'm not sure how they will come through into your individual addresses.

Rob -- There are 100 of these messages in my email. I'm not sure they will all come through with this forward. If they don't forward, we'll need to work together to get them into the public record for the application.

[Quoted text hidden]

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Comments on NISP 1041

2 messages

CHARLES KOPP Owner <charleskop@centurylink.net> Sun, Jun 7, 2020 at 1:24 PM
To: pcboard@larimer.org

Dear Planning Commissioners:

I respectfully urge you to deny the 1041 application for NISP, which I along with a multitude of residents of Larimer County feel is simply not worth all the expense and dire environmental consequences that will affect our county. It should be your job to put the interests of Larimer County first when there is a conflict of interests. And this is acting in the name of legitimate self-interest, and not selfishness, as some outside detractors might claim. You know that most of the municipalities that support NISP are outside Larimer County, and feel that they need it to supply enough water for their excessive development plans; and to me the latter is the crux of the problem. It's high time we look at the projected amount of development as a choice and not something inevitable for NOCO. And I get very frustrated when I hear people who even consider themselves environmentalists say things like: "I hate all the development that's coming, but what can we really do about it? The fact is we can put the brakes on it, or at least curtail it; but we need decision-makers like yourselves to be on the side of conservation----and not influenced by profit-driven big development companies that are the driving force behind it.

I'm certainly not against all development. I think much of the development that's occurred in NOCO for years has had very positive results on the region----providing many amenities, more population diversity, culture, and other good things that have made it a really great place to live. However, just because something has been good doesn't mean that more----and especially a lot more----will make things even better, when it fact it can actually make things worse. I really believe that we're at the point now where we should be saying that "enough is enough" when it comes to development, and that it's time to try to stabilize our population----or at least not encourage growth at the projected rate. Of course, we can't directly prohibit large amounts of people from moving here, but there are legitimate and fair things that can be done to discourage it, rather than encourage it----which is what NISP would do.

You well know that despite all the space Colorado has for more development, we live in a semi-arid region where water supply is very precarious, and will probably be getting moreso due to climate trends. So it's expected that the proposed Glade Reservoir would often be reduced to more of a mudhole and also not fit for the recreational purposes planned. And regarding that, I also feel that we certainly don't need another big recreational reservoir in such proximity to Horsetooth. One of the most disturbing things I've heard is that in order to meet the water requirements for NISP----now only about 50% provided according to the analysis----more farmland needs to be purchased in Larimer and Weld Counties for the water rights. In this day and age, we need to preserve more farmland, NOT sell it to development interests. And for what?----so there can be more big subdivisions with thirsty bluegrass lawns and more golf courses? Only the big development companies will profit from such a scheme.

If the 15 or so communities supposedly in favor of NISP really want the development, they have the right under Home Rule the way I understand it. But it shouldn't be at the expense of our great natural resources like the Poudre River and great landscapes in Larimer County. Your decision-making gives us leverage that we should use to act in our best interests, and the NISP communities I'm sure can come up with more innovative and less destructive ways----like more

simple water conservation----to provide the water they think they need. River diversions and new dams and reservoirs really are 19th and 20th century methods that should largely be left in those past centuries. I have supported Save the Poudre, Save Rural NOCO, and No Pipe Dream----the three grassroots organizations---and now more allied---in the long fight against NISP And I really hope that your final decision will be on our side. It would be better to err on the side of conservation----even if such a decision turned out to be a mistake---for such a decision could be reversed. But obviously not so if the final decision is to allow the degradation of our natural resources and quality of life by allowing a massive,expensive, and destructive project.

Lastly, I'll remind you to consider your legacy as decision makers, which I'm sure you want to be a positive one. Do you want to be remembered for acting to protect our great local resources and quality of life for the present and future generations, or for selling out on these things to what amounts to the interests of big developers and the misguided "continuous growth" philosophy? I think the answer is obvious. PLEASE SAY NO TO NISP!

Sincerely,

Charles Kopp
Fort Collins

Matthew Lafferty <laffermn@co.larimer.co.us> Mon, Jun 8, 2020 at 8:21 AM
To: Rob Helmick <helmicrp@larimer.org>

fyi
[Quoted text hidden]
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Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
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W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

Rob Helmick <helmicrp@co.larimer.co.us>

Do Not Approve NISP 1041 Project No. 20-ZONE 2- Save Our Rural Northern Colorado

1 message

Deborah Hofmann <dtschof70@gmail.com> Sun, Jun 7, 2020 at 2:02 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

My father resides in the area of the proposed Glade reservoir and I am currently staying at his home acting as his caregiver. I grew up across the state border in Laramie, and since moving to Oregon I have come back year after year to this unique and beautiful area to visit him and my other family members living in Colorado. I want to express concerns with the proposed Glade Project and the negative impacts that would occur if the project moves forward.

The primary benefits of this proposed reservoir would be enjoyed by the 15 subscriber towns or agencies that receive the proposed Glade water. Most of these towns and agencies are outside Larimer County. The most obvious and intense costs would be borne by local and other surrounding communities.

In general, my concern is that the scope and scale of this proposed project, if approved, would have significant, detrimental, and permanent impacts on the rural community and environment.

Specifically, the environment would be negatively impacted in the following ways:

1) Noise - The rerouted highway over the most eastern hogback would have an unobstructed view from residences in the foothills, there would be no middle hogback to block truck and auto noise. The NISP publications suggest that recreation would include motorboats and jet skis. Boats and skis are loud, they would likely be louder than current road traffic.

2) Light Pollution – This rural area enjoys fairly dark skies. The proposed recreational activities would generate significant exterior lighting for boats, facilities, camping, pumping facilities, traffic, etc. and headlights from traffic coming down the hogback on the rerouted 287 would shine into the adjacent private property. This could destroy the enjoyment of night skies.

3) New development - It is not known what sort of development would occur near and north of proposed Glade. The rerouted highway 287 would invite more residential development on the plains. The reservoir would invite more development in the adjacent foothills and valleys. It's not inconceivable that more commercial development catering to visitors would encroach into currently uncommercialized lands, forever altering the rural nature of the area.

4) Trespass – Plans for proposed Glade project almost 400,000 visitors per year. This would include boaters, campers, fishers and hikers and bikers, among others. There is every reason to believe that not all these visitors would stay within the confines of designated recreational areas. Some visitors are likely to explore the inviting foothills that border the reservoir and trespass, however inadvertently, on private property.

5) Wildlife – Proposed Glade would become a significant barrier to the permanent and migratory herds of deer and elk that reside in our area and would be disruptive to other wildlife. In a world where wildlife and nature are under stress, and is diminishing generally owing to human activities, should we be contributing to those activities for unnecessary purposes? Residents encourage the county to find alternatives that don't result in the significant loss of open space and wildlife habitat that this project would cause.

6) Wildfires – In this century three major wildfires burned over 100,000 acres on and around Glade. Two of the three forest fires were caused by careless people. Can we rely on the >1000 daily visitors to proposed Glade to be careful?

7) Emergency response – The recreation on the proposed reservoir is projected to be almost 400,000 visitors per year. Such a large increase in recreationalists would likely increase the number of emergency calls thereby further stretching

emergency response agency resources. Costs would be borne by Larimer County taxpayers, and emergency services that are diverted to Glade would not be readily available to serve the local communities.

8) Air quality – Because Glade would have junior water rights, the water level of the proposed reservoir would be highly variable, unlike Horsetooth. The water level frequently would drop precipitously, often changing proposed Glade Reservoir to Glade Mudflats, and could stay that way for years. The large “bathtub ring” that would materialize around the reservoir would become dry soil that would blow in our strong winds causing air quality and visual concerns. The hundreds or thousands of vehicles that would travel to the area emit gases, particulates, and ozone precursors (i.e., health hazards).

9) Climate change – the pumps, the construction vehicles, the recreational vehicles: the project would result in considerable burning of fossil fuels, forever, and the emission of greenhouse gases. The pumping stations alone would emit the equivalent of adding 7000 GHG emitting cars at a time when Colorado is implementing zero emissions vehicle standards.

10) Aesthetic - The drive from Livermore to Laporte would no longer be through the heritage rangeland and the familiar hogbacks. Since the proposed reservoir would likely be only partially filled much of the time, instead of beautiful hogbacks and grassy foothills, the viewshed would be marred by the barren sides (bathtub ring) and murky surface of a partially filled reservoir.

11) Social justice - While the benefits of proposed Glade would be enjoyed by people who live and work far from the reservoir site, the costs would be borne by those whose quality of life would be severely lessened.

12) Conservation and Alternatives – Conservation is not being adequately considered. While the Colorado Front Range is land-rich for development, it is semi-arid and thus water-limited. About 2/3 of the Poudre is already taken out, and Glade would take another 40% of what’s left. Yet another reservoir is nothing but a temporary fix for a small portion of the state’s water needs; but one with permanent, destructive impacts on a large part of rural northern Colorado. The time is way past due for developing long-term solutions based on state-of-the-art technologies and widespread education on the absolute necessity to conserve water, and to stop relying on 19th century solutions for 21st century challenges.

The Larimer County Commissioners must save its rural communities and be good stewards of its natural resources by saying no Glade Reservoir!

Sincerely,

--
Ms Deborah Hofmann
dtschof70@gmail.com
6008 SE 21st Ave
Portland, OR 97202

Save Rural NoCo Member

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 Permit Application; Project No. 20-ZONE 2657

1 message

Grant L. Campbell <roy@bonnersprings.net> Sun, Jun 7, 2020 at 1:36 PM
To: bocc@larimer.org
Cc: rhelmick@larimer.org, jkefalas@larimer.org, swjohnson@larimer.org, tdonnelly@larimer.org

Board of County Commissioners, Larimer County

200 West Oak Street
Fort Collins, CO 80521

Sirs:

I encourage you to deny the NISP 1041 permit. This project is a boondoggle, an environmental and economic disaster that will further compromise the Cache la Poudre River and scar the rural landscape for eternity. Up to half of the time it will be little more than a huge mud puddle, largely negating any claims of its recreational benefits. Please consider alternatives to this poorly planned and wasteful project, including a serious regional water conservation effort.

Sincerely,

Grant Campbell

Grant L. Campbell, MD, PhD

1037 Bonner Springs Ranch Road

LaPorte, Colorado 80535-9731

Cell (970) 219-3152

Fax (970) 493-5256

Email: roy@bonnersprings.net

1998

Rob Helmick <helmicrp@co.larimer.co.us>

Say no to NISP

1 message

Calderazzo,John <John.Calderazzo@colostate.edu> Mon, Jun 8, 2020 at 11:32 AM
To: "pcboard@larimer.org" <pcboard@larimer.org>

Dear Planning Comissioners,

Take and take and take the Poudre's water--will that be the "plan" then?

What an awful, unsustainable idea for a hundred reasons, prominently including the ones laid out carefully and clearly in so many communicaons sen t to you for years now from Save the Poudre, other common-sense organizaons, and so man y of us ordinary ciz ens.

Please say no to this very, very bad idea.

I'm an un-radical, very concerned, long-me (34 y ears) Larimer County resident.

Sincerely--John Calderazzo
5725 Rist County Road, Bellvue CO 80512

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: message about NISP 1041

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Mon, Jun 8, 2020 at 12:11 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information and consideration.

Rob -- Please include this message in the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **CHARLES KOPP Owner** <charleskop@centurylink.net>
Date: Sun, Jun 7, 2020 at 5:53 PM
Subject: message about NISP 1041
To: <bocc@larimer.org>

Dear County Commissioners:

I respectfully urge you to reject the NISP 1041 application. You should definitely put the interests of Larimer County first when there is a conflict of interests, as much as possible, even if outside detractors might say that acting for such legitimate sell-interest is selfish. The mainly out of county communities in favor of NISP should not be allowed to realize their massive, extremely expensive, and unnecessary project at the expense of the already highly-stressed Poudre River and other great natural resources in our county, while also degrading our quality of life. What's really driving NISP are the interests of profit-driven, big national development companies that have influenced community decision-makers and even enough members of these communities. It's high time that we re-examine this runaway development which many regard as inevitable---almost like a law of physics---when it really isn't. Rather it's a choice we make---or at least decision-makers like yourselves make---and I get very frustrated when I hear even people who consider themselves environmentalists say things like: "I really hate all the development that's coming, but what can we really do about it?"

I'm definitely not opposed to development itself, and think that the large amount that NOCO has seen for years has had a lot of positive effects---offering more amenities, a more diverse population, culture, and other good things that have made our region a great place to live. But I really feel we've come to a point where "enough should be enough," and just because something has been good doesn't mean that a lot more will be even better---when in fact it can make things worse. I believe now is the time we should try to stabilize our population, or at least oppose the projected rate of growth, which is bound to undermine our quality of life. Of course we can't directly prohibit a lot of people from moving to NOCO, but there are legitimate and fair-minded ways we can discourage excessive growth, and not encourage it like NISP would do.

If the 15 or so communities behind NISP really want a high level of development, it's their right under Home Rule the way I understand it. But again, it should not come at the expense of our precious environment in Larimer County; and you as decision-makers have the leverage to stop this from happening. If denied NISP, I would bet highly that these communities will find other, and more innovative and environmentally-friendly ways to achieve their goals----including sounder water-conservation policies. You well know that Colorado has the space for more development but a semi-arid climate where water supply is precarious, and likely to get more so with climate trends. The proposed Glade Reservoir is expected to sometimes be reduced to not much more than a mud hole----also precluding many of the recreational opportunities planned for it. And on that matter, it doesn't seem that we at all need another big recreational reservoir in such proximity to Horsetooth. One of the most disturbing things I've heard is that NISP has only provided about 50% of the necessary water supply according to the present analysis; and as a result needs to buy farmland in Larimer and Weld Counties for more water rights. This at a time when we should really be doing all we can to preserve farmland, and NOT sell it for development interests. And for what? ---so there can be more big subdivisions with thirsty, bluegrass lawns and more golf courses?

I've been a supporter of Save the Poudre, Save Rural NOCO, and No Pipe Dream---the three grassroots organizations leading the charge against NISP that are now more allied in the fight. I really hope that your final decision will be on our side. I came from New Jersey, where decades ago a massive project similar to NISP that the Federal government was involved in called Tocks Island was defeated after a very drawn-out battle----which would have dammed the free-flowing Delaware River and created a huge reservoir. For a long time it seemed like a done deal. But it's eventual undoing is still considered one of the great victories of the early years of the environmental movement. If you don't know much about this issue, I suggest you google it. I say that if Tocks Island could be defeated, so can NISP----but we need your help.

Lastly, I'll remind you to consider your legacy as decision-makers, which I'm sure you'd like to be a positive one. Do you want to be remembered for voting in favor of conservation of our great natural resources and our quality of life for present and future generations, or for selling out to pressures from big development interests and the misguided philosophy of "continuous growth?" The answer seems pretty obvious. And voting against conservation in this case would be irreversible, where erring on the side of conservation---should it possibly turn out to be a mistake---isn't. SO PLEASE REJECT NISP!

I also request that the upcoming hearings be further postponed until a time when there can be full participation by the public on this critical issue, and not restricted by conditions of the pandemic, which I presume the scheduled ones would be.

Sincerely,

Charles Kopp
Fort Collins

2001

Rob Helmick <helmicrp@co.larimer.co.us>

Public Comments on NISP project

3 messages

Bill Jenkins <Nawr01@msn.com> Mon, Jun 8, 2020 at 3:09 PM
To: "pcboard@larimer.org" <pcboard@larimer.org>
Cc: "bocc@larimer.org" <bocc@larimer.org>

Hello Larimer County Commissioners,

I am writing today to ask you not approve the NISP and Glade Reservoir planned projected.

My thinking is in complete agreement with the following groups:

- Save the Poudre
- Save Rural NoCo
- No Pipedream

By now I believe you have reviewed their objections such as water rights required will have to be purchased from hundreds of farms like in “Buy and Dry” similar to other projects, failure to quantify any requirements to meet state water quality standards, and the overall harm to the Poudre River and riparian forest near it.

This is just a bad idea for the citizens or Larimer County.

Thank you for your attention and please take care of us by not approving this project.

Bill Jenkins

Fort Collins

2002

Linda Hoffmann <hoffmalc@co.larimer.co.us> Mon, Jun 8, 2020 at 9:46 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information and consideration.

Rob -- Please include this message in the public record for the application.

[Quoted text hidden]

Matthew Lafferty <laffermn@co.larimer.co.us> Tue, Jun 9, 2020 at 8:20 AM
To: Rob Helmick <helmicrp@larimer.org>

fyi

---------- Forwarded message ---------
From: **Bill Jenkins** <Nawr01@msn.com>
Date: Mon, Jun 8, 2020 at 3:09 PM
Subject: Public Comments on NISP project
To: pcboard@larimer.org <pcboard@larimer.org>
Cc: bocc@larimer.org <bocc@larimer.org>

[Quoted text hidden]

--

Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

2003

Rob Helmick <helmicrp@co.larimer.co.us>

hearings regarding NISP 1041

2 messages

CHARLES KOPP Owner <charleskop@centurylink.net> Sun, Jun 7, 2020 at 4:09 PM
To: pcboard@larimer.org

Dear Planning Commissioners:

I recently sent a message expressing my strong opposition to the NISP 1041 application, and forgot to mention and request that the scheduled hearings on this very big issue be postponed to a time when there can be full and normal public participation in them, without the restrictions due to the pandemic, which I presume the upcoming ones will involve that are bound to limit participation. So please delay them if at all possible. It's too important an issue to limit in-person public participation.

Sincerely,

Charles Kopp
Fort Collins

Matthew Lafferty <laffermn@co.larimer.co.us> Mon, Jun 8, 2020 at 8:20 AM
To: "Helmick, Rob" <rhelmick@larimer.org>

FYI
[Quoted text hidden]
--

Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

2004

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

Gregory Holley <gcholleycolorado@gmail.com> Mon, Jun 8, 2020 at 9:12 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

Esteemed Commissioners,

My great grandmother first purchased a home in the upper Poudre Canyon along the banks of the Cache la Poudre River in 1919. I currently have a home less than a mile from that original homesite, so for over 100 years our family has been living in and enjoying the pristine, majestic, and unparalleled beauty of the Poudre Canyon and surrounding mountain areas. And for the past 40 years or more, we have been constantly on guard and battling those who want to build a dam on the Poudre River to encourage industrial development and supply water to individuals and interests far from the source. Way back when Friends of the Poudre first originated, when Don't Damn the Poudre, Save the Poudre, and many other slogans expressed the desire to protect and conserve the glorious natural world that abounds around the free flowing Poudre river, we have been fearing and fighting this development. And now it's raising its ugly head again, this time more immediate, extensive, and damaging than ever before.

We and countless other residents of Larimer County and beyond were elated, exhilarated, and overjoyed many years ago when the Poudre River was designated as a Wild and Scenic River and granted protected status, as that was supposed to protect the river and its surrounding ecosystems from ever being dammed or developed. However, with the current proposed Glade Reservoir and associated project, that designation and protection is being ignored, and the disastrous effects from the completion of this project would be profound, irreversible, and devastating beyond anything that is conceivable or acceptable. This is a blatantly ill-conceived and ill-advised plan, and its successful completion is highly unlikely. It would inevitably be vastly over budget, extremely under funded, take infinitely much longer than projected, never realize the dreamed of capacity, and cause incalculable damage and destruction to the river, the landscape, ecosystems, habitats, and wildlife. Not just in the immediate area of the impoundment and reservoir, but over the entire course of the river and all the surrounding and adjacent forests, meadows, fields, and terrain. The damage and destruction would encompass many square miles and thousands of acres of gorgeous Colorado mountain landscape. The countless ripple effects of each layer and level of destruction would be far reaching and exceedingly damaging beyond comprehension. This project will never truly fulfill the overblown promises and projections of the proponents, and should be stopped immediately from going any further.

I encourage you to consider in full the long term catastrophic impacts of this disastrous proposal, and I request that you, the commissioners, stewards, and guardians of Larimer County and its residents, to act with insight, integrity, and foresight to deny the 1041 permit for the Northern Integrated Supply Glade Reservoir Project. As you contemplate the reality of the end result, remember that the glossy visions, rosy dreams, inflated projections, and overly optimistic predictions, along with all those individuals who propose and support them, will all disappear and vanish into the mist fairly soon. But the massive destruction, inestimable loss, inescapable problems, negative consequences, and vast devastation will last forever.

Thank you,

--
Mr Gregory Holley
gcholleycolorado@gmail.com
77 Big Bend Lane
Bellvue, Colorado 80512

Save Rural NoCo Member

2005

Rob Helmick <helmicrp@co.larimer.co.us>

NISP project

1 message

Gayla Martinez <gmaxwellmartinez@gmail.com> Mon, Jun 8, 2020 at 1:18 PM
To: pcboard@larimer.org

Dear Commissioners,

I am writing to ask that the permit application for the NISP project be denied. We have only begun to explore the many options available to conserve and recycle the water currently available to Front Range residents and businesses.

Our personal water usage has been significantly reduced since upgrading our home's toilets and washing machine, as well as converting our front yard into a native plant habitat. And we are exploring more ways to reduce our water usage even further!

Others can do the same. As a community, we can save our beloved river and learn to live within our means!

Respectfully,
Gayla Maxwell Martinez

2006

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 Permit Application, Project No. 20-ZONE 2657

1 message

Dean Biggins <deanbiggins@gmail.com> Mon, Jun 8, 2020 at 9:00 PM
To: rhelmick@larimer.org

Dear Mr. Helmick,

We thank the county for the opportunity to comment on the subject NISP project. Please find attached the letter we sent to all three county commissioners.

Appreciatively,

Dean Biggins

NISP letter Biggins 200607.docx
15K

7 June 2020

To: John Kefalas, Larimer County Commissioner
From: Dean and Denise Biggins
Subject: NISP 1041 Permit Application
Project No. 20-ZONE 2657

Dear Mr. Kefalas,

We are writing this letter to express our opposition to the NISP Glade Reservoir Project. Although we find ourselves agreeing with most of the points made by other critics (we are associated with Save Rural NoCo), such as their objections to the increased traffic, noise, ultimate recreational uses, and the general degradation of quality of life in northern Colorado, we would like to take the time here to emphasize one theme in particular. That theme is the sharing of space by human and non-human life.

We have not found the previous discussion of impacts of Glade Reservoir on wildlife particularly satisfying because that discussion represents a piecemeal approach which, by intent, applies to this specific project without much regard to cumulative effects of historic and future developments. Proposed mitigation measures that attempt to compensate for losses specific to this project are commendable but inadequate over the long term. Also, most species are not included in the planning discussion because they do not fall into any statutory category of concern or they have no special economic or recreational value. The latter two (value) criteria we find especially problematic because they avoid consideration of the intrinsic value of non-human life.

Our home is a short distance north of the proposed Glade Reservoir, and we believe the natural community on our property is somewhat representative of the wildlife community that will be destroyed by the reservoir itself and impacted by associated development. Our land is dominated by a mixed shrub-grassland, crossed by several intermittent streams (tributaries of Owl Creek). These sub-irrigated plant communities form riparian habitat that is critical to the biodiversity of the area. We have identified more than 150 species of plants, 98 birds, 28 mammals, 6 reptiles, and 4 amphibians on our property. The total number of vertebrate species is doubtless dwarfed by the number of invertebrate species. The latter may ultimately be the most important of all. As biologist E. O. Wilson put it, “If insects were to vanish, the environment would collapse into chaos.” Unfortunately, insects are indeed vanishing at a higher rate than other organisms (notwithstanding the exceptions like our recent invasion of miller moths). To us, “wildlife” includes all non-human life (not just deer and elk). The point here is to engage ourselves in thinking about the bigger picture beyond our vertebrate tally. There is no doubt in our minds that the riparian zones in our area are important to the overall welfare of larger-scale wildlife habitats. Again, in the words of Wilson, “The most vulnerable habitats of all…are rivers, streams, and lakes…” Thus, we find it particularly disturbing that the Glade project proposes to reduce water flows in a river in order to flood an area with wetlands and intermittent watercourses, resulting in a form of double jeopardy.

We can imagine folks already responding with something like, "So what? This is just one small area of northern Colorado. There is plenty of habitat left." One problem with that logic is the failure to consider cumulative impacts. As E. O. Wilson put it "…the problems created by humanity are global and progressive." We believe longer-term thinking would consider something like Wilson's "Half-Earth" concept. In general, this is a proposal to allocate half of the planet's habitats and "resources" to supporting native ecosystems and their non-human life (and human life indirectly). By some measures, 60% of the water in the Poudre River is already taken for use by humans—we have already locally compromised Wilson's proposal. How much is enough? If one finds the views of an ecologist like Wilson unconvincing, perhaps listening to a theologian will help. In his book, *For the Beauty of the Earth*, Steven Bouma-Prediger writes "…the blue-green sphere on which we live is finite...There is only so much to go around."

When it comes to making difficult decisions, it seems we have another recent lesson from the COVID-19 pandemic. The federal government was generally risk averse, failed to be decisive at critical points, and passed the buck to the states. Some states found it equally difficult to take the responsibility and be decisive, deferring to municipalities and counties. Similarly, when it comes to decisions regarding what our local landscapes are to look like after another 50 or 100 years, the buck may stop with you, the county commissioners. You may think of this as a political nightmare and a liability. We like to think of it as an opportunity. We urge you to deny the present 1041 permit for the Glade project. We hope that this will give you more time to consider the long-term future of Larimer County and how it could become an example for Colorado and for the nation in terms of achieving a unity of high quality human life coupled with an appropriate sharing of space with non-human life. We believe humans can be part of a fully functioning natural ecosystem if we enter the relationship with humility and consideration for other life. We would hope that a high percentage of your constituents would agree if given the chance to reflect and voice their opinions.

Sincerely,

Dean and Denise Biggins

2009

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project

1 message

Jan Rothe (lemmule@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 10:12 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

The NISP is an extremely expensive project that would cause great destruction; disrupt and displace residents around the proposed reservoir, residents along Highway 287, and residents along the proposed pipeline route; and it isn?t needed. There are many conservation actions that would provide all the water proposed to be delivered by Glade, including improved water efficiency by municipal districts, industry, and agriculture; public education and awareness programs; repairs to leaking ditches and pipelines, landscape irrigation improvements, and much more.

The NISP is a controversial project that is of great interest to many people in Larimer County who want full opportunity to comment on the permitting process and to appear at public hearings. Because of the scope and controversy surrounding this proposed project, the Commissioners should wait until the coronavirus pandemic has subsided enough to allow for full in-person public participation.

Sincerely,

Jan Rothe
6521 Placer Ct
Bellvue, CO 80512
lemmule@gmail.com
(970) 467-1415

2010

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Do Not Approve NISP 1041 Project No. 20-ZONE 2- Save Our Rural Northern Colorado

1 message

John Tschirhart <cheerheart@msn.com> Mon, Jun 8, 2020 at 4:36 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

There are myriad reasons for rejecting the proposed Glade Reservoir, including, but not limited to the facts that: 1) the FEIS statement that the Glade alternative would ensure that almost no agricultural land will be lost is false, because NISP must now purchase large amounts of water rights from farmers; 2) the Poudre River cannot afford to have large amounts of water diverted for a reservoir if it is to remain a valuable source of scenery, recreation and solace to the Ft. Collins region; and 3) that the proposed reservoir would replace scenic areas north of LaPorte, with a giant mud pit for much of its existence given NISP's low priority water rights. These points and others notwithstanding, I would like to step back and look at the broader idea of building a large dam and reservoir, a 20th Century approach to water management, in a rapidly changing world where our civilization, according to voluminous scientific studies, is having huge and irreversible impacts on the planet's resources.

Locally, the fundamental question is whether a 20th Century approach to water management is still appropriate for the rapidly changing Western U.S., and in particular our rapidly changing Larimer County. The County's population has grown by leaps and bounds in recent decades, and it has experienced the many growth pains that come from pushing up against available ag lands, as more housing, roads, schools, commercial businesses and so on must expand to keep pace with the population growth. But the challenges are just beginning. The County's population is expected to double by 2050. DOUBLE! Where are the already stressed resources going to come from to meet the future challenges?

Considering the need for water, where will the water come from? Building a reservoir like Glade is nothing more than a small band-aid. It would provide a drop in the large bucket that growth will require. In addition, there are few opportunities left for dam building sites, so that Glade would be the last of a 20th Century technology used in the County for dealing with water needs. And it will largely be a failed reservoir at that, given the low priority water rights.

A smarter approach to deal with future growth would be to not rely one more time on a 20th Century technology, but to start developing new approaches and technologies that ensure adequate water supplies. Why spend several billion dollars on a dying technology when funding could be dedicated to searching for, testing, and implementing new methods. Let it be known to future generation that the County, and the County Commissioners in 2020, turned the corner and recognized that the past ways of dealing with growth and water needs were not going to solve the coming problems. Instead they set our direction toward new ideas, both technical and legal, to maintain the quality of life in Larimer County.

John T. Tschirhart, Ph.D. Economics
5886 Obenchain Rd.
LaPorte, Colorado 80535

Save Rural NoCo Member

--
Mr John Tschirhart
cheerheart@msn.com
5886 Obenchain Rd
LaPorte, CO 80535

Save Rural NoCo Member

2011

Rob Helmick <helmicrp@co.larimer.co.us>

NISP comment - Glade

1 message

JOHN TSCHIRHART <cheerheart@msn.com> Mon, Jun 8, 2020 at 2:05 PM
To: "rhelmick@larimer.org" <rhelmick@larimer.org>
Cc: "cytolinda@aol.com" <cytolinda@aol.com>

Dear Rob
I'd like the attached comment be added to the comments re the proposed Glade Reservoir. It is also shown below.
thanks
John Tschirhart

There are myriad reasons for rejecting the proposed Glade Reservoir, including, but not limited to the facts that: 1) the FEIS statement that the Glade alternative would ensure that almost no agricultural land will be lost is false, because NISP must now purchase large amounts of water rights from farmers; 2) the Poudre River cannot afford to have large amounts of water diverted for a reservoir if it is to remain a valuable source of scenery, recreation and solace to the Ft. Collins region; and 3) that the proposed reservoir would replace scenic areas north of LaPorte, with a giant mud pit for much of its existence given NISP's low priority water rights. These points and others notwithstanding, I would like to step back and look at the broader idea of building a large dam and reservoir, a 20th Century approach to water management, in a rapidly changing world where our civilization, according to voluminous scientific studies, is having huge and irreversible impacts on the planet's resources.

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John T. Tschirhart, Ph.D. Economics
5886 Obenchain Rd.
LaPorte, Colorado 80535

NISP2.docx

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John T. Tschirhart, Ph.D. Economics
5886 Obenchain Rd.
LaPorte, Colorado 80535

2013

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 Permit Application

1 message

Jacqueline Voss <jacque@bonnersprings.net> Mon, Jun 8, 2020 at 12:51 PM
To: "bocc@larimer.org" <bocc@larimer.org>, "rhelmick@larimer.org" <rhelmick@larimer.org>, "JKefalas@larimer.org" <JKefalas@larimer.org>, Steve Johnson <swjohnson@larimer.org>, tdonnelly <tdonnelly@larimer.org>

Board of County Commissioners, Larimer County

200 West Oak Street
Fort Collins, CO 80521

Gentlemen,

I am writing in strong opposition of NISP 1041 and strongly urge you to deny this application. I believe that it will have lasting environmental effects on our county and is not economically wise. It will pull more water from the Poudre River, but not deliver the promised recreational benefits in the reservoir. In fact, much of the time the area will be a huge mud puddle and eye sore for those of us living in this beautiful area. Other important issues are the negative impact on wildlife, increased traffic, increased risk of fires, and increased pollution. Alternative solutions should be explored that involve a clear commitment to water conservation rather than destruction of the environment.

Sincerely,
Jacqueline Voss
1037 Bonner Springs Ranch Road
Laporte, CO 80535
970-217-5796

2014

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: NISP Project

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Mon, Jun 8, 2020 at 9:32 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information and consideration.

Rob -- Please include this message in the public record for the application.

---------- Forwarded message ---------
From: **Gayla Martinez** <gmaxwellmartinez@gmail.com>
Date: Mon, Jun 8, 2020, 1:19 PM
Subject: NISP Project
To: Larimer Co Board of Commissioners <bocc@larimer.org>

Dear Commissioners,

I am writing to ask that the permit application for the NISP project be denied. We have only begun to explore the many options available to conserve and recycle the water currently available to Front Range residents and businesses.

Our personal water usage has been significantly reduced since upgrading our home's toilets and washing machine, as well as converting our front yard into a native plant habitat. And we are exploring more ways to reduce our water usage even further!

Others can do the same. As a community, we can save our beloved river and learn to live within our means!

Respectfully,
Gayla Maxwell Martinez

2015

Rob Helmick <helmicrp@co.larimer.co.us>

Do Not Approve NISP 1041 Project No. 20-ZONE 2- Save Our Rural Northern Colorado

1 message

Herb Schaal <herb.schaal@bellvueemporium> Mon, Jun 8, 2020 at 1:38 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

We are landowners residing in the area of the proposed Glade reservoir that have concerns with the proposed Glade Project and the negative impacts that would occur if the project moves forward.

The primary benefits of this proposed reservoir would be enjoyed by the 15 subscriber towns or agencies that receive the proposed Glade water. Most of these towns and agencies are outside Larimer County. The most obvious and intense costs would be borne by local and other surrounding communities.

In general, our concerns are that the scope and scale of this proposed project, if approved, would have significant, detrimental, and permanent impact on our rural community, environment, and lifestyle we enjoy today and desire to have in the future.

Specifically, our rural environment we believe would be negatively impacted in the following ways:

1) Noise - The rerouted highway over the most eastern hogback would have an unobstructed view from residences in the foothills, there would be no middle hogback to block truck and auto noise. The NISP publications suggest that recreation would include motorboats and jet skis. Boats and skis are loud, they would likely be louder than current road traffic.

2) Light Pollution – This rural area enjoys fairly dark skies. The proposed recreational activities would generate significant exterior lighting for boats, facilities, camping, pumping facilities, traffic, etc. and headlights from traffic coming down the hogback on the rerouted 287 would shine into the adjacent private property. This could destroy the enjoyment of our night skies.

3) New development - We do not know what sort of development would occur near and north of proposed Glade. The rerouted highway 287 would invite more residential development on the plains. The reservoir would invite more development in the adjacent foothills and valleys. It's not inconceivable that more commercial development catering to visitors would encroach into currently uncommercialized lands, forever altering the rural nature of the area.

4) Trespass – Plans for proposed Glade project almost 400,000 visitors per year. This would include boaters, campers, fishers and hikers and bikers, among others. There is every reason to believe that not all these visitors would stay within the confines of designated recreational areas. Some visitors are likely to explore the inviting foothills that border the reservoir and trespass, however inadvertently, on our private property.

5) Wildlife – Proposed Glade would become a significant barrier to the permanent and migratory herds of deer and elk that reside in our area and would be disruptive to other wildlife. In a world where wildlife and nature are under stress, and is diminishing generally owing to human activities, should we be contributing to those activities for unnecessary purposes? We encourage the county to find alternatives that don't result in the significant loss of open space and wildlife habitat that this project would cause.

6) Wildfires – In this century three major wildfires burned over 100,000 acres on and around Glade. Two of the three forest fires were caused by careless people. Can we rely on the >1000 daily visitors to proposed Glade to be careful?

7) Emergency response – The recreation on the proposed reservoir is projected to be almost 400,000 visitors per year. Such a large increase in recreationalists would likely increase the number of emergency calls thereby further stretching emergency response agency resources. Costs would be borne by Larimer County taxpayers, and emergency services

2016

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 comments for 6/24 Planning Commission Hearing

1 message

Fort Collins Nursery <j.eastman@fortcollinsnursery.com> Mon, Jun 8, 2020 at 2:19 PM
To: rhelmick@larimer.org

Hi Rob

Attached please find comments I wish to have presented for the Larimer County Planning Commission Hearing for the 1041 Permit Application scheduled for June 24, 2020.

Thank you
Jesse Eastman

--
Jesse Eastman
Owner & General Manager
Fort Collins Nursery • 2121 E. Mulberry St., Fort Collins, Colorado 80524
970-482-1984 • 866-384-7516 • j.eastman@fortcollinsnursery.com

Follow us on facebook for gardening tips, trends, prize giveaways, and more!
Learn, Grow, Bloom!

2 attachments

NISP 1041 Exhibit 1 from Fort Collins Nursery.jpg
151K

NISP 1041 comments from Fort Collins Nursery.docx
50K

Fort Collins Nursery

June 8, 2020 LETTER OF OPPOSITION

Re: NISP 1041 Permit Application

To the members of the Larimer County Planning Commission,

I own and operate Fort Collins Retail Nursery, and am an authorized representative for AJA Properties, LLC, the entity that owns the property Fort Collins Nursery occupies, located at 2121 E. Mulberry St. in Fort Collins (the "Property"). The current plan to pass the pipeline through the center of the Property would be extremely disruptive and costly to my business. The following sets forth the major issues I foresee at this time:

- The proposed Pipeline route would bisect significant portions of the Property. During a meeting with Northern Water engineers, including Stephanie Cecil, P.E., I learned that the construction of the Pipeline would require a 100 foot wide berth along the Pipeline route. At times, they could reduce that to 40 feet, but not for the entire distance that the route would run through the Property. Even at the minimum 40 foot width, the path occupied during the construction phase would cause massive disruptions to daily operations. The easement route itself is a critical thoroughfare through the Property for operations, customer traffic, and truck traffic, including waste hauling, receiving, and service vehicles. Due to the width of the proposed easement, we would also be required to temporarily remove some of our enclosed growing facilities, which would impact our ability to grow the plants our business depends on.

- Should NISP ever need to service the Pipeline, my understanding is that they would have the right to perform that service at any time they deem necessary. While Northern Water has assured me they have a strong track record of not needing to do disruptive repairs, it is unreasonable to think that the possibility of disruption could ever be eliminated. This means that we would never be clear of the threat of further disruptions, and could not pick or choose the timing of disruptions. My business is highly seasonal. Should repair become necessary the revenue loss would be severe. The potential disruption to our business and inability to fully access our Property at any time of year would increase operating costs and create issues with our ability to effectively serve customers, damaging our bottom line and our hard-won reputation.

- A permanent utility easement through the Property would significantly cap any potential development value the Property possesses. Moreover, with the City of Fort Collins taking clear and obvious steps to annexing this portion of East Mulberry St. into the City, frontage road property will increase in value. This type of easement, at 100 feet in width, bisecting the Property would eliminate our ability to enjoy any potential appreciation in value.

- Our business cannot survive without a reliable water source. A vast majority of the plants we grow and sell in our business rely on an adjudicated well that is part of the Cache la Poudre Augmentation Plan, overseen by the Larimer County Underground Water Users Association, located on the Property ("Well"). Any major underground work poses the potential risks of interfering with the Well, including without limitation impacting the amount of water that can be pumped from the Well. In the event of a significant disruption or reduction in the pumping capacity or yield from the Well, we would be forced to forego a reliable water source and switch to using municipal water. This switch

would be costly both in the installation and in the long term cost of using treated water for agricultural applications.

In sum, the proposed Pipeline route will significantly impact our business, the use of our Property and value of the same, and our livelihood. Further, based on the current proposed plans and specifications for the Pipeline route, our Property appears to be the only one that runs an operational business right in the middle of the proposed Pipeline alignment. Accordingly, given the significant impacts that the Pipeline route will have on our business and the Property, I respectfully request that the Larimer County Planning Commission does not approve the proposed route for the Pipeline through our Property, and, instead, consider alternative, less invasive routes. I welcome continued discussion of such alternatives to the proposed route, and I am confident that with your help, a route can be established that does not so disproportionately affect our business.

Thank you for your consideration.

Jesse Eastman
Owner, Fort Collins Retail Nursery, Inc.

SEE ATTACHMENTS:
EXHIBIT 1 (MAP)


EXHIBIT 1
KEY
Property boundary
Pipeline route (proposed)
100 foot path
40 foot path
Structures impacted by construction
Well location
Fort Collins Nursery
0' 50' 100'
© 2020 Google

2020

Rob Helmick <helmicrp@co.larimer.co.us>

Long time resident of Larimer County

2 messages

Andrea Dunlap <Andrea@andreadunlap.com> Mon, Jun 8, 2020 at 7:48 PM
To: "pcboard@larimer.org" <pcboard@larimer.org>

Dear Board,

I have lived in Larimer County since 1972. I urge you to vote against the NISP project in it's present form. There is only one chance of getting water straight. Please vote against the project.

Andrea J. Dunlap

Cell 970-691-9010

Email Andrea@AndreaDunlap.Com

Website www.AndreaDunlap.com

Matthew Lafferty <laffermn@co.larimer.co.us> Tue, Jun 9, 2020 at 8:18 AM
To: Rob Helmick <helmicrp@larimer.org>

fyi
[Quoted text hidden]
--

Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721

2021

Rob Helmick <helmicrp@co.larimer.co.us>

Cache la Poudre River

1 message

Judy Harrington <judyh@inbox.com> Mon, Jun 8, 2020 at 9:36 AM
To: pcboard@larimer.org, bocc@larimer.org

Dear County Commissioners,

Water has the ability to do more than generate profits for developers and taxes for Thornton. Water can help the flora and fauna along the Cache la Poudre River survive and thrive. But water can do that only if you put it through the river.

You were elected to look out for the interests of Larimer County. Please decide to preserve the natural resources of Larimer County by maintaining healthy flows through the Cache la Poudre River.

Judy Harrington
2613 Flintridge Place
Fort Collins

2022

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Comments on NISP 1041 Permit Application; Project No. 20-ZONE 2657

1 message

John Lishman <jlish1950@gmail.com> Mon, Jun 8, 2020 at 8:31 PM
To: jkefalas@larimer.org, swjohnson@larimer.org, tdonnelly@larimer.org, rhelmick@larimer.org

Attached is a PDF signed copy of our comments with respect to this permit application. A signed original hard copy is also being sent to the Bd of Commissioners via USPS certified mail (# 70181130000081055215). We appreciate the opportunity to comment on this important matter and urge denial of this permit.

06082020Lishman_comments_NISP1041.pdf
145K

John & Joanne Lishman
1728 N. Greyrock Rd
Laporte, CO 80535

June 8, 2020

Re: NISP 1041 Permit Application; Project No. 20-ZONE 2657

Larimer County Board of County Commissioners
200 West Oak Street
Fort Collins, CO 80521

Dear Commissioners:

We are landowners residing in northern Larimer County close to the northern end of the proposed Glade Reservoir. Please include this letter, together with your response, in the administrative record for the 1041 permitting process for this ill-advised and unsustainable project. For the reasons expressed in this letter and the detailed comments already provided to you by Save the Poudre and Save Rural Northern Colorado, we respectfully request that you deny the permit application for this harmful, ill-conceived, and inadequately mitigated project.

The comments filed by Save the Poudre and Save Rural Northern Colorado explain the numerous significant and irreversible adverse environmental impacts, habitat loss, degradation of property values, and destruction of the rural and aesthetic characteristics of the impacted area. We support those comments and request that you give them careful and diligent consideration in making your decision on this permit application.

While those who live in proximity to this proposed project would bear the brunt of those extensive impacts, the alleged "benefits" of the project would primarily accrue to special interests outside of Larimer County. In this regard, it is especially important that our Larimer County Commissioners give careful and diligent consideration as to whether the benefits claimed for this project will ever become a reality. In particular, in light of the extensive adverse economic impacts and budget shortfalls resulting from the Coronavirus pandemic, the permit review process must include a careful and detailed independent analysis of the financial feasibility of this project in light of these new economic realities, which were unforeseen and unaccounted for during the conception and planning of this project.

No permit should be approved unless a review by Larimer County conclusively demonstrates that highway relocation, reservoir completion, water rights acquisition, and implementation of all necessary mitigation measures is fully assured in light of the current budget and economic climate. Failure to perform such a thorough and careful analysis would create an unacceptable risk that the many well documented adverse impacts associated with this project would begin to accrue upon project initiation, only for the so-called "benefits" of the project which were relied upon in justifying those impacts to never materialize.

In addition, it is essential that any consideration given to this proposed project take into full account its cumulative impacts with the proposed Seaman's and Halligan expansions. Both of those projects, together with the proposed Glade Reservoir, will have cumulative impacts on the environment and local rural communities well beyond the scope of their individual project effects. Failure to fully consider and analyze such cumulative impacts when reviewing the proposed Glade Reservoir permit would result in an inadequate and flawed decision making process that fails to adequately consider and account for the full effects associated with the project over time. Failure to consider such cumulative effects would also preclude the ability to make adequate judgments as to the need for, and scope of, each of these projects, alternatives thereto, and potentially create an arbitrary situation where project review is conducted in isolation based upon a "first-come-first-served" approach.

Lastly, we are particularly concerned about the potential for any power boat usage to occur on the proposed reservoir. The noise, lights, and general disturbance that would be created from such activities would be especially adverse to any property owners, such as ourselves, located in direct view of, and above, the proposed reservoir location, Highway noise from US 287, which is currently partially screened by a middle hogback, is already extensive and will significantly worsen with the highway realignment proposed to accommodate the reservoir. Allowance of power boat usage would compound this problem to unacceptable levels and negatively impact property values.

We appreciate the opportunity to provide these comments and ask that you give these careful consideration during your 1041 permitting process.

Sincerely,

John Lishman

Joanne Lishman

CC: Larimer County Commissioners:
jkefalas@larimer.org
swjohnson@larimer.org
tdonnelly@larimer.org
rhelmick@larimer.org

Rob Helmick Senior Planner, Development Review, Larimer County Community Development Division, Suite 3100, 200 West Oak Street, Fort Collin, Colorado 80521

2025

Rob Helmick <helmicrp@co.larimer.co.us>

Poudre river

2 messages

Cyble McFarland <cyble7@hotmail.com> Tue, Jun 9, 2020 at 8:09 AM
To: "pcboard@larimer.org" <pcboard@larimer.org>

Protect this treasure of nature. Keep the water for the river and the nature life it sustains.
Thanks
Cyble Mcfarland

Get Outlook for iOS

Matthew Lafferty <laffermn@co.larimer.co.us> Tue, Jun 9, 2020 at 8:17 AM
To: "Helmick, Rob" <rhelmick@larimer.org>

fyi
[Quoted text hidden]
--

Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: NISP

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Mon, Jun 8, 2020 at 9:53 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information and consideration.

Rob -- Please include this message in the public record for the application.

---------- Forwarded message ---------
From: **Colleen Mesec** <colleenmesec@yahoo.com>
Date: Mon, Jun 8, 2020, 3:24 PM
Subject: NISP
To: <bocc@larimer.org>

Why, why, why???

I am really tired and very weary having to constantly stay on high alert due to the greed of so few.

After everything I've read (and that is LOTS!), I cannot understand why this project is continuing to move forward. As far as I'm concerned, this is criminal behavior, putting many at risk.

DO NOT allow NISP to become our "nightmare" reality!

Colleen Mesec
3408 Shore Road
Fort Collins

2027

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project

1 message

CLAUDIA PARKER (clp484@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 8:49 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

The NISP is an extremely expensive project that would cause great destruction; disrupt and displace residents around the proposed reservoir, residents along Highway 287, and residents along the proposed pipeline route; and it isn?t needed. There are many conservation actions that would provide all the water proposed to be delivered by Glade, including improved water efficiency by municipal districts, industry, and agriculture; public education and awareness programs; repairs to leaking ditches and pipelines, landscape irrigation improvements, and much more.

The NISP is a controversial project that is of great interest to many people in Larimer County who want full opportunity to comment on the permitting process and to appear at public hearings. Because of the scope and controversy surrounding this proposed project, the Commissioners should wait until the coronavirus pandemic has subsided enough to allow for full in-person public participation.

Sincerely,

CLAUDIA PARKER
2412 VALLEY FORGE AVE
FORT COLLINS, CO 80526
clp484@gmail.com
(214) 339-6654

2028

Rob Helmick <helmicrp@co.larimer.co.us>

NISP

3 messages

Renee Walkup <walkup@salespeak.com> Mon, Jun 8, 2020 at 9:41 PM
To: "pcboard@larimer.org" <pcboard@larimer.org>

Hello. I am a resident of Larimer County and moved to Fort Collins almost 4 years ago.

One reason for our move here was to enjoy the Poudre and the benefits of clean water in Northern Colorado. My husband and I are avid outdoorspeople, and are also xeric gardeners. Water is extremely important to us and we feel that if it weren't for how Larimer County manages the Poudre, with limited resources, our county would suffer.

Please vote NO to NISP. It's a bad idea that will negatively affect our way of life in Northern Colorado.

Thank you for doing the right thing and preserving our precious water resource.

Sincerely,

Renee P. Walkup

3514 Pratolina Court

Fort Collins 80521

Matthew Lafferty <laffermn@co.larimer.co.us> Tue, Jun 9, 2020 at 8:18 AM
To: Rob Helmick <helmicrp@larimer.org>

fyi
[Quoted text hidden]
--

Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

Linda Hoffmann <hoffmalc@co.larimer.co.us> Tue, Jun 9, 2020 at 3:59 PM
To: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Please include this message in the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Renee Walkup** <walkup@salespeak.com>
Date: Mon, Jun 8, 2020 at 9:42 PM
Subject: FW: NISP
To: bocc@larimer.org <bocc@larimer.org>

Copy of email sent to pcboard

[Quoted text hidden]

2030

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: PLEASE NO NISP PIPELINE!

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Mon, Jun 8, 2020 at 9:48 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information and consideration.

Rob -- Please include this message in the public record for the application.

---------- Forwarded message ---------
From: **Susan Davis** <susan.davis8@comcast.net>
Date: Mon, Jun 8, 2020, 3:15 PM
Subject: PLEASE NO NISP PIPELINE!
To: <pcboard@larimercounty.org>, <bocc@larimer.org>

The NISP project will affect the quality of life with a huge pipeline project through northern neighborhoods.
I object to it taking water out of the Poudre River which is already depleted.
Please stand up for Northern Larimer County residents and say NO.

Susan Davis
1103 Bateleur Lane, Fort Collins, CO 80524

June 9, 2020

Dear Mr. Helmick,

I am writing to inform the Larimer County Planning Commission and County Commissioners of concerns with the NISP proposal.

1. As with the Thornton pipeline proposal not all residents in the proposed impact areas were notified by mail as required by the public input process. This is an ongoing issue with applications like these. As a resident of the S BAR G conservation development, I have registered several times with Thornton to be on mailing lists and there was never a change in the amount of contacts I received. I am afraid the same lack of citizen input is happening with the NISP process. There should be a requirement for the applicant, NISP in this case, that the county mailing list may not be complete and they are responsible for ensuring that affected residents are notified of application process timelines and deadlines for input. I was notified late last night about the deadline for today's input for NISP to ensure my comments go in the planning commission packet. I have no problem getting my property tax bills so I know I am in the county database.

2. The public notice process is also suspect for the NISP project as placing a notice at the courthouse was impeded by the Governor's stay at home orders in Larimer County and the closure of the county offices that draw people who may read that posting and become aware of the project.

3. How can a project the size of NISP go through the EIA and EIS process and still have a note that moving highway 287 is to be done by others. If this is the case then the same Federal Nexus for that realignment should also go through the Federal EIA and EIS process prior to moving the highway. As such the NISP project needs to wait a little longer for this to happen.

4. It appears that not all of the 1041 requirements were met in the application as other have pointed out. Will this result in another lawsuit by NISP parties against the county? If so does the county have a plan to defend itself and require NISP to repay the citizens for legal fees. Legal fees do cause harm to the county and should be noted as such in the NISP application form which they are not.

Unfortunately I was denied sufficient time to review and respond to the NISP application for the above mentioned reasons. I hope the planning commission, the board of county commissioners and other citizens concerns will be heard as my concerns as well.

Regards,

Scott GLick

2032

Rob Helmick <helmicrp@co.larimer.co.us>

NISP Comment

2 messages

Daniel Teska <dt2885@gmail.com> Mon, Jun 8, 2020 at 7:59 PM
To: "bocc@larimer.org" <bocc@larimer.org>, "ccsl@fcgov.com" <ccsl@fcgov.com>, "pcboard@larimer.org" <pcboard@larimer.org>

Dear Commisioners Donnelly, Johnson, and Kefalas,

I am writing you today to urge you to oppose NISP. The Cache la Poudre River is the heart and soul of Larimer County and Fort Collins, and allowing NISP to move forward would result in the destruction of the very river that provides irrigation for farmers, recreation, wildlife habitat, and aesthetics and beauty for our community.

You have the opportunity to provide a legacy for our children and grandchildren. If NISP is allowed to be built, the chance for them to enjoy the river as it now exists would disappear. Imagine if the National Park system was not created. We would have lost the public lands that we now enjoy, the incredible beauty of the country that we see every day. Without the Endangered Species Act, we would have lost many of the flora and fauna that are an essential part of a functioning ecosystem, and a chance to enjoy the plants and animals that Would have otherwise been lost. We would have lost our national symbol, the Bald Eagle, as well as many plant and animal species that have been saved because of the ESA.

You have heard the arguments for opposing NISP, but they are worth repeating here. Water from the reservoirs created by NISP would go outside of Larimer County, to Weld and Boulder County towns. It would reduce Poudre River flows to a trickle through Fort Collins and beyond, after the city spent millions building a new whitewater park. There would be massive dam construction impacts for local residents and massive pipeline construction impacts, destroying or damaging many Larimer County and Fort Collins natural areas. It would be necessary for NISP to buy 20,000 acres of farms for their water rights, taking farmland out of production that is needed for our future.

The impact on our rural communities would be huge. The noise, traffic, and air pollution caused by dam construction would negatively impact their way of life. Irreparable harm of the land, air, water and rural character would result from this project.

Pipeline construction impacts would be massive. Private property would need to be seized by eminent domain, road construction and environmental impacts would have a detrimental effects on day to day life. Natural areas would be lost, resulting in degraded ecosystems and recreational opportunities, not to mention the effects on wildlife and habitat.

NISP would result in the degradation of flows and water quality of the Poudre. It would mean the destruction of the river as we know it.

Is that the legacy you want to leave, or do you want to leave a legacy where the Poudre River would be protected and preserved for future generations? There are alternatives to provide water for future residents of Larimer County. But if you allow NISP to go forward, the loss of the river as we know it would be unimaginable.

Thank you for the opportunity to share my thoughts on this important subject. Please oppose NISP. Our children and grandchildren will thank you for the vision to make a very difficult decision.

Sincerely,

Dan and Val Teska
410 Buckeye St.
Fort Collins, CO 80524
970-218-1286

Matthew Lafferty <laffermn@co.larimer.co.us> Tue, Jun 9, 2020 at 8:18 AM
To: Rob Helmick <helmicrp@larimer.org>

2033

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Do Not Approve NISP 1041 Project No. 20-ZONE 2- Save Our Rural Northern Colorado

1 message

Linda Griego <dakolinda@gmail.com> Mon, Jun 8, 2020 at 4:23 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

RE NISP 1041 Permit Application; Project No. 20-ZONE 2657

Hello, my name is Linda Griego and I am a home owner on County Road 29C, which is the closest neighborhood to the proposed Glade reservoir. We have 29 households that have NOT had a say in the planning of this project because NISP did not – I repeat, DID NOT reach out to us or our neighbors who live on Bonner Peak, which is the next closest neighborhood to the proposed Glade project, other than one general meeting in Livermore. And that was after I contacted Northern Water and asked why they had not reached out to the closest communities to the project. When asked why we had not been contacted about NISP, I was told they did not have to contact anyone unless they were within ½ mile of the project. We are less than a quarter mile away. This is totally unacceptable considering the fact NISP has claimed they have done extensive outreach.

We strongly urge the county to deny the 1041 permit application based on the fact it will cause permanent damage to our quality of life. We are especially concerned about the following:

1) Noise - The rerouted highway over the most eastern hogback would have an unobstructed view from residences in the foothills, there would be no middle hogback to block truck and auto noise. The NISP publications suggest that recreation would include motorboats and jet skis. Boats and skis are loud; they would likely be louder than current road traffic.

2) Light Pollution – This rural area enjoys fairly dark skies. The proposed recreational activities would generate significant exterior lighting for boats, facilities, camping, pumping facilities, traffic, etc. and headlights from traffic coming down the hogback on the rerouted 287 would shine into the adjacent private property. This could destroy the enjoyment of our night skies.

3) New development - We do not know what sort of development would occur near and north of proposed Glade. The rerouted highway 287 would invite more residential development on the plains. The reservoir would invite more development in the adjacent foothills and valleys. It's not inconceivable that more commercial development catering to visitors would encroach into currently un-commercialized lands, forever altering the rural nature of the area.

4) Trespass – Plans for proposed Glade project almost 400,000 visitors per year. This would include boaters, campers, fishers and hikers and bikers, among others. There is every reason to believe that not all these visitors would stay within the confines of designated recreational areas. Some visitors are likely to explore the inviting foothills that border the reservoir and trespass, however inadvertently, on our private property.

5) Wildlife – Proposed Glade would become a significant barrier to the permanent and migratory herds of deer and elk that reside in our area and would be disruptive to other wildlife. In a world where wildlife and nature are under stress, and is diminishing generally owing to human activities, should we be contributing to those activities for unnecessary purposes? We encourage the county to find alternatives that don't result in the significant loss of open space and wildlife habitat that this project would cause.

6) Wildfires – In this century three major wildfires burned over 100,000 acres on and around Glade. Two of the three forest fires were caused by careless people. Can we rely on the >1000 daily visitors to proposed Glade to be careful?

7) Emergency response – The recreation on the proposed reservoir is projected to be almost 400,000 visitors per year. Such a large increase in recreationalists would likely increase the number of emergency calls thereby further stretching

emergency response agency resources. Costs would be borne by Larimer County taxpayers, and emergency services that are diverted to Glade would not be readily available to serve the local communities.

8) Air quality – Because Glade would have junior water rights, the water level of the proposed reservoir would be highly variable, unlike Horsetooth. The water level frequently would drop precipitously, often changing proposed Glade Reservoir to Glade Mudflats, and could stay that way for years. The large “bathtub ring” that would materialize around the reservoir would become dry soil that would blow in our strong winds causing air quality and visual concerns. The hundreds or thousands of vehicles that would travel to the area emit gases, particulates, and ozone precursors (i.e., health hazards).

9) Climate change – the pumps, the construction vehicles, the recreational vehicles: the project would result in considerable burning of fossil fuels, forever, and the emission of greenhouse gases. The pumping stations alone would emit the equivalent of adding 7000 GHG emitting cars at a time when Colorado is implementing zero emissions vehicle standards.

10) State Land Usage - The large area of state land west of the proposed reservoir is devoted to hunting and cattle grazing. The state and federal lands in this region of northern Colorado provide abundant and easily accessible opportunities for recreation, which we gratefully utilize. Impacts to use of or access to the state land is a negative impact to our communities.

11) Aesthetic - The drive from Livermore to Laporte would no longer be through the heritage rangeland and the familiar hogbacks. Since the proposed reservoir would likely be only partially filled much of the time, instead of beautiful hogbacks and grassy foothills, our viewshed would be marred by the barren sides (bathtub ring) and murky surface of a partially filled reservoir.

12) Lack of combined Project evaluation/coordination - There is no apparent coordination of the NISP or the proposed Seaman’s expansion or the Halligan expansion. All these projects surround our properties and would leave us on a peninsula of land cut from the rural environment we now enjoy. We met with the City of Greeley in August 2018 and learned that they are not planning to cooperate with other cities due to “challenges” and are proceeding on an expansion of Seamen’s reservoir from 5,000 to 80,000 acre-feet. In the 21st century, surface storage just doesn’t make sense; this is a semi-arid climate that is getting drier. Alternatives are available and should be seriously considered.

13) Social justice - While the benefits of proposed Glade would be enjoyed by people who live and work far from the reservoir site, the costs would be borne by those whose quality of life would be severely lessened.

14) Conservation and Alternatives – Conservation is not begin adequately considered. While the Colorado Front Range is land-rich for development, it is semi-arid and thus water-limited. About 2/3 of the Poudre is already taken out, and Glade would take another 40% of what’s left. Yet another reservoir is nothing but a temporary fix for a small portion of the state’s water needs; but one with permanent, destructive impacts on a large part of rural northern Colorado. The time is way past due for developing long-term solutions based on state-of-the-art technologies and widespread education on the absolute necessity to conserve water, and to stop relying on 19th century solutions for 21st century challenges.

In addition, I would add a few more serious concerns of the negative impacts that particularly relate to our neighborhood:

1) The majority of residents living on County Road 29C are older - retired citizens with a median age range of 65, many who are living with already existing health conditions, including myself. In light of that, safety and air pollution in addition to the light, and noise pollution would have a very serious negative impact on our health and our neighborhood during the 5-7 plus years of construction.

2) The structural integrity of our homes, our wells and our septic systems, with heavy equipment moving and blasting in the area will have a negative impact on our property and our values, especially with the sight of a ‘DAM’ in our front windows, which would take away the aesthetic values of why we moved out there in the first place. Would you want to look out your front window and see such a 280 foot monstrosity instead of deer, coyotes or hawks and eagles?

3) The impact on wildlife and conservation in the surrounding area, in particular, a Bald Eagle’s nest which is less than a third mile away, possibly nesting within the 1,500 ft. regulation distance for construction. I have watched these Bald eagles for 20+ years raise many fledglings and I felt privileged the day I saw them mating one year over the Poudre River. The NISP Environmental Impact Statement has plans to block this nest while they destroy the surrounding area because the state rule says they cannot do heavy construction within a certain distance of the nest. Is this what Larimer County Commissioners support for this community?

4) The ATLAS Missile Silo 13 may be disrupted, which according to several websites and articles, the possibility remains that there may STILL be the danger of a plume front which could not only contaminate our water supply but possibly the Poudre River and the Glade reservoir water supply.

I’d also like to question what analysis has been done in the permit application or the EIS of what impacts the NISP project

will have on businesses in Laporte. I frequent the Old Feed Store, owned by an older couple, and question whether the relocation of highway 287 will negatively impact small businesses such as these. Will they suffer and possibly be force to close from the lack of traffic coming from Red Feather, Livermore and other local communities along Highways 287 and 14, etc., who now frequent their store to buy livestock and pet food but will be redirected much further north?

And finally, I am asking the County Commissioners to please deny the 1041 permit based on all these damaging impacts to the community and to Larimer County residents. I personally believe this project would have the greatest negative environmental impact in the history of Larimer County.

Thank you,

Linda Griego

Save Rural NoCo Member

--
Ms Linda Griego
dakolinda@gmail.com
6401 N. County Road 29C
Bellvue, Colorado 80512

Save Rural NoCo Member

2036

Rob Helmick <helmicrp@co.larimer.co.us>

NISP comments

1 message

Larry Lechner <larlec@frii.com> Mon, Jun 8, 2020 at 6:49 PM
To: jkafalas@larimer.org, swjohnson@larimer.org, tdonnelly@larimer.org, rhelmick@larimer.org

To all concerned, I am listing my comments on the NISP project into the body of this email and attaching a copy as a .pdf as well in case this aids your record keeping or suits you reading style better.

June 8, 2020

To the Larimer County Commissioners,

As a resident of Bellvue who lives less than five miles from the proposed NISP Glade Reservoir I would like to voice my strong opposition to the project.

I will not attempt to articulate the many technical, legal and community issues with the project as they have been articulated by others much more capable than me. I do request that you do pay close attention to those concerns and note that I share many of them.

Beyond those concerns I request that you consider the following:

1. Larimer County does not necessarily accrue any direct concrete benefits from the project and all benefits such as recreation (the only real benefit I could perceive) are at best potential and would not necessarily benefit the residents of Larimer County as most likely many of those recreating would come from neighboring communities and/or the Denver metropolitan area. This could severely impact the quality of life for those of us currently residing in the area with increased traffic, noise, vandalism, etc.

2. Pleasant Valley has been the site of several major construction projects during the last several years – the upgrade of the Fort Collins pipeline, improvements to the Greeley pipeline, the Noosa Yogurt factory and a large expansion of the Morning Fresh Dairy. This too has lowered the quality of life substantially for many in the valley with increased noise, traffic and construction activities. Enough is enough. We do not need several years of construction noise, traffic rerouting and heavy machinery in our area especially if it brings no value to our lives or the local community.

3. The land upon which Glade will be build is, at present, an excellent component of the corridor connection between the mountain and planes ecotypes and the Front Range is losing these connection points at an alarming rate due to increasing development. How does it benefit Larimer County to sacrifice such an important landscape? What do we gain by foreclosing yet another key part of our environment to development? Nothing.

4. There is not adequate zoning in place to control the increased development associated with this type of development and, as we have seen, the voices of the development community are much louder than local voices and the resident communities, in this case Bellvue and Laporte, suffer. Without strong zoning based upon local community values in place there is no security for our communities.

5. It is clear that the cities and districts that would benefit from this project need water if they are to continue their rapid pace of development. However, the Glade project is not the correct solution especially since we pay the price and derive no benefit. Perhaps they should consider their plans

more carefully understanding the natural constrains of this landscape. It is not our problem to solve.

As indicated earlier there are many reasons to deny the Glade proposal, far beyond what I have presented here. My hope is that you hear all the concerns expressed in the growing chorus of opposition by members of your constituency. We elected you as our representatives so please hear our voices and turn down this project.

Warm regards,

Larry Lechner

3817 N. County Rd. 25E

Bellvue, CO 80512

--
Larry Lechner
Bellvue, CO

Glade opposition letter.pdf
73K

2038

Rob Helmick <helmicrp@co.larimer.co.us>

NISP application is incomplete

3 messages

Lynn U Nichols <lynn.healthwrite@gmail.com> Mon, Jun 8, 2020 at 11:45 AM
To: pcboard@larimer.org
Cc: bocc@larimer.org

Hello Planning Commissioners,
Thank you for your thoughtfulness on planning issues that affect Larimer County. I am writing regarding the NISP application that was recently deemed complete by the Board of County Commissioners.

As you have likely read in the formal letter from No Pipe Dream, Save the Poudre and Save Rural NoCo's attorneys, there are many reasons why the application is not complete. One of the biggest being the exclusion of the relocation of Highway 287 from the 1041 application. Excluding the relocation of a 7 mile stretch of a major highway/truck route (and deeming it a separate CDOT project) is obviously manipulative and wrong. Pulling this from the original proposal can only speak to concerns that it wouldn't be accepted if it was included. This relocation is a huge expense, and will also have major impacts on public safety, disruption of private land and visual impacts. All these costs and impacts must be considered.

I am also concerned that water for the reservoir has yet to be secured--relying on a hopeful Buy and Dry scheme of area farms (which as you know leaves land unusable)--and the negative impact it will have on the flow of the Poudre River.

I ask you to deem the NISP application incomplete until these, and several other concerns, are addressed.

Thank you,
Lynn Utzman-Nichols
Fort Collins

--
Lynn U Nichols
Healthwrite Communications
970-218-8514

Linda Hoffmann <hoffmalc@co.larimer.co.us> Mon, Jun 8, 2020 at 9:14 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information and consideration.

Rob -- Please include this message in the public record for the application.

[Quoted text hidden]

Matthew Lafferty <laffermn@co.larimer.co.us> Tue, Jun 9, 2020 at 8:22 AM
To: Rob Helmick <helmicrp@larimer.org>

fyi

---------- Forwarded message ---------
From: **Lynn U Nichols** <lynn.healthwrite@gmail.com>
Date: Mon, Jun 8, 2020 at 11:45 AM
Subject: NISP application is incomplete
To: <pcboard@larimer.org>
Cc: <bocc@larimer.org>

[Quoted text hidden]

--

Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

2040

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Do Not Approve NISP 1041 Project No. 20-ZONE 2- Save Our Rural Northern Colorado

1 message

mila garelle <milagarelle@gmail.com> Mon, Jun 8, 2020 at 10:09 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

We are landowners residing in the area of the proposed Glade reservoir that have serious concerns regarding the proposed Glade Project and the negative impacts if the project moves forward.

My concerns are that the scope and scale of this proposed project, if approved, would have significant, detrimental, and permanent negative impact on our rural community, environment, and safety we enjoy today and depend on to have in the future.

Specifically, our rural environment would be negatively impacted in the following ways:

The rerouted highway 287 would:
be so much more dangerous than it is now (which is already deadly), especially in winter!,
destroy more natural landscapes, (pave paradise)
destroy wildlife habitat and further interfere with migrations,
encourage more invasive weeds to our agricultural economy,
create an eyesore 24/7 over the ridge east of the glade,
create significantly more noise (24/7) from trucks going up and braking going down the reroute over the ridge,
create light pollution far and wide from headlights every night from vehicles, especially trucks going up and over the ridge.
The current routing of 287 is in the valley and prevents widespread negative impact from noise, light and weed dispersal that would result from rerouting over the ridge.
Do NOT reroute over the ridge. It makes no sense for the environment, budget and routing of semi's livestock trailers, RVs, trucks, motorcycles and other vehicles that use this route heavily every day.

Air quality – Because Glade would have junior water rights, the water level of the proposed reservoir would be highly variable, unlike Horsetooth. The water level frequently would drop precipitously, often changing proposed Glade Reservoir to Glade Mudflats, and could stay that way for years. The large “bathtub ring” that would materialize around the reservoir would become dry soil that would blow in our strong winds causing air quality and visual concerns. The hundreds or thousands of vehicles that would travel to the area emit gases, particulates, and ozone precursors (i.e., health hazards).

Climate change – the pumps, the construction vehicles, the recreational vehicles: the project would result in considerable burning of fossil fuels, forever, and the emission of greenhouse gases. The pumping stations alone would emit the equivalent of adding 7000 GHG emitting cars at a time when Colorado is implementing zero emissions vehicle standards.

Conservation and Alternatives – Conservation is not begin adequately considered. While the Colorado Front Range is land-rich for development, it is semi-arid and thus water-limited. About 2/3 of the Poudre is already taken out, and Glade would take another 40% of what’s left. Yet another reservoir is nothing but a temporary fix for a small portion of the state’s water needs; but one with permanent, destructive impacts on a large part of rural northern Colorado. The time is way past due for developing long-term solutions based on state-of-the-art technologies and widespread education on the absolute necessity to conserve water, and to stop relying on 19th century solutions for 21st century challenges.

The Larimer County Commissioners is obligated to serve and protect our rural communities and be good stewards of our natural resources by saying no Glade Reservoir!

Sincerely,

Mila GarelleEssam

--
Ms mila garelle
milagarelle@gmail.com
93 Juniper Ridge Rd
Laporte, Colorado 80535

Save Rural NoCo Member

2042

Rob Helmick <helmicrp@co.larimer.co.us>

NISP

2 messages

Michael Anthony <manthony@skybeam.com> Mon, Jun 8, 2020 at 6:04 PM
To: jkefalas@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, pcboard@larimer.org

If Glade Reservoir is approved what is the long term (50 + years) plan for the area around the lake? Is there a plan? Will it be developed like Canyon Lake, CA?

Take a look at the Google map link below:

https://goo.gl/maps/WDWMtpN5fs4VtE6c7

Thanks,

Michael Anthony

Matthew Lafferty <laffermn@co.larimer.co.us> Tue, Jun 9, 2020 at 8:19 AM
To: "Helmick, Rob" <rhelmick@larimer.org>

FYI
[Quoted text hidden]
--

Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

2043

Rob Helmick <helmicrp@co.larimer.co.us>

NISP

2 messages

'Dolores Williams' via Planning Commission Board <pcboard@co.larimer.co.us> Mon, Jun 8, 2020 at 10:22 PM
Reply-To: Dolores Williams <tinytornado@mac.com>
To: pcboard@larimer.org
Cc: bocc@larimer.org

To allow the Poudre River to become a stinking ditch through Fort Collins to supply water to cities like Erie, etc. should not happen. There has to be a limit to development in this desert area while buying up farms to take their water is short-sighted at best. Drying farmland should not be allowed. Some day we might need the farms to feed our nation.

People will keep coming as long as we build homes, etc. But there should be limit to the destruction to our area because people keep selling farms for residential and commercial use. Hate should be the limit and people should move elsewhere.

Also, we need to stop watering acres of lawns. Conservation must be in the mix so we don't dry up the Poudre River.

Dolores Williams
415 Mason Court 7A
Fort Collins, CO 80524

Matthew Lafferty <laffermn@co.larimer.co.us> Tue, Jun 9, 2020 at 8:18 AM
To: Rob Helmick <helmicrp@larimer.org>

fyi
[Quoted text hidden]
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Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

June 7, 2020

Larimer County Commissioners: John Kefalas, Steve Johnson, Tom Donnelly
Cc: Rob Helmick, Senior Planner

Transmitted via email: bocc@larimer.org

Re: **NISP 1041 Permit Application; Project No. 20-ZONE 2657**
Citizen Comment on 1041 Application for the Northern Integrated Supply Project

Pleasant Valley is a Special Place in Larimer County, with substantial intact conservable assets worthy of protection. To that end, Citizen Activists from THIS AREA successfully eliminated NISP's planned pipeline to connect Horsetooth and Glade which would have struck like a mad rattlesnake through the heart of Pleasant Valley.

Other pipelines are needed to convey water from Glade Reservoir and pipeline alignment and construction is a disruptive and devastating activity as you have witnessed recently with the challenges to the Thornton Pipeline alignment. We have experienced more than our share of pipeline disruption here in Bellvue in recent years. These pipelines also rob the Poudre of it's function as a natural water conveyance, and in supplying distant ratepayers, place even more stress on the river ecosystem below the North Poudre diversion point.

The Poudre River created this beautiful landscape, in combination with other natural forces, over millennia and deserves conservation. Yet now, for many months of the year, the Poudre does not flow at Bellvue. What will NISP bring? Quality and quantity of water far below that required for a "healthy" river, according to Northern's project documentation and submittals. When the peak flows are diverted, the only time of the year that the Poudre truly flows, will end. A trickle of water passing through Fort Collins will do nothing to heal this blow to the health of the Poudre River. At this point Northern Water does not own sufficient water rights to fill Glade Reservoir - why the rush to permitting and construction? Predicted prolonged droughts may mean it will never be filled. Look to Lakes Powell and Mead as foreshadowing the folly of this venture.

Recreational opportunities are being offered as a panacea for the damage to the Poudre River, however Larimer County has not negotiated any substantive, binding agreements with Northern Water regarding this possibility. I note from the document entitled "Larimer County 1041 Permit Technical Memorandum No. 4 Glade Reservoir Recreation Voluntary Permit Conditions" that, "The parties will begin development of this plan after the issuance of, and acceptance by the NISP Participants, of the 1041 Permit," "Northern Water shall have the right to modify a recreation facility design or location at any time if, in its sole discretion, it determines it is necessary to comply with NISP operations or maintenance, NISP permit conditions, or other issues that present a conflict with the primary water supply purposes of the Project," and that Larimer County will be paying 25% of the cost to construct facilities on land it does not own. None of these points appear to strongly represent and protect the interest of Larimer County residents, who bear virtually all of the burden of disruption.

By the time NISP is complete, the 15 participating entities will have spent well over $1 billion, financed by municipal debt and to be repaid through the sale of taps in their communities, and fees paid by the ratepayers. Any prolonged downturn interrupting the cash flows needed to fund the repayments has the possibility of creating devastating municipal bankruptcies in these communities. If the past 90 days have shown us anything, it's that nothing is certain, especially the ability to service a large debt in a time of crisis.

We demand that the Commissioners DENY the 1041 permit for NISP and urge Northern Water to pursue alternatives for which their own rate-payers, who will receive the benefits, will bear the brunt of the negative impacts, financial, and otherwise.

Sincerely;

Elizabeth L Ashbach and Michael P Eland, 1501 Red Mesa Lane, Bellvue, CO

2045

Rob Helmick <helmicrp@co.larimer.co.us>

Reject the NISP

1 message

Eric Brayden <embrayden@gmail.com> Mon, Jun 8, 2020 at 11:09 AM
To: wjohnson@larimer.org, rhelmick@larimer.org, JKefalas@larimer.org, tdonnelly@larimer.org

Hello,

I would like to add my voice to the people urging you to reject the NISP, and preserve the flow of the Poudre River. Please don't support a mistake that would forever change this important feature of northern Colorado. Thank you.

2046

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: Northern Integrated Water Supply Project

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Mon, Jun 8, 2020 at 10:06 PM
To: John Kefalas <kefalajm@co.larimer.co.us>, Steve Johnson <johnsosw@co.larimer.co.us>, Tom Donnelly <donnelt@co.larimer.co.us>
Cc: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Commissioners -- Forwarded for your information and consideration.

Rob -- Please include this message in the public record for the application.

---------- Forwarded message ---------
From: **Larimer.org** <noreply@larimer.org>
Date: Mon, Jun 8, 2020, 4:58 PM
Subject: Northern Integrated Water Supply Project
To: <bocc@larimer.org>

Submitted on Monday, June 8, 2020 - 4:58pm

Submitted by user: Anonymous

Submitted values are:

Emailing (to) bocc@larimer.org
Subject Northern Integrated Water Supply Project
Your Name Elaine Spencer
Phone 970-988-8034
Your Email espencer@frii.com
Confirm Email espencer@frii.com
Message
Please DO NOT approve the NISP project!
We don’t need a giant pipeline disrupting our neighborhoods, creating traffic flows that are contesting and polluting.
I want to go on the Poudre River trails and enjoy watching the new white water park in downtown Fort Collins, seeing a substantial water flow making the white water park usable and the wildlife on the river possible.
As a taxpayer of local, state, and federal taxes I should not have to pay for a major realignment of Route 287.
Then there are the fault lines underneath the proposed site of the Glade reservoir. I don’t want to go through another major earthquake when it could be prevented by you rejecting this project.

Larimer County residents don’t benefit from such a large financial and environmental disruption.

Thank you,

Elaine Spencer

Privacy Setting

This form was submitted from a /contact email link on larimer.org.

2047

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Do Not Approve NISP 1041 Project No. 20-ZONE 2- Save Our Rural Northern Colorado

1 message

Dave & Julie Abramoff <daveabramoff@gmail.com> Mon, Jun 8, 2020 at 7:21 AM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

We are landowners residing in the area of the proposed Glade reservoir that have concerns with the proposed Glade Project and the negative impacts that would occur if the project moves forward.

The primary benefits of this proposed reservoir would be enjoyed by the 15 subscriber towns or agencies that receive the proposed Glade water. Most of these towns and agencies are outside Larimer County. The most obvious and intense costs would be borne by local and other surrounding communities.

In addition it has been shown in many other communities around the country and the world that with intelligent planning, strong conservation efforts, water sharing agreements, and water saving devices, tat water usage can be significantly reduced.

In general, our concerns are that the scope and scale of this proposed project, if approved, would have significant, detrimental, and permanent impact on our rural community, environment, and lifestyle we enjoy today and desire to have in the future.

Specifically, our rural environment we believe would be negatively impacted in the following ways:

1) Noise - The rerouted highway over the most eastern hogback would have an unobstructed view from residences in the foothills, there would be no middle hogback to block truck and auto noise. The NISP publications suggest that recreation would include motorboats and jet skis. Boats and skis are loud, they would likely be louder than current road traffic.

2) Light Pollution – This rural area enjoys fairly dark skies. The proposed recreational activities would generate significant exterior lighting for boats, facilities, camping, pumping facilities, traffic, etc. and headlights from traffic coming down the hogback on the rerouted 287 would shine into the adjacent private property. This could destroy the enjoyment of our night skies.

3) New development - We do not know what sort of development would occur near and north of proposed Glade. The rerouted highway 287 would invite more residential development on the plains. The reservoir would invite more development in the adjacent foothills and valleys. It's not inconceivable that more commercial development catering to visitors would encroach into currently uncommercialized lands, forever altering the rural nature of the area.

4) Trespass – Plans for proposed Glade project almost 400,000 visitors per year. This would include boaters, campers, fishers and hikers and bikers, among others. There is every reason to believe that not all these visitors would stay within the confines of designated recreational areas. Some visitors are likely to explore the inviting foothills that border the reservoir and trespass, however inadvertently, on our private property.

5) Wildlife – Proposed Glade would become a significant barrier to the permanent and migratory herds of deer and elk that reside in our area and would be disruptive to other wildlife. In a world where wildlife and nature are under stress, and is diminishing generally owing to human activities, should we be contributing to those activities for unnecessary purposes? We encourage the county to find alternatives that don't result in the significant loss of open space and wildlife habitat that this project would cause.

6) Wildfires – In this century three major wildfires burned over 100,000 acres on and around Glade. Two of the three forest fires were caused by careless people. Can we rely on the >1000 daily visitors to proposed Glade to be careful?

7) Emergency response – The recreation on the proposed reservoir is projected to be almost 400,000 visitors per year.

Such a large increase in recreationalists would likely increase the number of emergency calls thereby further stretching emergency response agency resources. Costs would be borne by Larimer County taxpayers, and emergency services that are diverted to Glade would not be readily available to serve the local communities.

8) Air quality – Because Glade would have junior water rights, the water level of the proposed reservoir would be highly variable, unlike Horsetooth. The water level frequently would drop precipitously, often changing proposed Glade Reservoir to Glade Mudflats, and could stay that way for years. The large “bathtub ring” that would materialize around the reservoir would become dry soil that would blow in our strong winds causing air quality and visual concerns. The hundreds or thousands of vehicles that would travel to the area emit gases, particulates, and ozone precursors (i.e., health hazards).

9) Climate change – the pumps, the construction vehicles, the recreational vehicles: the project would result in considerable burning of fossil fuels, forever, and the emission of greenhouse gases. The pumping stations alone would emit the equivalent of adding 7000 GHG emitting cars at a time when Colorado is implementing zero emissions vehicle standards.

10) State Land Usage - The large area of state land west of the proposed reservoir is devoted to hunting and cattle grazing. The state and federal lands in this region of northern Colorado provide abundant and easily accessible opportunities for recreation, which we gratefully utilize. Impacts to use of or access to the state land is a negative impact to our communities.

11) Aesthetic - The drive from Livermore to Laporte would no longer be through the heritage rangeland and the familiar hogbacks. Since the proposed reservoir would likely be only partially filled much of the time, instead of beautiful hogbacks and grassy foothills, our viewshed would be marred by the barren sides (bathtub ring) and murky surface of a partially filled reservoir.

12) Lack of combined Project evaluation/coordination - There is no apparent coordination of the NISP or the proposed Seaman’s expansion or the Halligan expansion. All these projects surround our properties and would leave us on a peninsula of land cut from the rural environment we now enjoy. We met with the City of Greeley in August 2018 and learned that they are not planning to cooperate with other cities due to “challenges” and are proceeding on an expansion of Seamen’s reservoir from 5,000 to 80,000 acre-feet. In the 21st century, surface storage just doesn’t make sense; this is a semi-arid climate that is getting drier. Alternatives are available and should be seriously considered.

13) Social justice - While the benefits of proposed Glade would be enjoyed by people who live and work far from the reservoir site, the costs would be borne by those whose quality of life would be severely lessened.

14) Conservation and Alternatives – Conservation is not begin adequately considered. While the Colorado Front Range is land-rich for development, it is semi-arid and thus water-limited. About 2/3 of the Poudre is already taken out, and Glade would take another 40% of what’s left. Yet another reservoir is nothing but a temporary fix for a small portion of the state’s water needs; but one with permanent, destructive impacts on a large part of rural northern Colorado. The time is way past due for developing long-term solutions based on state-of-the-art technologies and widespread education on the absolute necessity to conserve water, and to stop relying on 19th century solutions for 21st century challenges.

The Larimer County Commissioners must save our rural communities and be good stewards of our natural resources by saying no Glade Reservoir!

Sincerely, dave and Julie abramoff

--
Ms Dave & Julie Abramoff
daveabramoff@gmail.com
69 university ridge road
Laporte, Co 80535

Save Rural NoCo Member

that are diverted to Glade would not be readily available to serve the local communities.

8) Air quality – Because Glade would have junior water rights, the water level of the proposed reservoir would be highly variable, unlike Horsetooth. The water level frequently would drop precipitously, often changing proposed Glade Reservoir to Glade Mudflats, and could stay that way for years. The large “bathtub ring” that would materialize around the reservoir would become dry soil that would blow in our strong winds causing air quality and visual concerns. The hundreds or thousands of vehicles that would travel to the area emit gases, particulates, and ozone precursors (i.e., health hazards).

9) Climate change – the pumps, the construction vehicles, the recreational vehicles: the project would result in considerable burning of fossil fuels, forever, and the emission of greenhouse gases. The pumping stations alone would emit the equivalent of adding 7000 GHG emitting cars at a time when Colorado is implementing zero emissions vehicle standards.

10) State Land Usage - The large area of state land west of the proposed reservoir is devoted to hunting and cattle grazing. The state and federal lands in this region of northern Colorado provide abundant and easily accessible opportunities for recreation, which we gratefully utilize. Impacts to use of or access to the state land is a negative impact to our communities.

11) Aesthetic - The drive from Livermore to Laporte would no longer be through the heritage rangeland and the familiar hogbacks. Since the proposed reservoir would likely be only partially filled much of the time, instead of beautiful hogbacks and grassy foothills, our viewshed would be marred by the barren sides (bathtub ring) and murky surface of a partially filled reservoir.

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13) Social justice - While the benefits of proposed Glade would be enjoyed by people who live and work far from the reservoir site, the costs would be borne by those whose quality of life would be severely lessened.

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The Larimer County Commissioners must save our rural communities and be good stewards of our natural resources by saying no Glade Reservoir!

Sincerely,

--
Ms Herb Schaal
herb.schaal@bellvueemporium
6020 WCR 54E
Bellvue , CO 80512

Save Rural NoCo Member

2050

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

Herb Schaal <herb.schaal@bellvueemporium.com> Tue, Jun 9, 2020 at 2:12 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

I'm a landowner residing in northern Larimer County, near the proposed location of Glade Reservoir, it's massive dam, forebay, pumps, pipelines, campgrounds, parking lots, boat ramps, and other facilities. We strongly urge the Board of County Commissioners to deny the 1041 permit for the Northern Integrated Supply Project because it would forever impact the fundamental nature of the rural landscape in which we live and harm our quality of life.

We choose to live in northern Colorado for its beautiful natural landscapes, its wild and scenic rivers, it's clean air and quiet surroundings, its wildlife, its opportunities for outdoor recreation on the abundant state and federal lands in the area. These are key pieces to our quality of life; key pieces that would be lost if this project is constructed and operated as proposed. Our land, water, and communities would be harmed by this project, and any benefits of the project would accrue to communities mostly outside Larimer County.

It is unacceptable that our rural northern Colorado communities must bear the impacts and unmitigable risks of this massive and ill-conceived project, the biggest ever proposed for Larimer County.

If construction is executed as planned, there would be seven years of heavy construction impacting our communities. We would be subjected to lots of heavy truck traffic, since the main artery to and from the reservoir site is Highway 287, which is also our main route; 6-days-a-week heavy traffic and heavy machinery operations, and the unwelcome, intrusive, and obnoxious presence of widespread and large-scale construction activity, noise, dust, and danger, over a long period of time. The intrusion would turn the hundreds of acres of the landscape into a construction zone, and take away the attractiveness, the clean air, the quiet – the things we depend on for health and happiness.

Northern Water is currently buying farms in northern Colorado to make up a more than 50% shortfall in the water rights needed for a successful project. In addition, recent prolonged droughts, which are becoming more common, have affected the amount of water that would be available from the Poudre River and other sources. For us, this means that we would endure the years and years of construction, and the irreparable loss of the unique landscape in which we live, all for an unfulfilled promise that "if they build it, the water would come" which is by no means guaranteed. The water shortage will only get worse as the climate dries, so Larimer County should deny this project, which will likely fail to meet its objectives. Less expensive, less destructive alternatives to water supply should be seriously considered.

Encouraging almost 400,000 visitors per year to this area would alter it from the quiet, rural and sparsely populated landscape we sought and invested in, to a busy recreational area with noise, dust, traffic, activity, accidents, and fires. Noise from motorboats on Glade would exceed state standards, would be heard miles away, and would significantly disrupt our lives. For some owners, the noise would cause property values to decline.

That's if the reservoir fills. The photographs Northern Water shows of a beautiful full reservoir are misleading at best, because the reservoir would rarely, if ever, look like that. It would generally look like an abandoned industrial facility marring the area's aesthetics.

Since the reservoir would not fill, and likely would not be full during much of its life, the project would look like an abandoned muddy puddle much of the time, and the recreational facilities would be mostly empty. Who would pay for the upkeep of the unused recreational facilities, Larimer County taxpayers? The project ruins the aesthetics of the valley and hogbacks – a unique and beautiful landscape – for a project that would provide little or no benefit to Larimer County and in fact would negatively impact its residents and its coffers.

The project would also contribute to climate change. Over 30,000 tons per year of CO2 would be emitted by engines to pump water into Glade. Other greenhouse gases would also be produced, both during construction and operation. Air

pollution would also occur due to the project, including gases that form ozone, a severe health hazard.

Dust blown from the barren shorelines would be swept up the valley on the area's strong winds and seep into our homes and further degrade our lives. The EIS states that it would take an 80-mph wind to generate any fugitive dust from the shorelines of the operating reservoir, an assertion that doesn't pass the laugh test for anyone living in this rural landscape. What else has have they got wrong? Are we to be the guinea pigs for some ill-conceived experiment?

We are very concerned about the potential for fire. We live in a high fire hazard, and we take many precautions with our homes and properties to protect against fires. Many visitors, who would be visiting in summer when the land is hottest and driest, would not be aware of how easy it is to cause a wildfire in this landscape. Some would be careless with campfires, with cigarettes, with illegal fireworks, or with firearms, and wildfires would be inadvertently ignited. Their vehicles can start fires. Unfortunately, arson is possible. Our climate is getting drier. Larimer County must recognize the seriousness of this issue and deny this permit. The county cannot simply hope for the best because our homes, our property, our animals would all be put at unacceptable risk of wildfire due to construction, high visitation, and incomplete understanding. These increased risks would also cause increased demands on local emergency services, especially fire, medical, and law enforcement.

No project this big can be undertaken without significant and irreparable impacts. We ask Larimer County to be a good steward and deny this permit and prevent the loss of open space and wildlife habitat, increased risk of wildfires and other public safety hazards, increased demands on local volunteer emergency services, noise, light pollution where now there is little, increased development and traffic in ever-widening circles around the reservoir, reduced air quality, climate change, increased illegal activities such as trespass on adjacent private land, decreased property values, and the loss of unique visual and aesthetic values. The natural and rural quality of this land is very important to our lives and communities.

Sincerely,

--
Ms Herb Schaal
herb.schaal@bellvueemporium.com
6020 WCR 54 E
Bellvue , CO 80512

Save Rural NoCo Member

2052

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: NISP review

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Tue, Jun 9, 2020 at 4:03 PM
To: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Please include this message in the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Janet Carabello** <jdcarabello@gmail.com>
Date: Tue, Jun 9, 2020 at 11:35 AM
Subject: NISP review
To: <bocc@larimer.org>

To Larimer County Board of Commissioners:

This is a copy of a message we sent to the Larimer County Planning Commission about NISP:

We are totally opposed to the proposed Northern Integrated Supply Project (NISP) as it has been thus far presented to the Planning Department. There are far too many issues that would adversely affect the environmental quality of life in Northern Colorado. It will further drain water needed in the Poudre River to support valuable recreation and wildlife. It would also be a major disruption to citizens residing in the path and nearby the proposed reservoir and the pipeline. The project has very little bene it to Larimer County, and instead feeds the insatiable population growth in Weld and other counties. At some point there has to be a limit to the exploitation of our limited water resources here in Colorado. Please do the right thing and do not approve this horrendously damaging project proposal.

Respectfully submitted,

Janet Carabello and James Hill, concerned citizens and voters

2053

Rob Helmick <helmicrp@co.larimer.co.us>

NISP review

1 message

Janet Carabello <jdcarabello@gmail.com> Tue, Jun 9, 2020 at 11:33 AM
To: pcboard@larimer.org

To the Larimer County Planning Commission:

We are totally opposed to the proposed Northern Integrated Supply Project (NISP) as it has been thus far presented to the Planning Department. There are far too many issues that would adversely affect the environmental quality of life in Northern Colorado. It will further drain water needed in the Poudre River to support valuable recreation and wildlife. It would also be a major disruption to citizens residing in the path and nearby the proposed reservoir and the pipeline. The project has very little bene it to Larimer County, and instead feeds the insatiable population growth in Weld and other counties. At some point there has to be a limit to the exploitation of our limited water resources here in Colorado. Please do the right thing and do not approve this horrendously damaging project proposal.

Respectfully submitted,

Janet Carabello and James Hill, concerned citizens and voters
Fort Collins, Co.

2054

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: NISP 1041 Permit Application; Project No. 20-ZONE 2657

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Tue, Jun 9, 2020 at 4:15 PM
To: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Please include this message in the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Alan Miller** <alanm@frii.com>
Date: Tue, Jun 9, 2020 at 4:05 PM
Subject: NISP 1041 Permit Application; Project No. 20-ZONE 2657
To: <jkafalas@larimer.org>, <swjohnson@larimer.org>, <tdonnelly@larimer.org>
Cc: <bocc@larimer.org>

Greetings

Please find attached my letter and comments regarding the NISP 1041 Permit Application

I am a supporter of Save Rural Northern Colorado and Save the Poudre

Thanks

Alan Miller

Bellvue, CO 80512

970-498-9169

NISP 1041 Permit Application.pdf
398K

NISP 1041 Permit Application; Project No. 20-ZONE 2657

Dear County Commissioners

I have been a licensed health care provider in Colorado since 1975 and a resident of Larimer County for 30 years. My life has been one of service and not financial gain. We moved to the Front Range and bought property in Bellvue in 1990. My wife grew up in Littleton and wanted to be closer to her family so our daughters could spend more time with their grandparents. We strategically picked our home location in Bellvue to be rural and with limited growth potential. We live in a beautiful area above the entrance to Lory State Park and are surrounded by public land. The Glade Reservoir project will not affect us directly but will have, I believe, a devastating impact on rural Larimer County, the Front Range and future generations.

It is interesting that the county commissions represent unincorporated Larimer County but I do not believe any of you live in a rural area and may have a hard time understanding us, why we chose to live where and how we do, and many of our issues. For us the inconvenience of having to drive to town for shopping, children sports, etc. is the price of admission for our wonderful rural life close to nature. Living in unincorporated Larimer County is like being the kid in junior high that is always being bullied and the County Commissioners are our only protectors. The USA is the bastion of capitalism in the world and there is both good and bad in this system, as with everything. We have bicycle-toured in many different countries including communist Cuba, and I am grateful every day for being born in the USA, especially living here in the foothills of Colorado. Nothing happens in this country unless someone makes an obscene amount of money doing it. Rural Larimer County does not have the financial power, legal power, political power or resources to protect ourselves from the interests of the large cities of the Front Range, from venture capitalists and hedge funds. We (your constituents) elected you to look after our interests and the principles that our country was founded upon: Life, Liberty and the pursuit of happiness.

The re-routing US highway 287 if Glade Reservoir is built will be to an area where people settled for a quiet rural life and is inconsistent with the above values.

What have you learned from the last few months and our current pandemic? What is really important in life (just money)? Do you think this will never happen again? The people most affected by Covid 19 in Colorado are/were in high density areas. The purpose of Glade Reservoir is to increase population growth – great for a virus but not so great for your constituents and our economy. My grandmother used a saying "enough is enough".

I will leave the issues of environmental impact, social impact and growth that never pays for itself (the current residents bear the brunt of taxes and decrease to their quality of life) to others as well as inconceivable issues like building a reservoir above the Poudre River that will require massive energy expenditures to pump water up into the reservoir. What will future generations think of this idea?

Remember back a few months ago what was important to the younger generation in both our country and the world. It was global warming and hopefully this will still be an issue at the next general election. Looking east from our deck we can see I-25 in the distance. For years the brown cloud has gotten progressively worse. With the decrease in travel due to Covid 19, the brown cloud has disappeared for the last month. Driving on I-25 (what was called the Valley Highway) last month

reminded us of driving in the 1980s. We live in a beautiful place but have a significant air quality issue; for years the ozone levels have been out of compliance. Why would we exacerbate this issue by approving a reservoir that is targeted to increase growth, population, congestion, air pollution, and global warming? Is this progress?

In the past, parents always tried to improve life for their children. My children will never get to have the outdoor experiences I have had. The Milky Way used to be bright and vivid at our home and now it is barely visible on the darkest nights. I was able to go on backpack and river trips and not see anyone else – now reservations and sometimes lotteries are needed for backcountry camping. We actually drank water from the streams without any treatment. It troubles me how our quality of life and spiritually has been diminished by insatiable greed and the now holy US dollar.

My father dropped out of high school, enlisted in the army infantry and spent two and a half years fighting from Normandy to the Netherlands during WWII sleeping most nights under a tank. The first lesson he taught me was that a man is only as good as his word. A hard lesson to start learning in elementary school but it has been important to me all my life. I ask that you imagine your children's children's world, and review the oath you took when becoming a County Commissioner before voting on the permit for Glade Reservoir.

Thank You

Alan Miller

Bellvue, CO 80512

970-498-9169

2057

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: NISP

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Tue, Jun 9, 2020 at 4:00 PM
To: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Please include this message in the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Larimer.org** <noreply@larimer.org>
Date: Tue, Jun 9, 2020 at 10:12 AM
Subject: NISP
To: <bocc@larimer.org>

Submitted on Tuesday, June 9, 2020 - 10:12am

Submitted by user: dana.barclay

Submitted values are:

Emailing (to) bocc@larimer.org
Subject NISP
Your Name Dana A. Barclay
Phone 9704840744
Your Email dana.barclay@gmail.com
Confirm Email dana.barclay@gmail.com
Message
Please reject NISP and support intelligent planning, water conservation, recycling, water We need intelligent planning, water conservation, recycling, water sharing agreements between cities and farms, and water efficiency upgrades. agreements between cities and farms, and water efficiency upgrades.
Privacy Setting

This form was submitted from a /contact email link on larimer.org.

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

Donba Bathory <magiamagpie@gmail.com> Tue, Jun 9, 2020 at 10:14 AM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick
Dear commissioners,
Below is the letter from my organisation, but I wish to tell you personally that I believe the time for damaging rivers to fuel growth in Colorado and the west is over. Many dams are actually being removed, as I'm sure you are aware. Short term greed will eliminate good long term life in Larimer county if you do not act in the right way now.. I'm hoping you will, and rely on you as our elected representatives.
Thanks

I'm a landowner residing in northern Larimer County, near the proposed location of Glade Reservoir, it's massive dam, forebay, pumps, pipelines, campgrounds, parking lots, boat ramps, and other facilities. We strongly urge the Board of County Commissioners to deny the 1041 permit for the Northern Integrated Supply Project because it would forever impact the fundamental nature of the rural landscape in which we live and harm our quality of life.

We choose to live in northern Colorado for its beautiful natural landscapes, its wild and scenic rivers, it's clean air and quiet surroundings, its wildlife, its opportunities for outdoor recreation on the abundant state and federal lands in the area. These are key pieces to our quality of life; key pieces that would be lost if this project is constructed and operated as proposed. Our land, water, and communities would be harmed by this project, and any benefits of the project would accrue to communities mostly outside Larimer County.

It is unacceptable that our rural northern Colorado communities must bear the impacts and unmitigable risks of this massive and ill-conceived project, the biggest ever proposed for Larimer County.

If construction is executed as planned, there would be seven years of heavy construction impacting our communities. We would be subjected to lots of heavy truck traffic, since the main artery to and from the reservoir site is Highway 287, which is also our main route; 6-days-a-week heavy traffic and heavy machinery operations, and the unwelcome, intrusive, and obnoxious presence of widespread and large-scale construction activity, noise, dust, and danger, over a long period of time. The intrusion would turn the hundreds of acres of the landscape into a construction zone, and take away the attractiveness, the clean air, the quiet – the things we depend on for health and happiness.

Northern Water is currently buying farms in northern Colorado to make up a more than 50% shortfall in the water rights needed for a successful project. In addition, recent prolonged droughts, which are becoming more common, have affected the amount of water that would be available from the Poudre River and other sources. For us, this means that we would endure the years and years of construction, and the irreparable loss of the unique landscape in which we live, all for an unfulfilled promise that "if they build it, the water would come" which is by no means guaranteed. The water shortage will only get worse as the climate dries, so Larimer County should deny this project, which will likely fail to meet its objectives. Less expensive, less destructive alternatives to water supply should be seriously considered.

Encouraging almost 400,000 visitors per year to this area would alter it from the quiet, rural and sparsely populated landscape we sought and invested in, to a busy recreational area with noise, dust, traffic, activity, accidents, and fires. Noise from motorboats on Glade would exceed state standards, would be heard miles away, and would significantly disrupt our lives. For some owners, the noise would cause property values to decline.

That's if the reservoir fills. The photographs Northern Water shows of a beautiful full reservoir are misleading at best, because the reservoir would rarely, if ever, look like that. It would generally look like an abandoned industrial facility marring the area's aesthetics.

Since the reservoir would not fill, and likely would not be full during much of its life, the project would look like an abandoned muddy puddle much of the time, and the recreational facilities would be mostly empty. Who would pay for the

upkeep of the unused recreational facilities, Larimer County taxpayers? The project ruins the aesthetics of the valley and hogbacks – a unique and beautiful landscape – for a project that would provide little or no benefit to Larimer County and in fact would negatively impact its residents and its coffers.

The project would also contribute to climate change. Over 30,000 tons per year of CO2 would be emitted by engines to pump water into Glade. Other greenhouse gases would also be produced, both during construction and operation. Air pollution would also occur due to the project, including gases that form ozone, a severe health hazard.

Dust blown from the barren shorelines would be swept up the valley on the area's strong winds and seep into our homes and further degrade our lives. The EIS states that it would take an 80-mph wind to generate any fugitive dust from the shorelines of the operating reservoir, an assertion that doesn't pass the laugh test for anyone living in this rural landscape. What else has have they got wrong? Are we to be the guinea pigs for some ill-conceived experiment?

We are very concerned about the potential for fire. We live in a high fire hazard, and we take many precautions with our homes and properties to protect against fires. Many visitors, who would be visiting in summer when the land is hottest and driest, would not be aware of how easy it is to cause a wildfire in this landscape. Some would be careless with campfires, with cigarettes, with illegal fireworks, or with firearms, and wildfires would be inadvertently ignited. Their vehicles can start fires. Unfortunately, arson is possible. Our climate is getting drier. Larimer County must recognize the seriousness of this issue and deny this permit. The county cannot simply hope for the best because our homes, our property, our animals would all be put at unacceptable risk of wildfire due to construction, high visitation, and incomplete understanding. These increased risks would also cause increased demands on local emergency services, especially fire, medical, and law enforcement.

No project this big can be undertaken without significant and irreparable impacts. We ask Larimer County to be a good steward and deny this permit and prevent the loss of open space and wildlife habitat, increased risk of wildfires and other public safety hazards, increased demands on local volunteer emergency services, noise, light pollution where now there is little, increased development and traffic in ever-widening circles around the reservoir, reduced air quality, climate change, increased illegal activities such as trespass on adjacent private land, decreased property values, and the loss of unique visual and aesthetic values. The natural and rural quality of this land is very important to our lives and communities.

Sincerely,

--
Ms Donba Bathory
magiamagpie@gmail.com
2422 obenchain road
Laporte , Colorado 80535

Save Rural NoCo Member

2060

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Deny 1041 permit application for NISP (Project No. 20-ZONE 2657)

1 message

quailspg@frii.com <quailspg@frii.com> Tue, Jun 9, 2020 at 3:51 PM
To: "bocc@larimer.org" <bocc@larimer.org>
Cc: "rhelmick@larimer.org" <rhelmick@larimer.org>

COMMISSIONERS DONNELLY, JOHNSON, and KEFALAS:

I am writing to ask that the 1041 permit for NISP be denied. Below are my reasons.

1) My concern about this project is long term. I have attended NISP open houses. I attended a lecture at CSU that explained the negative impacts on wildlife of a reduced peak flow. Over the years I have sent letters to and attended the hearings of -- and even summoned the courage to speak in front of -- City Council, Planning Commission, and County Commissioners.

2) I am not interested in mitigation. "Mitigation" means that the river will still lose and Northern Water customers (including myself) will pay for window dressing.

3) I'm not interested in the recreational opportunities that have been dangled before the public to sweeten the deal. (They are not even a certainty and, apparently, may be substantially changed or eliminated if Northern Water chooses.)

4) My highest concern is for the health of the ecosystems associated with the river.

5) My lowest concern is for the communities whose plans are to grow their population ad infinitum. Unlimited growth is so 20th century!

6) When their allotted amount of water taken annually from the Poudre has been parceled out in taps, where will these communities go next?

7) If water is a finite resource and its availability limits growth, communities will EVENTUALLY have to decide how to cope with a finite supply. Shouldn't we be retooling our approach to growth NOW -- while the river is still viable -- rather than later, when the river and its attendant ecosystems have been exhausted?

8) I am dismayed that private property is condemned for pipelines and the resulting benefits are transferred to private citizens -- housing developers, for instance -- in other communities.

9) I have never understood why the BOCC has accommodated Northern Water, favoring communities in other jurisdictions while neglecting to protect its own citizens.

10) Pleasant Valley, where my home in Bellvue is located, has been in the crosshairs of outside interests for a long time. We have endured pipeline projects in the past. They are noisy, intrusive, and leave right-of-way scars. The Pleasant Valley Pipeline crossed my own property some years back; it is not a happy memory. Thankfully, the proposed pipeline between Glade and Horsetooth is off the table -- for now. We have no guarantee that it will not return.

11) Although a major pipeline has, on paper, been rerouted and avoids Bellvue, it is now set to run along HWY 287 for a stretch, about three quarters of a mile from my house. Since I can plainly hear traffic from the highway (these days loud and seemingly continual), I shudder to think about construction noise. And what of the equipment and supply trucks traveling to the reservoir construction site? And for how many years?

12) I have lived in Bellvue for the past forty years. Although my house is three quarters of a mile away, in quiet moments I can hear the Poudre roar during periods of high runoff. It's one of the dwindling amenities here; drought, fire, ridgeline building, increased traffic, and expanded commercial endeavors have substantially eaten away our quality of life. The Glade Reservoir project is guaranteed to do more of the same.

DONNA BRAGINETZ
3817 N. County Rd. 25E
Bellvue, CO 80512
(970) 484-7402

2062

Rob Helmick <helmicrp@co.larimer.co.us>

Concerns regarding the Northern Integrated Supply Project (NISP) 1041 Permit Application

1 message

Jon Elliott <jonwelliott@gmail.com> Tue, Jun 9, 2020 at 12:47 PM
To: rhelmick@larimer.org, bocc@larimer.org

Mr. Helmick,

Please find the attached letter stating my concerns, as a Larimer County resident, regarding the NISP Glade Reservoir 1041 application. I appreciate that this letter will be included in the Planning Commission's hearing packet.

Thank you,
Jon Elliott
3725 S Bar G Lane
Fort Collins, Co 80524

NISP Letter_6-9-2020.pdf
221K

To: Mr. Rob Helmick, Larimer County Planning Commission
CC: The Board of County Commissioners

From: Jonathan Elliott
3725 S Bar G Lane
Fort Collins, CO 80254

Date: 6/9/2020

Re: Concerns regarding the Northern Integrated Supply Project (NISP) 1041 Permit Application

Mr. Helmick,

As a Larimer County resident, I am writing to express my concerns regarding information included in the NISP 1041 application and that should be considered before approval.

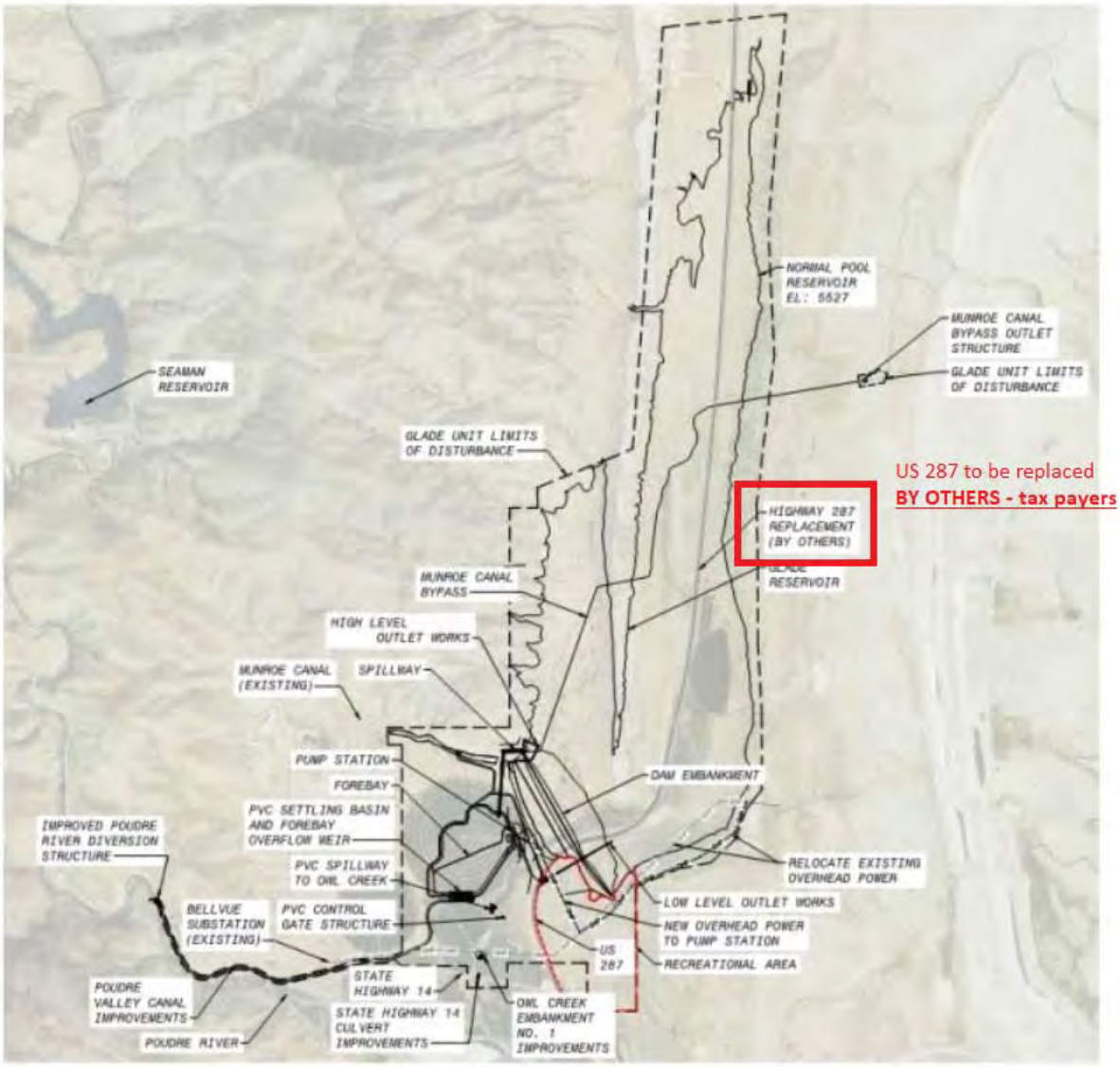
1) My first concern is that none of the residents on S Bar G Lane (e.g. the S Bar G Conservation Development) which is located on West Douglas Road just east of Eagle Lake were made aware, in writing, of the 1041 application submission, review hearings or deadlines to provide comment on this matter. I was made aware of today's deadline for comments via email by a resident of Eagle Lake.

2) Secondly, the NISP document entitled "Larimer County Analysis – Supplement 1 to Technical Memorandum No. 9 Traffic Impact Study" and dated April 28, 2020 shows (see image attached on next page) that US highway 287 is to be replaced ***'BY OTHERS'***. Since this highway is a federal and state travel route, the 'others' indicated here in this case are tax payers who are supplying funding that is distributed via the Federal Highway Administration and State DOTs. The cost to relocate US highway 287 should fall on those who receive the direct benefit of water from the Glade Reservoir project and not the tax payer in general.

3) I feel it's important that NISP better/further explain how they forecast the proposed recreation income that will be generated by the NISP project for Larimer County. Since this could be a benefit for Larimer county residents, a better description to validate the economic forecast of recreation income that the reservoir will create should be provided before a 1041 application is approved. The benefit of recreation income for the county generated by this project is a major *'selling point'*, and more attention should be given to guarantee the accuracy of claims made regarding this matter by NISP in the application.

Thank you for considering these concerns and including them in the public record.

Jonathan Elliott
3725 S Bar G Lane
Fort Collins, CO 80254



NISP Document: Larimer County Analysis – Supplement 1 to Technical Memorandum No. 9 Traffic Impact Study" and dated April 28, 2020

Page 2; Figure 1 – Glade Unit Overview

Mr. Helmick,

Please find the attached letter stating my concerns, as a Larimer County resident, regarding the NISP Glade Reservoir 1041 application. I appreciate that this letter will be included in the Planning Commission's hearing packet.

Thank you,
Jonathan Elliott
3725 S Bar G Lane
Fort Collins, Co 80524

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

Julee Dettenwanger <jdettenwanger@gmail.com> Tue, Jun 9, 2020 at 4:01 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

I'm a landowner residing in northern Larimer County, near the proposed location of Glade Reservoir, it's massive dam, forebay, pumps, pipelines, campgrounds, parking lots, boat ramps, and other facilities. We strongly urge the Board of County Commissioners to deny the 1041 permit for the Northern Integrated Supply Project because it would forever impact the fundamental nature of the rural landscape in which we live and harm our quality of life.

We choose to live in northern Colorado for its beautiful natural landscapes, its wild and scenic rivers, it's clean air and quiet surroundings, its wildlife, its opportunities for outdoor recreation on the abundant state and federal lands in the area. These are key pieces to our quality of life; key pieces that would be lost if this project is constructed and operated as proposed. Our land, water, and communities would be harmed by this project, and any benefits of the project would accrue to communities mostly outside Larimer County.

It is unacceptable that our rural northern Colorado communities must bear the impacts and unmitigable risks of this massive and ill-conceived project, the biggest ever proposed for Larimer County.

If construction is executed as planned, there would be seven years of heavy construction impacting our communities. We would be subjected to lots of heavy truck traffic, since the main artery to and from the reservoir site is Highway 287, which is also our main route; 6-days-a-week heavy traffic and heavy machinery operations, and the unwelcome, intrusive, and obnoxious presence of widespread and large-scale construction activity, noise, dust, and danger, over a long period of time. The intrusion would turn the hundreds of acres of the landscape into a construction zone, and take away the attractiveness, the clean air, the quiet – the things we depend on for health and happiness.

Northern Water is currently buying farms in northern Colorado to make up a more than 50% shortfall in the water rights needed for a successful project. In addition, recent prolonged droughts, which are becoming more common, have affected the amount of water that would be available from the Poudre River and other sources. For us, this means that we would endure the years and years of construction, and the irreparable loss of the unique landscape in which we live, all for an unfulfilled promise that "if they build it, the water would come" which is by no means guaranteed. The water shortage will only get worse as the climate dries, so Larimer County should deny this project, which will likely fail to meet its objectives. Less expensive, less destructive alternatives to water supply should be seriously considered.

Encouraging almost 400,000 visitors per year to this area would alter it from the quiet, rural and sparsely populated landscape we sought and invested in, to a busy recreational area with noise, dust, traffic, activity, accidents, and fires. Noise from motorboats on Glade would exceed state standards, would be heard miles away, and would significantly disrupt our lives. For some owners, the noise would cause property values to decline.

That's if the reservoir fills. The photographs Northern Water shows of a beautiful full reservoir are misleading at best, because the reservoir would rarely, if ever, look like that. It would generally look like an abandoned industrial facility marring the area's aesthetics.

Since the reservoir would not fill, and likely would not be full during much of its life, the project would look like an abandoned muddy puddle much of the time, and the recreational facilities would be mostly empty. Who would pay for the upkeep of the unused recreational facilities, Larimer County taxpayers? The project ruins the aesthetics of the valley and hogbacks – a unique and beautiful landscape – for a project that would provide little or no benefit to Larimer County and in fact would negatively impact its residents and its coffers.

The project would also contribute to climate change. Over 30,000 tons per year of CO2 would be emitted by engines to pump water into Glade. Other greenhouse gases would also be produced, both during construction and operation. Air

pollution would also occur due to the project, including gases that form ozone, a severe health hazard.

Dust blown from the barren shorelines would be swept up the valley on the area's strong winds and seep into our homes and further degrade our lives. The EIS states that it would take an 80-mph wind to generate any fugitive dust from the shorelines of the operating reservoir, an assertion that doesn't pass the laugh test for anyone living in this rural landscape. What else has have they got wrong? Are we to be the guinea pigs for some ill-conceived experiment?

We are very concerned about the potential for fire. We live in a high fire hazard, and we take many precautions with our homes and properties to protect against fires. Many visitors, who would be visiting in summer when the land is hottest and driest, would not be aware of how easy it is to cause a wildfire in this landscape. Some would be careless with campfires, with cigarettes, with illegal fireworks, or with firearms, and wildfires would be inadvertently ignited. Their vehicles can start fires. Unfortunately, arson is possible. Our climate is getting drier. Larimer County must recognize the seriousness of this issue and deny this permit. The county cannot simply hope for the best because our homes, our property, our animals would all be put at unacceptable risk of wildfire due to construction, high visitation, and incomplete understanding. These increased risks would also cause increased demands on local emergency services, especially fire, medical, and law enforcement.

No project this big can be undertaken without significant and irreparable impacts. We ask Larimer County to be a good steward and deny this permit and prevent the loss of open space and wildlife habitat, increased risk of wildfires and other public safety hazards, increased demands on local volunteer emergency services, noise, light pollution where now there is little, increased development and traffic in ever-widening circles around the reservoir, reduced air quality, climate change, increased illegal activities such as trespass on adjacent private land, decreased property values, and the loss of unique visual and aesthetic values. The natural and rural quality of this land is very important to our lives and communities.

Sincerely,

--
Mrs Julee Dettenwanger
jdettenwanger@gmail.com
1197 Shadow Ridge Rd
Laporte, CO 80535

Save Rural NoCo Member

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 permit

1 message

JOHN MCKEAN <AG_ENT@msn.com> Tue, Jun 9, 2020 at 12:55 PM
To: "pcboard@larimer.org" <pcboard@larimer.org>, JOHN MCKEAN <ag_ent@msn.com>

The new principles and requirements for cost-benefit (CBA) of federal water-related projects

In 2014, **t**he federal rules for applying CBA to water resources (U.S. Water Resources Council, 1983) were replaced by the U.S. Council on Environmental Quality (Mar. 2013, Dec. 2014) as required by Congress (Water Resources Development Act Section 2031, 2007). The rules were updated to be consistent with the CBA protocol already required for other types of federal actions, such as regulations. A critical modification in the new water resources CBA protocol is to require the measurement of non-use economic values explicitly.

In 2014, the replacement was finalized for the 1983 *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*. The new CBA protocol is defined (partly) in two documents created by the U.S. Council on Environmental Quality, *The Principles and Requirements* (Mar. 2013), and *Chapter III Interagency Guidelines* (Dec. 2014). Most important, *Circulars A-4* and *A-94* (U.S. Office of Management and Budgets, 1992, 2003) are referenced in *Chapter III* where it states, ″Monetization should follow sound economic principles and practices (See OMB *Circulars A-94* and *A-4* for examples of currently accepted monetization practices . . .” (*Circular A-4* explicitly requires the measurement of existence and bequest values.) The new requirements protocol is more concisely described in a single U.S. Department of Interior (July 2015) publication, *Agency Specific Procedures for Implementing the Council on Environmental Quality's Principles, Requirements and Guidelines for Water and Land Related Resources Implementation Studies*. The new rules for analyzing water-related projects have great significance because CBA's are now required to include non-use values (existence, bequest, and option value) for the effects of a federal water project. Most important, secondary sources for the non-market benefit estimates (benefit transfer) are not allowed for significant water projects.

An example of the required measurement of non-market benefits and costs is the final report dated April 2008, *Estimating the Economic Benefits of Maintaining Peak Instream Flows in the Poudre River through Fort Collins, Colorado* by Dr. John Loomis.

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 Permit Application; Project No. 20-ZONE 2657

1 message

Joel Meeter <joelmeeter@gmail.com> Tue, Jun 9, 2020 at 1:59 PM
To: bocc@larimer.org, rhelmick@larimer.org
Cc: Carole Meeter <carolemeeter@gmail.com>

Dear Larimer County Commisioners Kefalas, Johnson, and Donnelly,

We live in the Bonner Spring Ranch Area near the sight of the proposed Glade Reservoir. We strongly urge the Board of County Commissioners to **deny** the 1041 permit for the Northern Integrated Supply Project.
It would forever impact the fundamental nature of the rural landscape in which we live and harm our quality of life.

- We will have to live for seven years (at least) next to a massive construcon pr oject, with noise, dust, poluon, and tr affic delays.
- It will divert water from the, already stressed, Poudre River during the cric al spring run off. This is cric al to clean the river of sediment and maintain river health.
- It will bring thousands of visitors to our peaceful area with motor boats, jet skis, lots of noise and traffic. With it will come more chances of wildfire.
- It's primary benefit is to developers, mostly not in Larimer County, who will get rich and we the residents will bear the burden of this reservoir for their profit.
- It will encourage more irresponsible and uncontrolled growth and sprawl of which our roads and infrastructure already can not keep up with.
- There is a high likelihood that the reservoir will be only half full or empty most of the me cr eang an ugly, dusty mud puddle. Northern Water does not even have the required water rights needed.
- There are other water conservaon measur es that could be taken to allow responsible, controlled, development along the front range.

For these reasons and more we ask that you deny the 1041 permit and protect the residents of Larimer County.

Sincerely,

Joel and Carole Meeter
3264 Bonner Springs Ranch Rd
Laporte CO 80535

2069

Rob Helmick <helmicrp@co.larimer.co.us>

NISP Comments for the Record

1 message

K Artell <artellme2@gmail.com> Tue, Jun 9, 2020 at 1:21 PM
To: "pcboard@larimer.org" <pcboard@larimer.org>, jkefalas@larimer.org, Steve Johnson <swjohnson@larimer.org>, "tdonnelly@larimer.org" <tdonnelly@larimer.org>

Hello Larimer County Planning Commission and County Commissioners

Please take care regarding Northern Water's proposed pipelines through Larimer County.

I think Poudre River water should be left in the River through Fort Collins to be picked up by a pipeline east of I-25.

The County Commissioners declined to approve Thornton's pipeline which seems to be a similar route through Larimer County as the NISP Pipeline. Is the NISP Pipeline different?

The second additional Poudre Delivery Pipeline is touted by Northern Water as bringing water directly to the Poudre River and through Fort Collins with water being picked up east of Fort Collins. Please note the route of the Poudre Delivery Pipeline (see attached maps and links below). The Pipeline starts in the Homestead Natural Area in Fort Collins and the Pump Station is in the Kingfisher Natural Area in Fort Collins and takes a route through Kingfisher and River Bend Natural Areas as the pipeline heads southeast past I-25. The route is not "east of Fort Collins" as Northern Water claims on its NISPTalk page. The route goes through Fort Collins natural areas within City limits and the City's GMA area.

The Poudre Delivery Pipeline route is detrimental to the Natural Areas on which taxpayers have spent $millions to improve the health of the Poudre River, riparian areas, wildlife and recreation. As you know the health of Larimer County depends in part on the health of the Poudre River. The detriment to the River and Natural Areas includes pipeline construction with accompanying noise and air quality impacts on wildlife and area residents and businesses and includes Northern Water's permanent easement along the pipeline route. How can Northern Water mitigate the damage done to the Poudre River and surrounding area?

How does running a pipeline through Natural Areas and the River's riparian area "provide positive benefits to the river corridor and enhance the aquatic and riparian environment" as Northern Water claims? The proposed pipeline should be changed and ideally the water should run through in the Poudre River to be picked up east of I-25.

City of Fort Collins map of pipeline through Larimer County
https://www.fcgov.com/nispreview/files/nisp-alignment-gma.pdf?1587655316
https://www.fcgov.com/nispreview/files/nisp-pipes-on-nad-properties.pdf?1587410652
Found here https://www.fcgov.com/nispreview/

Thank you for your consideration.

2 attachments

nisp-alignment-gma.pdf
1117K

nisp-pipes-on-nad-properties.pdf
397K

2070

Rob Helmick <helmicrp@co.larimer.co.us>

NISP public comments

2 messages

Kathy Cosgrove Green <kathycos@frii.com> Tue, Jun 9, 2020 at 4:20 PM
To: pcboard@larimer.org
Cc: bocc@larimer.org

Hello,

My concerns include, but are not limited to, the following:

1. Damning the wild and scenic river, the Poudre, would be heartbreaking. The people who follow us will question how we could have allowed this to happen.

2. People can move to where there is water. We do not need to support people who want to move where there is no water. "Get the water and they will come". Is that what we want?

3. Do we want to give up the Poudre for developers to make money and build houses in the Denver metro area?

4. What is the benefit to we who live in Fort Collins area? I'm waiting, waiting, for the answer.

5. Our friends and neighbors, your constituents will be subject to years of inconvenience and construction for something with no benefit to them.

6. The relocation of #287 must be addressed in the 1041. Why is the cost no longer discussed in the 1041? Why should taxpayers pay for huge road costs that are only needed because of sending water south to the Denver area?

7. The relocation of #287 will bring increased risk to those who travel on the highway, and it is already a dangerous road, as shown by accidents and deaths.

8. What about the power that this whole project will need? And the environmental costs?

9. Where is the proof that the benefits are worth the costs of this project?

Thank you for hearing my concerns,

Kathy Cosgrove Green

Linda Hoffmann <hoffmalc@co.larimer.co.us> Tue, Jun 9, 2020 at 4:38 PM
To: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Please include this message in the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

[Quoted text hidden]

2071

Rob Helmick <helmicrp@co.larimer.co.us>

NISP, Glade Reservoir, ad 54" Pipeline BAD for Fort Collins and the Planet

1 message

Kathie Dudzinski <bikeskik@gmail.com> Tue, Jun 9, 2020 at 10:20 AM
To: pcboard@larimer.org
Cc: bocc@larimer.org, No Pipe Dream <info@nopipedream.com>

To Whom it may concern:

As residents of Terry Point in Larimer County just north of Fort Collins for the last 47 years, we have been horrified to watch the Poudre River dwindle as cities downstream extract its water for increased development.

We have watched the county struggle to pay for important projects.*

Not only have we paid our taxes to Larimer County, as ardent supporters of "No Pipe Dream", we have found it necessary to donate to help pay for lawyers to prevent water being pulled from the Poudre upstream, and being diverted through a 54" Pipeline near us destined for Thornton. As NISP is being proposed to support even more development, we are ardently against it. Decreased snowpack due to global warming has already decreased the Poudre's flow, and this will get worse. No more water should be pulled from the river! Healthy flows of the river as described by Save the Poudre are exceptionally important and must be addressed.

We totally agree with and thank Bobbi Norman for her detailed letter describing the deficiencies in NISP's 1041 Glade Reservoir application.

Highlights which need to be addressed in its application for the 1041:

Negative impact on health and safety:

* The fact that NISP has passed on the **cost** on to **Larimer County of relocating HWY 287**… necessary only for its own specific project is totally unfair and ridiculous, and the **reroute** places the highway in **much less safe terrain**.

It is frightful to imagine water being contaminated by carcinogenic compounds in a plume at the base of the Glade Dam from the DoD Nuclear Missile site, of the Dam, with its weight and that of the water against it being set above 2 large earthquake prone faults.

Other negative impacts:
The huge demand for power to pump the water from the Poudre into the reservoir and the related huge transmission towers and power lines with similarity to the size of Glen Canyon Dam is inconsistent with the quality of life Larimer County stands for…and is NOT for the benefit of Larimer County residents, but for yet unbuilt (and unnecessary) congestion downstream.

In order for Glade Reservoir to be filled, hundreds of farms in Weld County need to be purchased which has not yet been done.

That mitigation is not being addressed at this point, and is being put off for 30 years is unfathomable! It must be totally addressed NOW in the1041.

This proposal will have a much greater impact on the Poudre River, Larimer County and the whole state of Colorado than was considered when first imagined.

THERE IS NO PLACE IN THE 21ST CENTURY FOR SUCH A PLAN AS NISP!!
Do not allow approval of the 1041 application!

LET US REMEMBER, THE QUANTITY OF WATER IS DECREASING AS THE POPULATION IS INCREASING. We must be careful with water use!

Sincerely, Kathie and Paul Dudzinski

3309 Canadian Parkway,
Fort Collins, CO 80524

2073

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 Permit Application; Project No. 20-ZONE 2657

1 message

julia klein <jklein.csu@gmail.com> Tue, Jun 9, 2020 at 2:17 PM
To: jkafalas@larimer.org, swjohnson@larimer.org, tdonnelly@larimer.org, rhelmick@larimer.org, bocc@larimer.org

Dear Commissioners and Mr. Hemlock -

Please see my attached letter/comments regarding the NISP 1041 permit.

Thank you so very much for your service to our community.

Sincerely,

Julia Klein

Klein_Commissioners_DenyNISP1041.pdf
94K

Julia A. Klein, PhD
1638 N Greyrock Road
Laporte, CO 80535

June 9, 2020

Larimer County Board of County Commissioners + Planning Staff
200 West Oak Street, Suite 3100, PO Box 1190
Fort Collins, CO 80521

Dear Commissioners Johnson, Kefalas, and Donnelly,

I am a landowner residing in northern Larimer County and own two properties near the proposed location of Glade Reservoir and its associated massive infrastructure**. I am strongly opposed to this project and urge the Board of County Commissioners to deny the 1041 permit for the Northern Integrated Supply Project. This project will harm the environment of Larimer county and the livelihoods and quality of life of its residents.**

I live in northern Colorado because I value the rural landscapes, wildlife, recreation and public lands, including the Poudre River. The land, water and communities in Larimer County will be harmed by Glade Reservoir, with any benefits being realized mostly outside Larimer County.

I oppose this project for many reasons. Below I highlight just a few:

- increased **wildfire** risk during construction and due to recreation and camping around Glade.
- multiple years of **construction – nuisance** for getting to my workplace and my children to school; **dust, noise, air quality, contributions to climate change**, among other issues.
- addressing our critical water issues in the county requires **conservation, smart growth, and addressing climate change – not Glade**. Analysis reveals this won't be anything like Horsetooth in terms of recreation – it won't even be full much of the time.
- the Poudre River is our local treasure and it is already overallocated**. This Wild and Scenic River defines our community, unites us, is a source of life and livelihood and physical/spiritual survival for this community. Please don't take this away from us.**

I agree with the conclusion of Save Rural NOCO:

"No project this big can be undertaken without significant and irreparable impacts. We ask Larimer County to be a good steward and deny this permit *and prevent the loss of open space and wildlife habitat, increased risk of wildfires and other public safety hazards, increased demands on local volunteer emergency services, noise, light pollution… increased development and traffic… reduced air quality, climate change, increased illegal activities such as trespass…, decreased property values, and the loss of unique visual and aesthetic values… The natural and rural quality of this land is very important to our lives and communities."*

Sincerely,

Julia A. Klein

Julia Klein

2075

Rob Helmick <helmicrp@co.larimer.co.us>

NISP - Objection to 1041 Application

1 message

Kratt, Christine <christine.kratt@bms.com> Tue, Jun 9, 2020 at 11:12 AM
To: "jkefalas@larimer.org" <jkefalas@larimer.org>, "swjohnson@larimer.org" <swjohnson@larimer.org>, "tdonnelly@larimer.org" <tdonnelly@larimer.org>, "rhelmick@larimer.org" <rhelmick@larimer.org>, "bocc@larimer.org" <bocc@larimer.org>

07 June 2020

Letter re: NISP 1041 Application

Dear County Commissioners Donnelly, Kefalas and Johnson and Mr. Rob Helmick -

I would like to thank you for the opportunity to voice my thoughts regarding the NISP Reservoir and Pipeline. I respectfully request that you deny approval of the 1041 application. Most notably, because there are significant engineering flaws and a very viable alternative which is clearly less expensive, safer, and overall less damaging to private land owners and county residents. I am in support of Dr. Tom Sale's subsurface water storage and recovery solution as the most practical alternative. An alternative that can work! Additionally, as with the Thorton proposal, there is a pipeline component that is very concerning. Please support Larimer county residents and ensure that private properties are not utilized. Such destruction would be completely reckless. If pipeline is necessitated, pathways should ONLY be permitted if impacted lands are publically owned or owned by applicant explicitly for such purpose or existing utility infrastructure is leveraged without additional harm.

I come to you as a Doctor of Veterinary Medicine of 25 years with special expertise in preserving rare and endangered wildlife and ensuring we can co-exist with our animal friends. I am writing specifically to ensure our protected areas, conservation land, agricultural land are protected as they were designed to be protected! The entire S Bar G neighborhood was specifically built according to conservation guidelines. I live at 4100 S Bar G Lane and have worked hard to create my land and home as a sanctuary for rare birds and wildlife (38.5 acres). My property as well as adjoining land owned by Woody Creek subdivision has received a distinguished designation of Important Bird Area (IBA) by the National Audubon Society making it off-limits to destructive activity. (See documentation attached.) It is one of the few in Larimer County outside of Fort Collins that is home to the rare Mountain Bluebird (a very sensitive species to urban /suburban sprawl and development) and a breeding pair of Great Horned Owls. The Great Horned owl pair has taken sanctuary on my land for 4 years running as their primary territory and nesting site. These federally protected birds of prey have 2-3 owlets each year. My land which I maintain as pristine protected habitat also includes Black Lake which I maintain as an untouched marshland of shallow water. All in all provides appropriate diversity of unique habitats, food, shelter and water availability. The inventory of birds on the land is ever growing and includes also blue herons, Canada geese, seagulls, mallard ducks, rarer wood ducks, Bald eagles, nesting Red Tailed Hawks, red winged black birds, flickers, pelicans, 20+ identified songbirds and more!

Furthermore, I have preserved 8 acres of my land as a long standing naturally established Milkweed plot such that the struggling Monarch Butterfly has a safe and reliable place to reproduce in summer as they are exclusively dependent on the one and only Milkweed plant. I am also conducting a 10-year study for the endangered Jumping Mouse with Wildlife biologists from CSU. We are tracking this rare endangered species through conduct of an annual inventory of my property.

With this as well as some critical issues regarding severely unstable soils on the land and neighboring homes(Eagle Lake, Woody Creek, S Bar G) and the precarious water movement throughout, I object to any invasion of such activity on my property as my neighbors do with theirs; it would be catastrophic to all! I also depend on the subirrigation to stay as is

for the my haying and pasturing of my livestock. This is a rare protected piece of property which could NEVER return to normalcy if a pipeline passed through it. Mammals such as foxes, bobcat and Colorado mink would also be negatively impacted and would be displaced. This is my property and the only one I can protect. I intend to do so! If NISP (and Thorton) wish to create destruction through Larimer County, please have them do it by utilizing their own property, existing infrastructure if/where it already exists, innovative solutions for water collection. We don't need another reservoir and we certainly don't need a pipeline. Let's keep Larimer County a refuge for animals and unique species that live with us.

Much thanks for your support.

Best,

Christine Kratt, DVM

4100 S Bar G

Fort Collins, CO 80524

Cell 970-219-0881

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2 attachments

KRATT and WATER DEVELOPMENT LETTER FINAL.pdf
254K

Kratt Wildlife Sanctuary - Protected Land June 2020.pdf
2024K

Audubon ROCKIES
SCIENCE EDUCATION POLICY
National Audubon Society ~ Serving Wyoming and Colorado

Regional Office
116 N. College Ave., Suite 1
Fort Collins, CO 80524
Phone: 970.416.6931
http://rockies.audubon.org

August 9, 2017

To: Lairmer County Planning, Larimer County Commissioners and City of Thoroton;

Audubon Rockies is writing this letter to express our deep concern regarding any possible water pipeline project along or through the Kratt Acreage Important Bird Area (IBA). It has come to our attention that the Kratt Acreage is within a corridor in consideration by City of Thorton. Such potential development plans could have detrimental effects on the birds and other wildlife using The Kratt Acreage IBA.

The Kratt Acreage was recently identified as an Important Bird Area by Audubon Rockies. Audubon Rockies' Important Bird Areas program has developed an inventory of the *key sites* within Colorado that support a significant abundance and diversity of birds including breeding, wintering and/or migrating birds. The Kratt Acreage property is one of 55 sites totaling more than 1.3 million acres of land and water that is a critical part of our bird habitat and conservation network. For a site to be identified as an Important Bird Area it must meet one or more of a set of standardized criteria that were developed by a committee of bird experts from throughout the state. Each nominated site is reviewed and determined whether or not it meets the criteria based on the ornithological and habitat data submitted.

Audubon Rockies determined that the Kratt Acreage met the established Important Bird Areas designation criteria. This site is considered important because it supports special-concern species and unique habitat within Colorado. To this point, Audubon Rockies would like to express our concern with the potential water pipe project and the effects it may have on the Kratt IBA. Due to the fact that the property serves as migratory stopover, feeding and breeding ground for a host of waterfowl, shorebird and songbird species couple with the existing development surrounding the area, we believe that if disturbed, the birds and other wildlife could be negatively impacted. Specifically, Audubon's concerns include:

1. Further disturbance to numerous nesting, foraging and migrating shorebirds, raptors, waterfowl and songbirds in an already fragmented landscape. Due to urban and suburban sprawl of Fort Collins, the Kratt Acreage IBA provides a unique and much needed refuge for these birds. This includes the very sensitive Western Bluebird which has been utilizing the property for over the last 15 years as well as Federally Protected birds of prey (Great Horned Owls, Bald Eagles, Red Tailed Hawks and various other raptors).
2. Potential disturbance of the existing water table and thus impacts on bird habitat. The property includes Black Lake, a reliable and currently stable water source in a very complex geology including designated wetland areas, Woody Creek to the north, a natural spring to the east an irrigation ditch within the property's perimeter.

In conclusion, Audubon Rockies is very concerned over the potential impacts the potential project could have on this environmentally sensitive area. Given the species of concern documented using the area (I.e. Bald Eagle, Great Blue Heron and Red-tailed Hawk, Mountain Blue Bird, etc.) we would like the opportunity to discuss the impacts the development could have on our native wildlife before the project location is determined.

Sincerely,

Alison Holloran
Executive Director, Audubon Rockies
Vice President, National Audubon Society

IMPORTANCE OF CONSERVING AND PROTECTING WILDLIFE HABITAT AND AGRICULTURAL LAND

Objection to NISP 1041 application

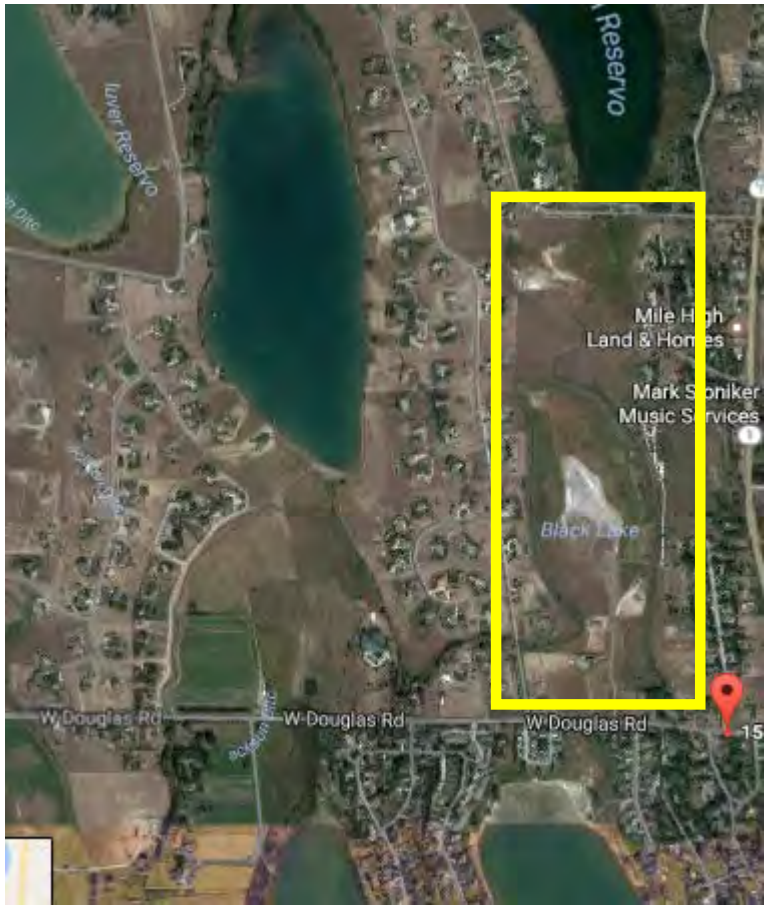
07 June 2020

Christine Kratt, DVM

Conservation Development, Agricultural land and Important Bird Areas

- Several developments have worked diligently to adhere to Conservation Development standards of Larimer County.
- Between agricultural land, conservation developments, and designated protected areas, we have well-established wildlife and bird corridors of which the Kratt Wild Sanctuary plays a big part.
- Only two areas in Larimer County have the Important Bird Area (IBA) designation by Audubon Society… and we in North Fort Collins have one of them! Kratt Wild Sanctuary and adjoining Wood Creek, dedicated to protecting sensitive bird habitats.

Important Bird Area



Audubon ROCKIES
SCIENCE EDUCATION POLICY

116 N. College Avenue, Suite 1
Fort Collins, CO 80524
Phone: 970.416.6931
rockies.audubon.org

May 1, 2017

Ms. Christine Kratt
4100 S Bar G Lane
Fort Collins, CO 80524

Dear Ms. Kratt;

It is my honor and privilege to congratulate you and the Kratt Acreage on being accepted and identified as an Important Bird Area. Audubon Rockies' Important Bird Areas program has developed an inventory of the *key sites* within Colorado that support a significant abundance and diversity of birds including breeding, wintering and/or migrating birds. Your property is one of 55 sites totaling more than 1.3 million acres of land and water and is a critical part of our bird habitat and conservation network.

For a site to be identified as an Important Bird Area (IBA) it must meet one or more of a set of standardized criteria that were developed by a committee of bird experts from throughout the state. Each nominated site is reviewed and determined whether or not it meets the criteria based on the ornithological and habitat data submitted.

The Important Bird Areas program is a program of the National Audubon Society and has *no regulatory authority* with no regulations attached to sites that receive IBA designation. Rather, Audubon Rockies looks forward to working with you in protecting the birds, water and critical habitat provided by the ranch ecosystem.

Audubon Rockies has determined that the Kratt Acreage has met the established Important Bird Areas designation criteria. This site is considered important because it supports special-concern species, other high conservation priority species, unique habitat, and significant concentrations of land birds, waterfowl, and shorebirds within Colorado. We recognize that your stewardship of the land has contributed to it being a location where these birds have and will continue to thrive. We hope to support your stewardship efforts and to find unique opportunities to work cooperatively to ensure that sites like Kratt Acreage IBA remain areas that are important sanctuaries for birds as well as much needed riparian habitat.

Congratulations again on being selected. Please feel free to contact me with any questions or concerns you may have regarding the IBA Program.

Sincerely,

Alison Holloran
Executive Director, Audubon Rockies
Vice President, National Audubon Society

Audubon Rockies' Philosophy
Working to protect birds and their habitat in Wyoming and Colorado.
Where birds thrive, people prosper.

Audubon ROCKIES
SCIENCE EDUCATION POLICY

116 N. College Avenue, Suite 1
Fort Collins, CO 80524
Phone: 970.416.6931
rockies.audubon.org

May 1, 2017

BOARD OF DIRECTORS

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Emeritus, Geologist

Rob Stumbaugh,
Principal,
Four Pines Advisors

William Wheeler,
Managing Member,
Raptor Ridge Farm, LLC

Woody Creek HOA
Fort Collins, CO 80524

Dear Woody Creek HOA;

It is my honor and privilege to congratulate you and the 20 acres encompass by Woody Creek HOA on being accepted and identified as an Important Bird Area. Audubon Rockies' Important Bird Areas program has developed an inventory of the *key sites* within Colorado that support a significant abundance and diversity of birds including breeding, wintering and/or migrating birds. Your property is one of 55 sites totaling more than 1.3 million acres of land and water and is a critical part of our bird habitat and conservation network.

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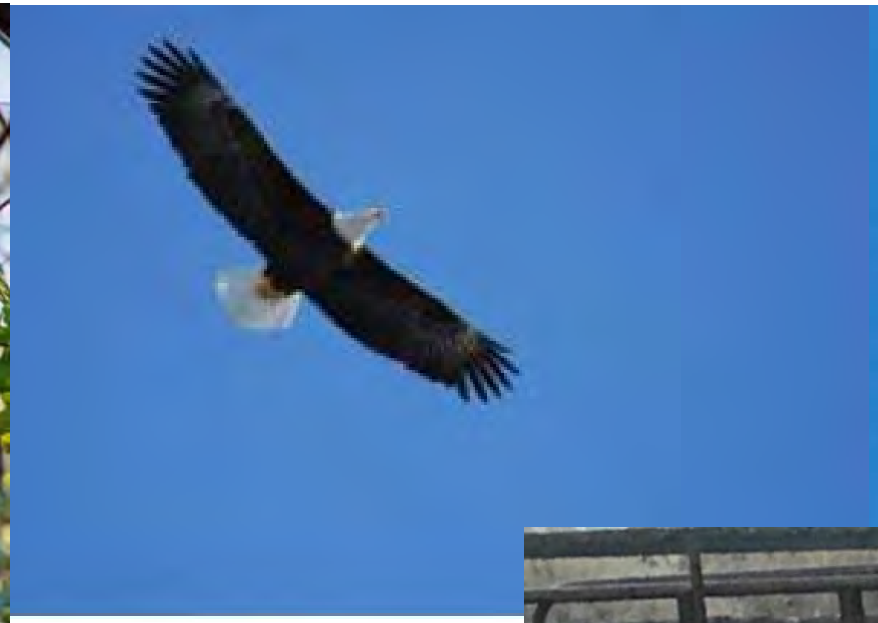
Audubon Rockies has determined that the site has met the established Important Bird Areas designation criteria. This site is considered important because it supports special-concern species, other high conservation priority species, unique habitat, and significant concentrations of land birds, waterfowl, and shorebirds within Colorado. We recognize that your stewardship of the land has contributed to it being a location where these birds have and will continue to thrive. We hope to support your stewardship efforts and to find unique opportunities to work cooperatively to ensure that sites like Woody Creek HOA IBA remain areas that are important sanctuaries for birds as well as much needed riparian habitat.

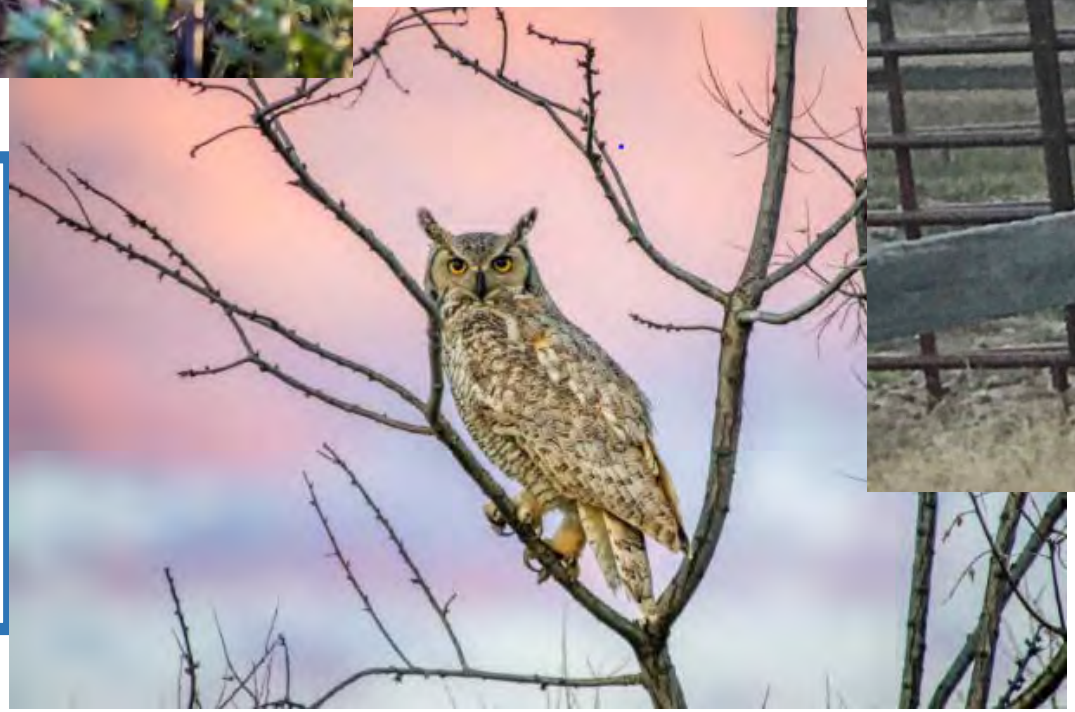
Congratulations again on being selected. Please feel free to contact me with any questions or concerns you may have regarding the IBA Program.

Sincerely,

Alison Holloran
Executive Director, Audubon Rockies
Vice President, National Audubon Society

Audubon Rockies' Philosophy
Working to protect birds and their habitat in Wyoming and Colorado.
Where birds thrive, people prosper.





Birds of Prey – Federally protected:

Great Horned Owls (and numerous babies each year)
Bald eagles
Red Tailed Hawks
Gryfalcons

BCC 08/17/20

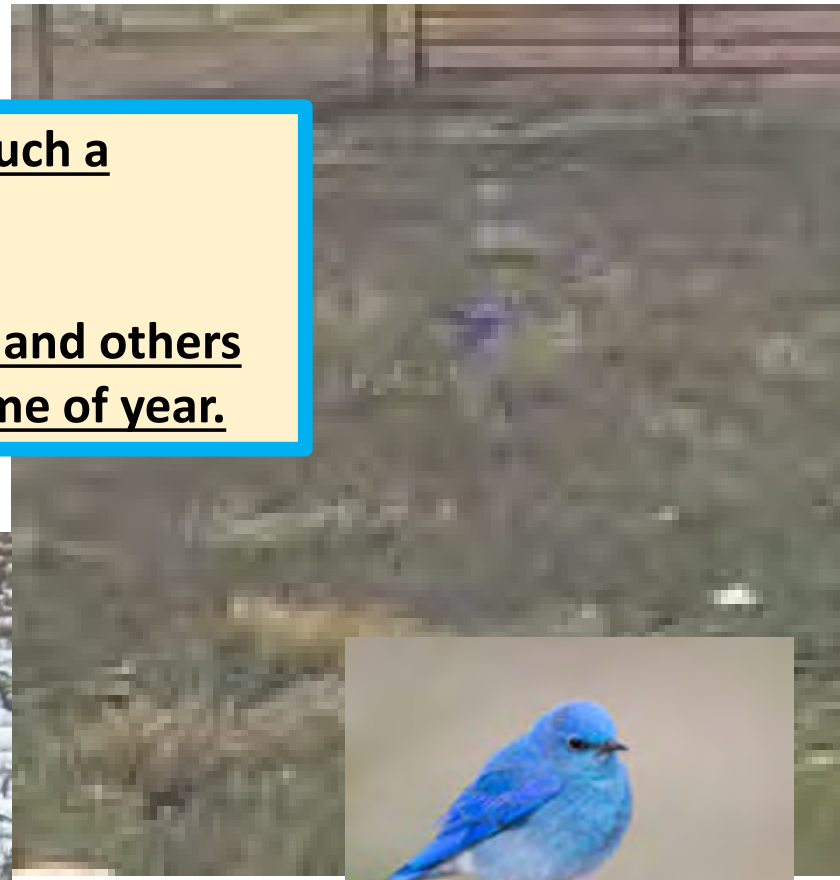
NISP

2081

BCC 08/17/20

Mountain Blue Birds are always such a beautiful sight:

Plus numerous blackbirds, robins and others live in 100s here depending on time of year.



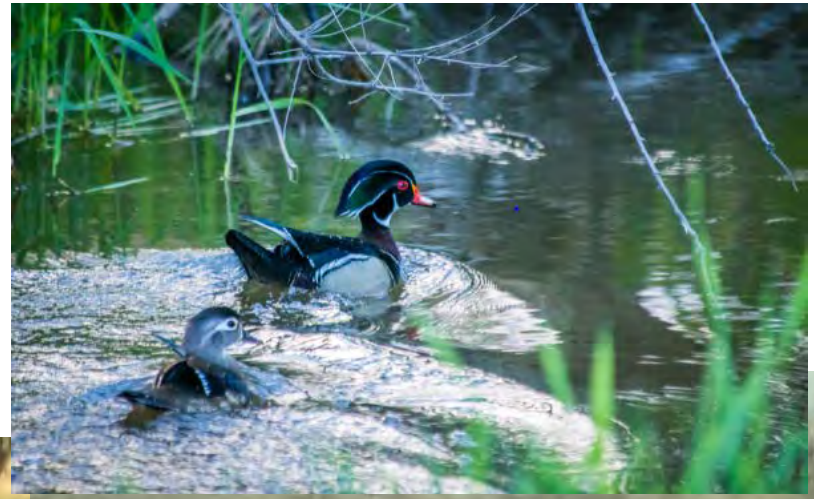
NISP

2082

Canada Geese, Herons and Ducks:

Geese in several 100s at a time eat and stay on black lake and migrate through. Geese, Mallard ducks and Wood ducks all build nests and raise young here! Lots of herons seen in ditch….year round.Fly over, between reservoirs

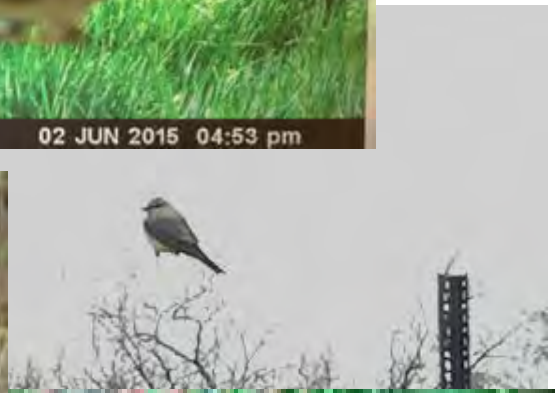
Also: Pelicans (white ones)



Numerous Song Birds and Others:

BCC 08/17/20

Finches
Songbirds
Robins
Black Birds (love the cat tails in the ditch and wetland areas)
Flickers
Loggerhead shrike (rare!!)



Wild Turkeys:

NISP

In the last three years, lucky photo captures of secretive wild turkeys!

2084

BCC 08/17/20

Lots of flowers, bushes, wild fruit trees:

- And milkweed for the soon-to-be endangered Monarch butterflies to complete their lifecycle.
- Rabbit brush provides late-summer/fall forage for 5 additional species of butterflies!

NISP

2085

BCC 08/17/20

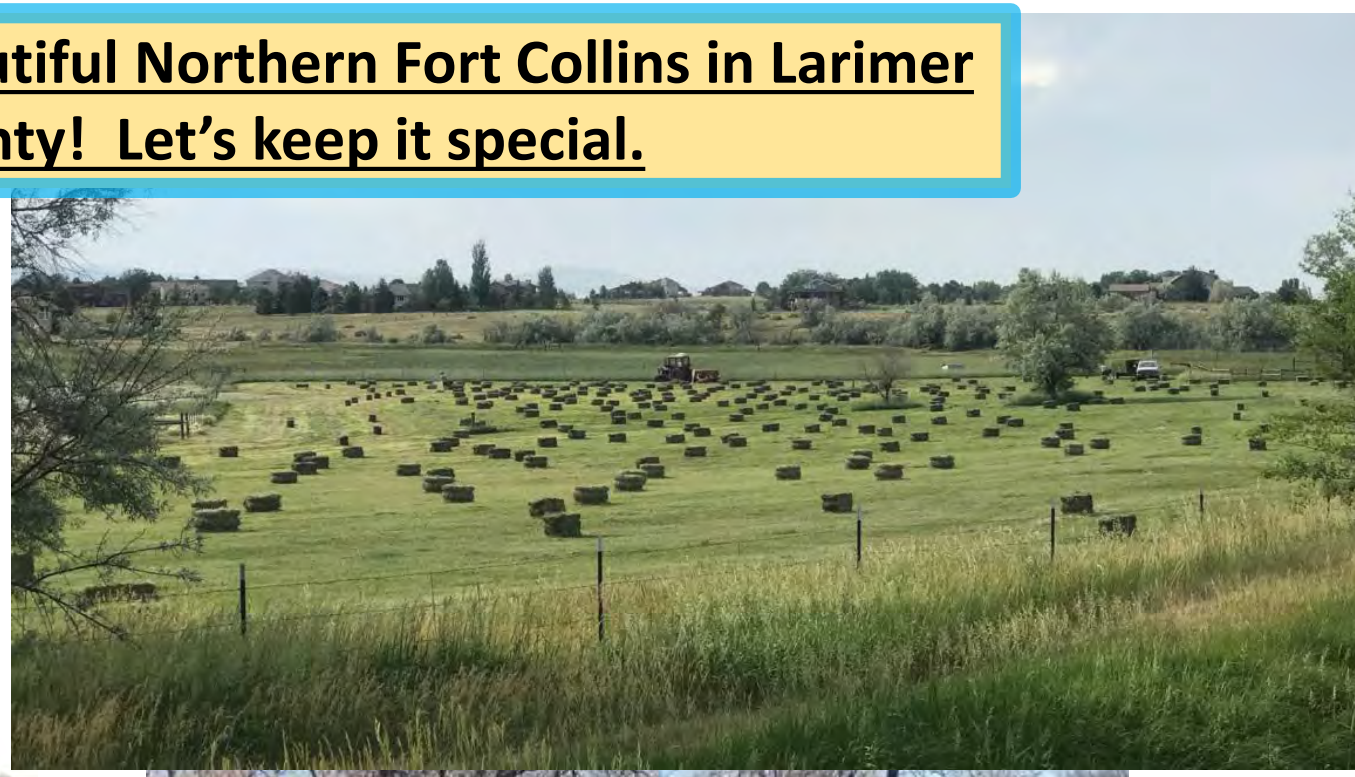
What is here!

Mule Deer, White-tailed deer, foxes, bobcats and mountain lions!

Once these animals are gone, they are gone! Let's share with our animal neighbors. We can't be fooled, destruction and construction zones going cross-country through habitats will have irreversible effects.

NISP

Beautiful Northern Fort Collins in Larimer County! Let's keep it special.



BCC 08/17/20

NISP

2087

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

NISP: The same old dam way of thinking.

1 message

Michael Anthony <manthony@skybeam.com> Tue, Jun 9, 2020 at 10:00 AM
To: jkefalas@larimer.org, swjohnson@larimer.org, tdonnelly@larimer.org, pcboard@larimer.org

Humans need to stop releasing carbon dioxide into the atmosphere. How does this project further that collective human objective? It does not!

This project will release millions (billions?) of tons of CO2 into the atmosphere during dam, pipeline and road construction, then demand huge amounts of coal to be burned to generate electricity (half lost in transmission) to run the pumps to get the water up over the dam. There is no mention of a hydroelectric station below the dam to offset some of that carbon when water is released. Really no thought of that? How much coal will have to mined, transported and burned each year to sustain this dam pumping scheme? This dam is useless without continuous energy input. An environmental disaster all the way around.

Times have changed, this project is outdated. It is time for real solutions not more of the same old dam thinking.

What will the end result of this project be? More water (with lots of embedded fossil fuel energy) for urban development which will encourage more urban development, which will require more dams, more pipelines and more carbon release. Enough! We have to be smarter than NISP.

Humbly submitted after another night of destructive weather events,

Michael Anthony

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 Permit Application Comments

1 message

mikepruz@gmail.com <mikepruz@gmail.com> Tue, Jun 9, 2020 at 4:03 PM
To: rhelmick@larimer.org

DISCLOSURE: I am an elected director of the Fort Collins Loveland Water District. My comments are my own personal option as a private citizen. I cannot and do not speak on behalf of the district, or the board, or any member or employee of the district. I speak solely for myself. These comments are my personal comments and my comments alone.

I was originally an NISP objector. However, after Northern addressed my concerns with roughly $60M in mitigations, including guaranteed releases, fish ladder support, and monitoring, I became a supporter of the project.

Also, note, while I have a side and my comment are biased towards items that support that side, please note that I'm not asking for a particular outcome. I asking for honor and integrity in the process. If my assumptions and information is wrong or inaccurate, then it is. Most of my comments are questions. I think the answers to those questions will support my position. As a resident of a NISP area, as a resident of Fort Collins, as a resident of Larimer County, NISP is needed for all. Look at local drought predictions. Current water isn't enough. Northern, Fort Collins, Greeley all looking to expand water supplies. The slow growth ballet issue failed, candidates running on no growth lose. Don't be confused about where public support really is. The project and the pipeline are needed, unless there is a regional growth moratorium and additional conservation requirements and all saved water is dedicated to the river. If you disagree with my thoughts, please make sure your response clearly documents why.

1) The opposition is making claims the Grey Mountain Reservoir. It is my understand that these are the same water rights for NISP. That the off stream proposal was supported as part of ending the Grey Mountain in stream project. Now it appears the opposition revoking their support for the alternative they previously supported. These facts should be verified.

2) The opposition is claiming NISP will destroy the new White Water Park. My understanding is that the minimum flows and down stream diversion are specifically to support the White Water Park. Please verify these facts before making a decision.

3) Ask why the opposition is opposing NISP, but not Halligan and Semans. Ask why Fort Collins thinks it shallow Ridgen reservoir is good, but the shallow NISP fore bay is bad. Ask why Fort Collins thinks turning green space into NISP and 2-stroke water craft is bad, but turning green space into Montava and it dirty 2-stoke lawn equipment is good. There many contradictions, be sure to do your diligence or risk losing a lawsuit.

4) Ask why dams are opposed, but the dam for the White Water park is supported. Ask what the opposition goal is and what a full win will look like. At one point I saw a presentation that said the flushing flows they want at the canyon mouth would flood Greeley. Flooding Greeley is illegal. They may not be able to get what they want.

5) Claim of river hard are clearly exaggerated. NISP has already help build the Watson Fish Ladder with the City of Fort Collins. NISP is already improving river health. NISP is also working with Fort Collins on a fish ladder a the downstream diversion. Be sure to do your fact checking.

6) Keep in mind that Fort Collins lost some of its Halligion Water Rights a few years back. Those rights did not go away. They refiled and went from being in front of NISP to being behind NISP. The rights did not go away, they did not get dedicated to the river. Be sure to understand water right law, if you block this project, Northern could sell that expensive 287 land for well over what they paid, buy cheaper land up the canyon, and we may be back to an in stream reservoir.

7) Keep in mind that conserved water doesn't go to the river. The utility gets to keep it and re-sell it to developers. I ran for Fort Collins mayor to create a problem to allow conserved water to be dedicated to the river. Be sure to understand if the opposition supporter or opposed me. This will tell you if they really care about river protection and enhancement or are just using delay tactics to drive up the cost of growth in the county and harm both citizens and businesses.

8) What would it cost Larimer County if all the NISP residents had to go to Xeriscape? 10k/home, 50k/home? What if NISP residents were put on rationing because new water source could not be acquired? Double rates? Quadruple rates? What would that do the economy, housing, and schools in South Fort Collins? Would create a economic and housing dead zone? Would it be isolated to South Fort Collins? Would it cause irreparable to the County Seat and non-NISP areas of the county?

9) An important point to understand and consider is what happens to the water rights if the project is blocked? Does that water get dedicated to the river in perpetuity? Or can it be sold to frackers that will take it out of the basin? NISP is committed to minimum flows. Will those flows be lost? Will the opposition really get the flushing flows they want? Will Northern just build a different reservoir some place else?

10) Thornton offered the county a win-win deal. The county turned it down is now facing a win-lose lawsuit. Be sure to understand the downside. Don't vote down the pipeline with Northern's current benefits just to lose in court and the pipeline without those benefits. An illegal blockage could hold the county liable. Make sure you cannot get sued this time.

11) Understand that, like it or not, the law says Northern has the right to take that water out of the river. The county has no authority over that right. The right essentially says the water is trespassing on the river and must be removed for the beneficial purpose listed on the right. The state has already ruled on this point. The county has not authority to hear arguments to stop the pipeline based on opposition view that right is not beneficial. There is a state water court process for that.

12) Be sure to ask the opposition what alternative location and flows and conditions they would support? If the answer is none, then be diligent that you are not supporting a possibility that cannot happen.

Michael Pruznick
Personal Opinion as a private citizen

2091

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

Rodger Ames <rodger.b.ames@gmail.com> Tue, Jun 9, 2020 at 12:48 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

I'm a landowner residing in northern Larimer County, near the proposed location of Glade Reservoir. I would like have my comments on Northern Water's 1041 Permit Application for the Northern Integrated Supply Project (NISP) entered in the agenda for the upcoming Larimer County Planning Commission and BoCC Hearings.

My family choose to live in northern Colorado for its beautiful natural landscapes, its wild and scenic rivers, it's clean air and quiet surroundings, its wildlife, its opportunities for outdoor recreation on the abundant state and federal lands in the area. These are key pieces to our quality of life; key pieces that would be lost if this project is constructed. Our land, water, and communities would be harmed by this project, and any benefits of the project would accrue to communities mostly outside Larimer County.

If construction is executed as planned, there would be seven years of heavy construction impacting our communities. We would be subjected to lots of heavy truck traffic, since the main artery to and from the reservoir site is Highway 287, which is also our main route; 6-days-a-week heavy traffic and heavy machinery operations, and the unwelcome, intrusive, and obnoxious presence of widespread and large-scale construction activity, noise, dust, and danger, over a long period of time. The intrusion would turn the hundreds of acres of the landscape into a construction zone, and take away the attractiveness, the clean air, the quiet – the things we depend on for health and happiness.

There is broad scientific consensus that future climate warming will cause more frequent and prolonged droughts in our region. Storage in reservoirs on the lower Colorado River Basin is at all time lows. The same situation could easily become a reality for reservoirs along the Front Range. The potential adverse impacts of droughts on water supplies to Glade are significant and have not been throughly evaluated in the NISP EIS process or Northern Water's 1041 Application.

An analysis of water storage at Glade conducted by Save Rural NoCo indicates that water levels at Glade may not support flat water recreation to the extent indicated in the NISP FEIS and Glade Recreation Plan. Furthermore, similarities in proposed recreation use at Glade to those at Horsetooth presented in the FEIS are misleading because Horsetooth is supplied by C-BT water, which is an entirely different, and historical data indicate more resilient to drought conditions, water supply than the Poudre River Basin.

The City of Fort Collins recently commissioned a water supply vulnerability study which concluded climate change is the most significant risk facing future water supplies to the City. However, hydrological modeling in the NISP FEIS relies solely on historical streamflows to predict future water supplies, and does not account for a range of risks to future water supplies. The ability to maintain consistently high water levels is paramount to the viability of flat water recreation at Glade. The county and its residents should be informed of risks, and the potential impacts of these risks on recreation value of Glade, before the project is allowed to proceed.

During times when the proposed Glade Reservoir and appurtenant recreation facilities support recreation use, the almost 400,000 visitors per year to this area would alter it from the quiet, rural and sparsely populated landscape we sought and invested in, to a busy recreational area with noise, dust, traffic, activity, accidents, and fires. For some owners, the noise would cause property values to decline.

The NISP would also contribute to climate change at a time when the Colorado and the county are working diligently to reduce GHG emissions. Over 30,000 tons per year of CO2 would be emitted by engines to pump water into Glade. That's equivalent to CO2 emissions from over 7000 gasoline powered vehicles. Other greenhouse gases would also be produced, both during construction and operation. Water storage options that rely on gravity to fill storage catchments would seem to be preferable alternatives at at time when so much effort is being put into GHG emission reduction

policies.

The project would also produce other air quality issues. Dust blown from barren shorelines would be swept up the valley on the area's strong winds. The EIS states that it would take an 80-mph wind to generate any fugitive dust from the shorelines of the operating reservoir. The air quality analysis presented in the NISP EIS, particularly potential impacts from wind blow dust due to exposed lake beds at Glade, should be reviewed with more scrutiny before the project is allowed to proceed.

As a local landowner, I am very concerned about the potential for fire. We live in a high fire hazard, and we take many precautions with our homes and properties to protect against fires. Many visitors, who would be visiting in summer when the land is hottest and driest, would not be aware of how easy it is to cause a wildfire in this landscape. Wildfire potential is a serious issue Larimer County must consider in the 1041 permit process. Increased wildfire risk would also increased demands on local emergency services, especially fire, medical, and law enforcement.

No project this big can be undertaken without significant and irreparable impacts. Speaking as a private citizens and local landowners, we ask Larimer County to be a good steward and deny this permit and prevent the loss of open space and wildlife habitat, increased risk of wildfires and other public safety hazards, increased demands on local volunteer emergency services, noise, light pollution, increased development and traffic, reduced air quality, and potential decreased local property values, and the loss of unique visual and aesthetic values. The natural and rural quality of this land is very important to our lives and communities.

Sincerely,

--
Mr Rodger Ames
rodger.b.ames@gmail.com
1638 N. Greyrock Rd.
Laporte, Colorado 80535

Save Rural NoCo Member

2093

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: NISP 1041 Permit

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Tue, Jun 9, 2020 at 4:06 PM
To: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Please include this message in the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Rose Brinks** <rosebrinks@gmail.com>
Date: Tue, Jun 9, 2020 at 3:11 PM
Subject: NISP 1041 Permit
To: <bocc@larimer.org>

On behalf of my cattleman/professor/sportsman husband Dr. James Brinks who died 5 years ago this week, I beg that you do nothing more to gut the Poudre River, 1/2 mile of which flows through and irrigates our Laporte farm. Use that permit we fought so hard for, and say no.

Rose L. Brinks

2094

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 permit

1 message

Roger Hoffmann <rogerh8808@gmail.com> Tue, Jun 9, 2020 at 2:15 PM
To: pcboard@larimer.org
Cc: bocc@larimer.org

Below, and attached as a PDF, is a letter re. the NISP 1041 review.

~Roger Hoffmann

****

3908 La Mesa Dr.

Fort Collins, CO 80524

June 9, 2020

Larimer County Planning Commission

Larimer County Board of County Commissioners

To all concerned,

I'm writing as a Larimer County resident, property owner and tax payer, with respect to the Northern Integrated Supply Project (NISP), and its pending 1041 Permit request.

For very many reasons, I believe the Planning Commission must reject the 1041 permit request by the project's proponents, Northern Water. Personally speaking, it is certainly not in my best interests. Nor, I believe, is it in the interest of those whom I suspect to be the vast majority of Larimer County residents. In fact, this project proposal represents significant public harms. I will only mention a few here, in partial explanation for why I oppose it and hope you will deny the 1041 permit.

As you likely know, the Poudre River is already stressed and endangered , in large part by diversions. NISP, if completed, will severely cut off the "peak flows" needed to maintain the river's health and habitats. There is no way to avoid this if this project is built as planned, and it is impossible to mitigate these system-wide impacts. One of the direct ones will likely be a reduction of habitat for trout species. While I'm not an angler myself, I have very many friends who are. Yet, even if there wasn't a single person who personally cared about fishing, we have a moral duty to preserve what we have.

Also with respect to the Poudre itself, I'm extremely concerned about the gradually increasing effects of climate change, whose effects may well be exacerbated by diversions from the river. What is the tipping point? Just how far are we willing to go? While I understand water rights, I would urge the Planning Commission and Board of Commissioners not to play a part in further damaging the river.

NISP's plan is also incompatible with Larimer County's Comprehensive Land Use Plan that pertains to the area in question. Larimer County should defend this plan and its visionary objectives, for the benefit of residents, both today's and tomorrow's; and put Larimer County's interests first.

That Northern Water will buy up farms in Weld County for their water rights is another reason for denial. Why does this matter? For one thing, the drying up of farms in Weld will be yet another heavy blow to agriculture in Northern Colorado, which has already been harmed by speculation in water and land. For another, all that "dry" land will then have only one perceived use- development. This will drive up vehicle miles traveled (VMT), a major contributor to both highway congestion and air quality problems that continue to lower quality of life while driving up costs for all. Several failed attempts to win public support for highway expansions illustrate the growing difficulty of ignoring this problem.

Unfortunately, the federal EIS missed the latter impacts, erroneously concluding that the project has no need for additional water rights (it will), and therefore, no farms would be purchased in order to fill the reservoir. This error alone casts significant doubt on the reliability of the federal EIS.

Of course, NISP won't just drive land development and sprawl in Weld County. The communities participating in NISP are faced with every-increasing costs to finance it. There will be even greater pressures on each for expansion for revenue development to cover these costs. This is ill-advised in an area already literally choking on the effects of high growth rates. NISP, in effect, creates a vicious cycle of deb-fueled expansion which leads to yet further costs for local governments and their taxpayers. This is madness. It is unsustainable and counters everything we try to do to keep Larimer County a great place to live.

Besides such harms, I'm also concerned about the potential long-term costs to residents here from trying to accommodate NISP. I marvel that this can even be considered without a prior public discussion and hearing on whether Larimer County should agree to the relocation of US287, along with the consequences of that.

Summing this up, this is a very bad deal for Larimer County and its residents. I hope that we, who will bear many (but not all) of the negative consequences will be your primary concern in this regard.

Respectfully,

Roger Hoffmann

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232K

2096

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 is incomplete

1 message

normanranch <normanranch@earthlink.net> Mon, Jun 8, 2020 at 10:20 AM
To: bocc@larimer.org, pcboard@larimer.org, rhelmick@larimer.org

Dear Commissioners,

NISP has its 1041 Glade Reservoir and Pipeline application deemed complete by the Planning Department. There are numerous deficiencies and the completeness determination should be reversed.

The issues below need to be addressed more thoroughly by NISP before ever going before the Planning Commissioners.

Here are just a few of the many concerns we have over NISP's 1041 application:

1. The relocation of 7 miles of Highway 287, a major federal highway, would not occur but for the NISP project. NISP is treating the 7 miles of highway 287 relocation as "not our problem" and is claiming the relocation and all of its impacts is a separate "CDOT" project, to be funded by taxpayers! The relocation of 287 started out in the NISP proposal, "NISP includes the following facilities located in Larimer County**: the Glade Unit**; the Glade Pump Station; raw water distribution piping; and the **relocation of U.S. Highway 287**." NISP then changed its mind and excluded the 287 relocation from the proposal. The relocation will have major impacts to Larimer County and its taxpayers, public safety, visual impacts, historic structures,etc.. The relocation of U.S. Highway 287 is part and parcel of NISP, please insist it is addressed in the 1041.

2. Not adequately addressing 1041 Criteria 6, "The proposal will not negatively impact public health and safety".

a. The proposal will push a missile site carcinogenic chlorinated solvent plume into domestic drinking water wells. As stated by geological expert, Tom Sales, "Historical operations at a DoD Nuclear Missile Site at the base of the Glade Dam created a large plume of carcinogenic chlorinated solvents in groundwater that currently passes out beneath the proposed forebay for Glade. Plumes of this nature last many lifetimes and it is implausible that site specific efforts to clean up the plume have been effective. Northern installed more than 20 monitoring wells in 2019 located through the plume, but no public records are available regarding data from the Northern 2019 monitoring well network." The forebay is a below dam small reservoir of the Poudre water which will be pumping water 375 feet up into Glade Reservoir. This groundwater carcinogenic contamination must be addressed thoroughly in the 1041. Why wasn't the NISP monitoring well information made public? Please insist this information is included in the 1041.

b. The relocation will take a benign straight highway alignment along a valley bottom and turn it into a dangerous road up and over a high hogback. This rocky terrain, and curvy reroute will be a longer and more dangerous road, causing higher accident rates. Blind corners will undoubtedly cause an increase in vehicle/vehicle and vehicle/wildlife accidents. I concur with attorney, John Barth's statement, "The new alignment will increase emergency response times by at least 5 minutes, critical minutes in a life-threatening emergency." This reroute is only for the benefit of NISP, and unnecessarily endangers Larimer County residents and visitors. Please insist these safety issues are addressed in the 1041 application.

c. Two large faults, the North Fork Fault and the Bellvue Fault, pass under the proposed Glade Dam site. Tom Sale, geological expert, states, " 1) the faults represent vertical intervals of broken rock and 2) that they pass directly under the proposed dam site (that will have up to 400 feet of differential water level) it seems highly likely that leakage under the dam along the faults will be severe. NISP's "Oh, by the way" inclusion in the application is**,** "There are two earthquake faults mapped within the Glade unit. The Bellvue Fault and North Fork Fault have been intercepted at depth by test holes advanced during the project's geotechnical investigations."…. "Both faults are inactive and do not present a seismic risk to the project." **All faults are inactive until they aren't**. NISP's remark of "Do not present a seismic risk to the project" has no reference to a government agency verifying there is no seismic risk. Any seismic risk, no matter how small, is unacceptable when it involves a dam holding back 170,000 acre feet of water!. Please demand a more thorough analysis from a federal authority and insist on a qualified government agency's certification that the two faults will never present a seismic risk to the project. Larimer County citizens lives depend on it!

3. Inadequate Criterion #5, "The proposal will not adversely affect any sites and structures listed on the State or National Registers of Historic Places." The Final EIS states there are 82 eligible or potentially eligible cultural sites present in the disturbed area. Eight of the sites are officially eligible and 74 require additional data and formal evaluation. These are dismissed by NISP as minor to moderate impacts. There are numerous additional sites in the APEs of the 287 reroute that are not even mentioned. The FEIS states mitigation will be decided at a future time. This is unacceptable. Please assure that historical sites are individually addressed, by appropriate historical societies as to impact.

4. Proposal has not addressed Criterion #4, "The proposal will not have a significant adverse affect on or will adequately mitigate significant adverse affects on the land or its natural resources, on which the proposal is situated and on lands adjacent to the proposal." To get the Poudre River water into Glade reservoir will take 80MW of power supplied by huge transmission towers similar to those used at Glen Canyon Dam (see below image).The forebay is the holding reservoir for water from the Poudre River, and from where the Poudre water will be pumped 400 feet up into the Glade Reservoir. "The proposed peak pumping rate in Northern's application to Larimer County, from the forebay, is 1,200 cubic feet per second and will require 81 MW (megawatt) of power. To put 81 MW in context, it is equivalent to the power required by Fort Collins' approximately 62,000 residences and 90% of the reported generation capacity of Glen Canyon Dam," states Tom Sale, civil and environmental engineering expert. We also want answers in the 1041 to Tom Sales questions of:

- How will NISP get the required electrical power to the pumps,
- Where is the approval for an 80 MW power line, and
- What is the visual impact of these enormous power lines?

We would like to add to that list:

- What is the carbon footprint in the producon, ins tallaon, and main tenance of the transmission towers and power lines, and

- What is the on going carbon footprint from the producon the electricity r equired to run those huge pumps?
- Where is the assessment assuring there are no protected and endangered species along the hogback that would be impacted by the towers and lines?

Below is the 90 MW power source illustration, from Tom Sales' comment letter, showing the transmission towers of 90 MW necessary for the Glen Canyon Dam. NISP has stated it will need 80 MW for the proposed Glade Reservoir. The towers needed will be unsightly in this beautiful valley and may have a huge impact of wildlife and human safety. Where is the assessment documentation that there are no protected and endangered species along the hogback?
 Glen Canyon Electric Power Source

Some things just don't make sense, and Glade Reservoir is one of them.

Thank you,

Roberta and John Norman

719-339-1751

normanranch@earthlink.net

2099

Rob Helmick <helmicrp@co.larimer.co.us>

NISP project

1 message

Tim Vaughan <timlvaughan@gmail.com> Tue, Jun 9, 2020 at 10:29 AM
To: pcboard@larimer.org, bocc@larimer.org, ccsl@fcgov.com

pcboard@larimer.org
bocc@larimer.org
ccsl@fcgov.com

Commissioners Johnson, Kefalas, and Donnelly;

I have a background as a geologist and I have significant concerns about the safety of The Northern Integrated Supply Project, if approved and constructed as currently envisioned. I am concerned that this reservoir dam is proposed to be constructed at the intersection of some major geological faults and the underlying rock below the water pool at the proposed Glade Reservoir is known to contain gypsum karst features that readily dissolve and years later cause dangerous and expensive to mitigate seepage problems such as as occurred at Horsetooth Reservoir (https://www.coloradoan.com/story/news/2017/04/15/look-back-why-horsetooth-reservoir-nearly-drained/100463850/). You can read the details of my concerns in the attached letter that I sent as a comment to the Corps of Engineers in 2009.

If my memory serves me correct, The Corps of Engineers response to my concerns was that they would be addressed during the construction phase which I take it as meaning that they will just pump cement grout into any fractured earth and caverns that they find during construction and then leave the future leakage and dam saftey issues for the future officals to mitigate.

In addition, the riparian areas of the Poudre River need the recharge water of a flood in order to maintain the habitat along the river that we all enjoy and cherish. Do you really want to turn the Poudre into a Los Angeles River situation? I don't.

Tim Vaughan
123 South Sherwood St.
Fort Collins, CO 80521
timlvaughan@gmail.com

Tim Vaughan's comments on NISP September 2, 2008.doc
78K

Tim Vaughan
123 S. Sherwood St.
Fort Collins, CO 80521
970 -- 484-8399
timlvaughan@Gmail.com
September 5, 2008

REPLY TO:
Chandler J. Peter
Denver Regulatory Office
9307 South Wadsworth Blvd.
Littleton, CO 80128-6901
FAX (303) 979-0602
chandler.j.peter@usace.army.mil

I would like to thank The United States Army Corps of Engineers for extending the time period allowed for comments on the draft EIS of the Northern Colorado Water Conservancy District's NISP project.

I will start with comments on the geology of the Glade Reservoir proposal.

First, the problem with the draft EIS is that there was not enough detailed geological mapping in the field, field sampling, or drilling to try to determine the exact locations of the North Fork fault, the Bellvue fault, the splays of the Bellvue fault, and the rock composition underneath the dam and reservoir site. Performing these tasks is necessary because:

- You must determine the exact locations of these faults, their dips, and the geology the area.
- The scientists who have studied these faults suggest that the North Fork Fault (a fault with an estimated 2 km of movement) cuts through the valley underneath the dam axis (both the old and current proposal sites of the dam).
- The Bellvue fault splay locations have always been mapped as questionable. This means that all geologists, including the authors of the draft EIS, who have mapped the Bellvue fault are guessing at its location, dip, etc.

I believe the dam axis is constructed above the intersection of at least two major geological faults, the North Fork fault and the Bellvue fault. Also, If you look at the geological maps (or take a walk in this area) of the Laporte to Livermore area you will see that the North Fork fault commonly breaks into large shears zones. Considering that the dam axis crosses two or more fault zones, there is a great potential for the ground underneath the dam to be composed of:

- large shears zone of crumbled up, crushed, and fractured sediments, most probably pieces of the Lykins Formation which has a very well documented seepage problems from gypsum-

karsts and possibly the Ingleside formation, which the draft EIS also acknowledges has seepage problems from gypsum karsts.

The geological formation underlying the dam axis, and the main reservoir pool, is the Lykins Formation. The Lykins Formation contains gypsum-karst features, such as breccias that cut across the strata, large semicircular collapse chimneys that also cut across the formations stratigraphy, solution cavities and conduits in pervious limestone beds, and discontinuous bodies of massive gypsum. (Pearson, Ronald M, U.S. Bureau of Reclamation). These features readily dissolved into water and are the cause of seepage problems. As is well known, during the late 1980s sinkholes formed at the south end of the Horsetooth Reservoir underneath the Lykins Formation and in late 2000, a sink hole was discovered on the upstream toe of the dam. This necessitated the expenditure of tens of millions of dollars to attempt to seal these karst features and insert stem walls to stop the seepage. At Carter Lake dam number 2, over 4 ft.^{3} per second of seepage exist downstream of the dam. Samples of the seepage water have shown it is almost saturated with dissolved gypsum, thus, once again, indicating problems with seepage from karst features in the Lykins Formation. I am not aware of the existence of current estimates for how much it will cost to try to stem off or seal off the seepage in the Lykins Formation at Carter Reservoir, but I suspect, will be in the multimillions. I keep wondering where the seepage will occur at these reservoirs and another 25 years, and how much more money will be spent to try to stem off these karst features?

Gypsum Karst features have created large problems at other reservoirs, including failure of some dam sites. I refer you to a recently published (January 2008) article in the publication, *Environmental Geology*, entitled, *"Gypsum -- karst problems in constructing dams in the United States",* by Kenneth S. Johnson of the Oklahoma Geological Survey. He states,

> *These karst features can compromise on the ability of a dam to hold water in a reservoir, and can even cause the collapse of a dam. Gypsum karst in the abutments or foundation of a dam can allow water to pass through, and around, or under a dam and solution channels can enlarge quickly, once water starts flowing through such a karst system……. in Oklahoma, the proposed Upper Magnum Dam was abandoned before construction, because of extensive gypsum karst in the abutments and impoundment area. Catastrophic failure of the Quail Creek dike in southwest Utah in 1989 was due to flow of water through an undetected karstified gypsum unit beneath the earth-fill embankment…….*

He also later states,

> *Gypsum -- karst features may seriously compromise the ability or likelihood that a proposed reservoir would be able to contain and retain water, without extensive and expensive engineering actions (such as deep excavation, deep cut off trenches filled with impermeable material, and/or extensive and deep grout curtains). Such corrective measures still may not provide a permanent solution to the karst problem..... The hydraulic head of the reservoir may also cause clay filled cavities in the gypsum karst beds to weaken and failed, allowing water to flow through pre-existing karst features.*

It also has been reported (Jarvis, 2003) that the construction of the Anchor Dam, near Thermopolis Wyoming, proceeded in spite of the known existence of sinkholes and karst conditions, because it was thought that remedial efforts (grouting) would eliminate any seepage or structural problems from karst features. There has been significant drainage of water from the reservoir, and the

abutments of the reservoir are on karst features and to date only a small quantity of water is being stored in the reservoir.

The catastrophic failure of the earthfill dam in the Huesca provenance of northeast Spain also has been reported in Environmental Geology, (2003). The abstract of this paper states:

> *……this case study demonstrates that frequently hidden limitations that evaporitic sediments* (gypsum) *and dispersive clay* (karst clay) *materials pose to the construction of dams……..*

In addition to the problems around the Glade Reservoir dam site, there is a significant potential that water stored in the reservoir pool will be lost through seepage into the bedrock and underground aquifers via fractures, faults, and gypsum karsts, breccias, etc.. This makes it imperative that detailed geological mapping, sampling, and core drilling in the reservoir basin area be done before the US Corps of Engineers comes to a conclusion on the viability of this project. These tasks need to analyze the potential for water seepage losses from the reservoir pool into the bedrock and underground aquifers via fractures, faults, and gypsum karsts, branches, etc... Both the Lykins Formation (which underlies the main pool), and the Ingleside formation (which contacts and underlies a portion of the smaller pool of water) have well documented problems with water loss via seepage into the bedrock.

Gypsum in the Lykins Formation and this area is so common that Colorado Lien extracts and produces gypsum from the Munroe Quarry, just north of the Glade Reservoir site. The gypsum is extracted from the Permian Lykins Formation, the same formation that underlies the main pool of the Glade Reservoir. Annual production averages about 50,000 standard tons. This implies that there is a very high potential that this reservoir will not be able to hold and store the water pumped into its pool because of water loss via seepage into the bedrock.

So in summary, from my reading of the draft EIS of NISP, and the analysis of the current geological opinions of the geology, geological structures, formations, and tectonics of the area, it appears that the Glade Reservoir dam is being proposed to be approved for construction without a detailed evaluation of the geological structures, formations, and seepage potential underneath the dam axis and abutments. Furthermore, given the high potential for hidden seepage features, no matter how well you drill and sample the area, it is my opinion that this dam will have a very high risk of seepage in the future, no matter how much remediation grouting and stem wall building is done.

This dam site is essentially located at the intersection of two major faults, and both with a high potential for large shears zones. The large shears zones will be composed dominantly of the Lykins Formation, which contains significant amounts of gypsum bodies, and gypsum-karst features, which have been tumbled and ground up. On top of this, it is proposed to build a large dam to hold back a larger reservoir of water. **This is an extremely risky proposition, with unknown potential seepage and structural problems in the future.**

Secondly, I would like to address likelihood of active earthquakes in the area of the dam site. The definition of active faults/earthquakes in the Front Range of Colorado is being currently reevaluated by scientists.

In the 1880s there was a magnitude 6.6 earthquake centered near the northeast corner of Rocky Mountain National Park. This is the largest historic earthquake to be recorded in Colorado. The 1882 earthquake frightened people in Denver and other northern Front Range cities. It was so strong that the bolts holding the electric generators for Denver were snapped off and power was knocked out. The Glade Reservoir area was within the area that also felt aftershock earthquakes.

In addition, Matthews, 2004, reports on two major new geological structural features in Colorado:

> *…….The upper crust underlying the northern Front Range and Denver Basin appears to be broken into three major blocks separated by* ***two northeast-striking lineaments*** *that are interpreted as scissor faults (Figure 3). The lineaments cross the Front Range and extend to the axis of the Denver Basin.* ***Modern earthquakes possibly occurred along the lineaments…****……*

If you examine the map Matthews has created, one northeast striking fault zone extends through the northeast corner of Rocky Mountain National Park (near the 1882 earthquake center) and on up through the Livermore embayment area. The proposed Glade Reservoir is located just south of the Livermore embayment, which is where this lineament extends out into the plains of the Front Range. The North Fork fault, which intersects of the dam of Glade Reservoir, extends north up into the Livermore embayment where it is cut off by a series of faults in the northeast striking lineaments that is described by Matthews.

All this suggests that before the US Corps of Engineers makes a decision on this project, the earthquake potential of the area should be reevaluated and then the dam structures are built concordantly to the reevaluated potential. It would not be difficult to contact the geologists who are currently studying and reevaluating the earthquake potentials of the Front Range of Colorado. Most of them work for the state of Colorado, or one of the state universities of Colorado.

The third point I would like to discuss, is about potential water salinity problems in the alternative reservoir that is proposed, the Cactus Hill Reservoir.

According to the draft EIS, the water will be relatively clean when it is pumped into Cactus Hill reservoir, however salts will leach out of the soils (and bedrock?) and cause the water to become saline. The authors of the draft EIS assume, "The *quality of runoff within the watershed may be similar to the quality of Lonetree Creek, which was sampled intensively by the USGS in 1993 through 1995 at a location north of the Cactus Hill site near Carr, Colorado."*

The authors are assuming the soils at the Cactus Hill site are the same as soils 10 to 15 miles away. **The composition of soils can change over just tens of feet. To make the assumption that the soils at the Cactus Hill dam site are the same as soils that were sampled 10 to 15 miles away is unacceptable.** Before the US Army Corps of Engineers approves this project, the soils and the bedrock at the Cactus Hill site should be intensively mapped, sampled, and drilled. The mapping should look for potential large and small fault zones and fractures, any evidence of anhydrite or gypsum (which have been documented in the upper Pierre in northern Colorado) which could cause seepage problems, breccia zones, caliche zones, and evidence of, "teepee buttes or cold seep mounds" which could cause water loss through seepage. In addition to the usual geotechnical

sampling and mapping, **the Pierre Shale should be analyzed for radioactive elements which have been found in the upper Pierre.**

I also question the validity of the model that the authors of the draft EIS used to estimate the potential salinity concentrations of the water pool at Cactus Hill. The authors state that a model was developed, however the model is not available to the public to analyze. In the draft EIS the authors use this model to predict that there will be salinity problems in the water from Cactus Hill for eight years, and then the water will stabilize because all of the salts will be have been leached out of the soils. The authors do not know the exact composition of the soils, because they have not sampled them in the field, rather they used the analysis of soils 10 to 15 miles away. They also assumed that only soils will leach salts into the water, they do not predict that the bedrock, which is known to contain salt formations, will leach salts into the water. Why they chose not to include leaching of salts from the bedrock, I do not know.

Since the data going into the model is suspect, and the distinct possibility that the model used is invalid, I suggest everything that the authors of the draft EIS say about the salinity of the Cactus Hill reservoir is invalid and the United States Corps of Engineers must not approve this project until the soils and bedrock have been properly sampled, mapped, and analyzed and the model that the authors use to estimate the leach rate of salts at Cactus Hill reservoir be made available to the public so its validity can be confirmed.

If I was a shareholder in this project, I certainly would not want to spend tens of millions of dollars in order to receive salty water for my community.

In conclusion, I would once again like to thank the United States Corps of Engineers for allowing the public an extended period of time in which to comment on the NISP project.

I recommend to the United States Corps of Engineers that they do not approve the construction of the Glade Reservoir because of the uncertainty of the geology that lies underneath the dam and water pool and the extremely high probability that no matter how much grouting and how many stem walls are sunk into the bedrock, eventually water seepage will occur, possibly resulting in the inability to hold and store water in the pool and potential dam failures.

In addition, I recommend to the United States Corps of Engineers that they do not approve the construction of the Cactus Hill Reservoir until the site has been thoroughly sampled, mapped, and drilled, the potential leakage issues are addressed, the water salinity problems are properly modeled, and the results (including the models used to make the predictions) made available to the public.

Finally, I would suggest that the owners of this project look to eventually put their water storage in rock formations, such as granites or clean, well cemented sandstones, where there are no potential leakage or salinity problems and in the meantime I suggest that they pursue alternative options for providing water their customers' desire.

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LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Larimer County Should Not Approve the NISP 1041 Permit Project No. 20-ZONE 2657

1 message

Doug Prince <dprince01821@msn.com> Tue, Jun 9, 2020 at 1:27 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

I'm a landowner residing in northern Larimer County, near the proposed location of Glade Reservoir, it's massive dam, forebay, pumps, pipelines, campgrounds, parking lots, boat ramps, and other facilities. We strongly urge the Board of County Commissioners to deny the 1041 permit for the Northern Integrated Supply Project because it would forever impact the fundamental nature of the rural landscape in which we live and harm our quality of life.

We choose to live in northern Colorado for its beautiful natural landscapes, its wild and scenic rivers, it's clean air and quiet surroundings, its wildlife, its opportunities for outdoor recreation on the abundant state and federal lands in the area. These are key pieces to our quality of life; key pieces that would be lost if this project is constructed and operated as proposed. Our land, water, and communities would be harmed by this project, and any benefits of the project would accrue to communities mostly outside Larimer County.

It is unacceptable that our rural northern Colorado communities must bear the impacts and unmitigable risks of this massive and ill-conceived project, the biggest ever proposed for Larimer County.

If construction is executed as planned, there would be seven years of heavy construction impacting our communities. We would be subjected to lots of heavy truck traffic, since the main artery to and from the reservoir site is Highway 287, which is also our main route; 6-days-a-week heavy traffic and heavy machinery operations, and the unwelcome, intrusive, and obnoxious presence of widespread and large-scale construction activity, noise, dust, and danger, over a long period of time. The intrusion would turn the hundreds of acres of the landscape into a construction zone, and take away the attractiveness, the clean air, the quiet – the things we depend on for health and happiness.

Northern Water is currently buying farms in northern Colorado to make up a more than 50% shortfall in the water rights needed for a successful project. In addition, recent prolonged droughts, which are becoming more common, have affected the amount of water that would be available from the Poudre River and other sources. For us, this means that we would endure the years and years of construction, and the irreparable loss of the unique landscape in which we live, all for an unfulfilled promise that "if they build it, the water would come" which is by no means guaranteed. The water shortage will only get worse as the climate dries, so Larimer County should deny this project, which will likely fail to meet its objectives. Less expensive, less destructive alternatives to water supply should be seriously considered.

Encouraging almost 400,000 visitors per year to this area would alter it from the quiet, rural and sparsely populated landscape we sought and invested in, to a busy recreational area with noise, dust, traffic, activity, accidents, and fires. Noise from motorboats on Glade would exceed state standards, would be heard miles away, and would significantly disrupt our lives. For some owners, the noise would cause property values to decline.

That's if the reservoir fills. The photographs Northern Water shows of a beautiful full reservoir are misleading at best, because the reservoir would rarely, if ever, look like that. It would generally look like an abandoned industrial facility marring the area's aesthetics.

Since the reservoir would not fill, and likely would not be full during much of its life, the project would look like an abandoned muddy puddle much of the time, and the recreational facilities would be mostly empty. Who would pay for the upkeep of the unused recreational facilities, Larimer County taxpayers? The project ruins the aesthetics of the valley and hogbacks – a unique and beautiful landscape – for a project that would provide little or no benefit to Larimer County and in fact would negatively impact its residents and its coffers.

The project would also contribute to climate change. Over 30,000 tons per year of CO_2 would be emitted by engines to pump water into Glade. Other greenhouse gases would also be produced, both during construction and operation. Air

pollution would also occur due to the project, including gases that form ozone, a severe health hazard.

Dust blown from the barren shorelines would be swept up the valley on the area's strong winds and seep into our homes and further degrade our lives. The EIS states that it would take an 80-mph wind to generate any fugitive dust from the shorelines of the operating reservoir, an assertion that doesn't pass the laugh test for anyone living in this rural landscape. What else has have they got wrong? Are we to be the guinea pigs for some ill-conceived experiment?

We are very concerned about the potential for fire. We live in a high fire hazard, and we take many precautions with our homes and properties to protect against fires. Many visitors, who would be visiting in summer when the land is hottest and driest, would not be aware of how easy it is to cause a wildfire in this landscape. Some would be careless with campfires, with cigarettes, with illegal fireworks, or with firearms, and wildfires would be inadvertently ignited. Their vehicles can start fires. Unfortunately, arson is possible. Our climate is getting drier. Larimer County must recognize the seriousness of this issue and deny this permit. The county cannot simply hope for the best because our homes, our property, our animals would all be put at unacceptable risk of wildfire due to construction, high visitation, and incomplete understanding. These increased risks would also cause increased demands on local emergency services, especially fire, medical, and law enforcement.

No project this big can be undertaken without significant and irreparable impacts. We ask Larimer County to be a good steward and deny this permit and prevent the loss of open space and wildlife habitat, increased risk of wildfires and other public safety hazards, increased demands on local volunteer emergency services, noise, light pollution where now there is little, increased development and traffic in ever-widening circles around the reservoir, reduced air quality, climate change, increased illegal activities such as trespass on adjacent private land, decreased property values, and the loss of unique visual and aesthetic values. The natural and rural quality of this land is very important to our lives and communities.

Sincerely,

--
Mr Doug Prince
dprince01821@msn.com
1821 N County Road 23
Bellvue, Colorado 80512

Save Rural NoCo Member

2110

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project

95 messages

Jessica Stewart (JNightowl11@AOL.com) Sent You a Personal Message Sat, Jun 6, 2020 at 12:04 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Jessica Stewart
PO Box 23
Bellvue , CO 80512
JNightowl11@AOL.com
(970) 980-6438

Sarah Waterson (Sarahwaterson@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 12:58 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Sarah Waterson
615 Gilgalad Way
Fort Collins, CO 80526
Sarahwaterson@gmail.com
(510) 289-6386
[Quoted text hidden]

Scott Hamilton (shamilton1771@yahoo.com) Sent You a Personal Message Sat, Jun 6, 2020 at 5:06 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Scott Hamilton
PO BOX 97
Bellvue, CO 80512
shamilton1771@yahoo.com
(970) 495-1771
[Quoted text hidden]

Steve Ekblad (coekblad@comcast.net) Sent You a Personal Message Sat, Jun 6, 2020 at 5:44 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Steve Ekblad
3030 Skimmerhorn St.
Fort Collins, CO 80526
coekblad@comcast.net
(970) 223-9045
[Quoted text hidden]

Kenneth Morey (ken.morey@comcast.net) Sent You a Personal Message Sat, Jun 6, 2020 at 5:46 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Kenneth Morey
5415 Cedar Valley Dr
Loveland, CO 80537
ken.morey@comcast.net
(970) 669-0359
[Quoted text hidden]

Scott Schneider (ss1256@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 5:48 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Scott Schneider
2531 Longview Dr
Estes Park, CO 80517
ss1256@gmail.com
(720) 369-9678
[Quoted text hidden]

Loren Crabtree (lorencrabtree@hotmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 6:18 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Loren Crabtree
4909 Caravelle Drive
Fort Collins, CO 80526
lorencrabtree@hotmail.com
(970) 237-9300
[Quoted text hidden]

Leanne Lauren (leannelauren@aol.com) Sent You a Personal Message Sat, Jun 6, 2020 at 6:19 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Leanne Lauren
240 Big Horn Drive
Estes Park, CO 80517

leannelauren@aol.com
(970) 689-0404
[Quoted text hidden]

Brian Colon (briankiltman@mac.com) Sent You a Personal Message Sat, Jun 6, 2020 at 6:21 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Brian Colon
924 Cheyenne Drive
Fort Collins, CO 80525
briankiltman@mac.com
(970) 980-9444
[Quoted text hidden]

Bill Brock (billbrock329@yahoo.com) Sent You a Personal Message Sat, Jun 6, 2020 at 6:34 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Bill Brock
826 W Magnolia Street
Fort Collins, CO 80521
billbrock329@yahoo.com
(970) 306-9895
[Quoted text hidden]

Jane Hoover (jhoover@frii.com) Sent You a Personal Message <automail@knowwho.com> Sat, Jun 6, 2020 at 6:39 AM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Jane Hoover
1300 Stoney Hill Dr
Fort Collins, CO 80525
jhoover@frii.com
(970) 484-9366
[Quoted text hidden]

Donna Wild (donnawild@msn.com) Sent You a Personal Message Sat, Jun 6, 2020 at 6:46 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Donna Wild
434 W 6th Street
Loveland, CO 80537
donnawild@msn.com
(970) 667-2222
[Quoted text hidden]

Karin Edwards (karinjedwards@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 7:19 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Karin Edwards
1020 Acacia Drive
Estes Park, CO 80517
karinjedwards@gmail.com
(970) 231-0133
[Quoted text hidden]

Denise Wurtz (denise@synergistixmedia.com) Sent You a Personal Message Sat, Jun 6, 2020 at 7:39 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Denise Wurtz
167 South 8th Street
Berthoud, CO 80513
denise@synergistixmedia.com
(516) 672-9040
[Quoted text hidden]

Stephen Stouffer (sstouffe@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 7:56 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Stephen Stouffer
1050 Hobbit St.
Fort Collins, CO 80526
sstouffe@gmail.com
(317) 517-9504
[Quoted text hidden]

June Hyman-cismoski (joberta7@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 8:10 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

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Sincerely,

June Hyman-cismoski
1317 South View Circle
Fort Collins, CO 80524
joberta7@gmail.com
(970) 674-0234
[Quoted text hidden]

Sharon K Wilson (skw@centurylink.net) Sent You a Personal Message Sat, Jun 6, 2020 at 8:19

<automail@knowwho.com> 2120 AM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Sharon K Wilson
520 E. Laurel St.
Fort Collins, CO 80524
skw@centurylink.net
(970) 493-2269
[Quoted text hidden]

---

evi buckner-opler (evi_bavaria13@YAHOO.COM) Sent You a Personal Message Sat, Jun 6, 2020 at 8:23 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

evi buckner-opler
PO Box 2227
loveland, CO 80539
evi_bavaria13@YAHOO.COM
(970) 667-8448
[Quoted text hidden]

Dennis Zerlan (vra2009@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 8:26 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Dennis Zerlan
2440 W. Prospect Rd
Ft. Collins, CO 80526
vra2009@gmail.com
(970) 493-7649
[Quoted text hidden]

Darlene Halvorsen (ddseh@aol.com) Sent You a Personal Message Sat, Jun 6, 2020 at 8:40 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Darlene Halvorsen
3143 Glendevey Dr.
Loveland, CO 80538
ddseh@aol.com
(970) 215-8219
[Quoted text hidden]

Sara Snider (saramsnider@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 9:12 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Sara Snider
4862 Brookfield Drive
Fort Collins, CO 80528

saramsnider@gmail.com
(952) 465-1016
[Quoted text hidden]

Craig Benkman (craig.benkman@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 9:12 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Craig Benkman
7001 Foxton Court
Timnath, CO 80547
craig.benkman@gmail.com
(307) 399-4785
[Quoted text hidden]

Susan Taylor (taisusan@aol.com) Sent You a Personal Message <automail@knowwho.com> Sat, Jun 6, 2020 at 9:21 AM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Susan Taylor
2608 Kansas Drive
Fort Collins, CO 80525
taisusan@aol.com
(410) 960-1019
[Quoted text hidden]

Kaycee Heid (kayceejh11@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 9:22 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Kaycee Heid
915 E. Prospect Rd.
Fort Collins, CO 80525
kayceejh11@gmail.com
(303) 591-5174
[Quoted text hidden]

Priscilla Nelson (pia2dales@aol.com) Sent You a Personal Message Sat, Jun 6, 2020 at 9:27 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Priscilla Nelson
2198 Governors Ln
Estes Park, CO 80517
pia2dales@aol.com
(970) 577-4777
[Quoted text hidden]

Erin MacLeod (emac272@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 9:29 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Erin MacLeod
404 West Street
Fort Collins, CO 80521
emac272@gmail.com
(508) 272-7902
[Quoted text hidden]

Rhonda Mickelson (rhonmickel@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 9:37 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Rhonda Mickelson
2419 Spruce Ave.
Estes Park, CO 80517
rhonmickel@gmail.com
(303) 596-1646
[Quoted text hidden]

Jeffrey McCoy (kjmccoy@comcast.net) Sent You a Personal Message Sat, Jun 6, 2020 at 9:51 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Jeffrey McCoy
2992 Crooked Wash Dr.
Loveland, CO 80538
kjmccoy@comcast.net
(970) 800-3885
[Quoted text hidden]

Ellen Ewert (debuce549@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 9:58 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Ellen Ewert
6439 Eden Garden Dr
Loveland, CO 80538
debuce549@gmail.com
(720) 732-6711
[Quoted text hidden]

Mark Enser (enser73@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 10:09 AM

<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Mark Enser
52 Sioux Ct
Red Feather Lakes, CO 80545
enser73@gmail.com
(303) 902-2008
[Quoted text hidden]

Meg Schiel (megsms@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 10:13 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Meg Schiel
637 N. Taft Hill Rd
Fort Collins , CO 80521
megsms@gmail.com
(970) 402-0635
[Quoted text hidden]

Dalton Zerlan (green123goldram@yahoo.com) Sent You a Personal Message Sat, Jun 6, 2020 at 10:20 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

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Sincerely,

Dalton Zerlan
2440 West Prospect Road
Fort Collins, CO 80526
green123goldram@yahoo.com
(970) 987-6543
[Quoted text hidden]

Kay Linder (kaylinder6@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 10:32 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Kay Linder
2105 Sage Drive
Fort Collins, CO 80524
kaylinder6@gmail.com
(970) 224-4232
[Quoted text hidden]

Denise Biggins (denisebiggins4@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 10:55 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Denise Biggins
327 Towhee Ridge Rd.
Laporte, CO 80535

denisebiggins4@gmail.com
(970) 420-2145
[Quoted text hidden]

Heath Blanton (hwbuell@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 11:01 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Heath Blanton
369 Stout St
Fort Collins, CO 80524
hwbuell@gmail.com
(970) 215-4333
[Quoted text hidden]

---

nikolas hall (nik.hall.1994@hotmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 11:03 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

nikolas hall
2504 TULANE DR
FORT COLLINS, CO 80525
nik.hall.1994@hotmail.com
(303) 946-3297
[Quoted text hidden]

Tricia Kob (kobhouse@comcast.net) Sent You a Personal Message Sat, Jun 6, 2020 at 11:05 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Tricia Kob
1918 Leicester Way
Fort Collins, CO 80526
kobhouse@comcast.net
(970) 416-1813
[Quoted text hidden]

Jacalyn Klausmeyer (abcsq2@aol.com) Sent You a Personal Message Sat, Jun 6, 2020 at 11:12 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Jacalyn Klausmeyer
PO Box 364
BELLVUE, CO 80512
abcsq2@aol.com
(970) 493-5329
[Quoted text hidden]

William Hilsmeier (wfhpilot@comcast.net) Sent You a Personal Message Sat, Jun 6, 2020 at 11:14 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

William Hilsmeier
3300 Stanford Rd., Apt. N107
Fort Collins, CO 80525
wfhpilot@comcast.net
(970) 233-8763
[Quoted text hidden]

Dolores Williams (tinytornado@mac.com) Sent You a Personal Message Sat, Jun 6, 2020 at 11:14 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Dolores Williams
415 Mason Court 7A
Fort Collins, CO 80524
tinytornado@mac.com
(970) 215-6951
[Quoted text hidden]

---

ann schnaidt (ann.schnaidt@frontrange.edu) Sent You a Personal Message Sat, Jun 6, 2020 at 11:20 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

ann schnaidt
618 east plum
ft collins, CO 80524
ann.schnaidt@frontrange.edu
(970) 495-0546
[Quoted text hidden]

Harry Rose (harrylrose@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 11:57 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Harry Rose
504 Edwards Street
Fort Collins, CO 80524
harrylrose@gmail.com
(970) 430-6731
[Quoted text hidden]

David Cantrell (cantrell@frii.com) Sent You a Personal Message Sat, Jun 6, 2020 at 11:59 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

David Cantrell
1148 Laporte Ave.
Fort Collins, CO 80521
cantrell@frii.com
(970) 482-0809
[Quoted text hidden]

Jennifer Benkman (jsbenkman@yahoo.com) Sent You a Personal Message Sat, Jun 6, 2020 at 12:06 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Jennifer Benkman
7001 Foxton Ct
Timnath, CO 80547
jsbenkman@yahoo.com
(307) 399-3818
[Quoted text hidden]

Julie Wille (womenforwildlands@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 12:10 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Julie Wille
485 West Sopris Creek Road
Basalt, CO 81621
womenforwildlands@gmail.com
(970) 925-3760
[Quoted text hidden]

Martha Stein (muffinstein66@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 12:12 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Martha Stein
307 So Washington
Fort Collins, CO 80521
muffinstein66@gmail.com
(970) 430-8720
[Quoted text hidden]

Thomas Allen (drtomallen@aol.com) Sent You a Personal Message Sat, Jun 6, 2020 at 12:29 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Thomas Allen
620 N County Road 23H
Loveland, CO 80537

drtomallen@aol.com
(970) 635-4650
[Quoted text hidden]

Robert Schmidt (schm821@aol.com) Sent You a Personal Message Sat, Jun 6, 2020 at 1:11 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Robert Schmidt
1207 Wooded Creek Court
Fort Collins, CO 80526
schm821@aol.com
(970) 223-0118
[Quoted text hidden]

Charles Kopp (charleskop@centurylink.net) Sent You a Personal Message Sat, Jun 6, 2020 at 1:13 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Charles Kopp
501 Hanna St.
Fort Collins, CO 80521
charleskop@centurylink.net
(970) 672-8597
[Quoted text hidden]

Susan Eikenbary (susan.eikenbary@colorado.edu) Sent You a Personal Message Sat, Jun 6, 2020 at 1:20 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Susan Eikenbary
4750 Pleasant Oak
Fort Collins, CO 80525
susan.eikenbary@colorado.edu
(970) 377-0000
[Quoted text hidden]

John Baker (Bakermils@hotmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 1:59 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

John Baker
727 La Cruz Drive
Fort Collins , CO 80524
Bakermils@hotmail.com
(970) 210-4445
[Quoted text hidden]

Susan Moore (slollar38@hotmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 2:12 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Susan Moore
4730 Levi Ct.
Loveland, CO 80537
slollar38@hotmail.com
(317) 354-7866
[Quoted text hidden]

Stacy Lesartre (hlcp187@aol.com) Sent You a Personal Message Sat, Jun 6, 2020 at 2:16 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Stacy Lesartre
619 Castle Ridge Court
Fort Collins, CO 80525
hlcp187@aol.com
(970) 223-8467
[Quoted text hidden]

Jeffrey Mitchell (jeffmitc@frii.com) Sent You a Personal Message Sat, Jun 6, 2020 at 2:18 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Jeffrey Mitchell
2622 Darren St.
Fort Collins, CO 80524
jeffmitc@frii.com
(970) 221-9539
[Quoted text hidden]

Robin Welsh (rswbirdbrain@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 4:00 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Robin Welsh
2437 Newport Court
Fort Collins , CO 80526
rswbirdbrain@gmail.com
(970) 493-6594
[Quoted text hidden]

Brian Park (brianp17@hotmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 4:08 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Brian Park
1419 LaPorte Ave
Fort Collins, CO 80521
brianp17@hotmail.com
(970) 690-8761
[Quoted text hidden]

Camille Hansen (hansencamille45@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 4:11 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Camille Hansen
1980 Welch Street
Fort Collins , CO 80525
hansencamille45@gmail.com
(970) 482-8564
[Quoted text hidden]

Tony Coulson (tonycoulson.tall@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 4:17 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Tony Coulson
888 Watercourse Way
Fort Collins, CO 80525
tonycoulson.tall@gmail.com
(630) 842-6995
[Quoted text hidden]

Janet Cross (jan.cross77@yahoo.com) Sent You a Personal Message Sat, Jun 6, 2020 at 4:27 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Janet Cross
1351 Arikaree Drive
LOVELAND, CO 80538
jan.cross77@yahoo.com
(970) 669-8806
[Quoted text hidden]

Conny Seay (connerseay@yahoo.com) Sent You a Personal Message Sat, Jun 6, 2020 at 4:39 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Conny Seay
1646 Garnet St
Loveland , CO 80537

connerseay@yahoo.com
(719) 466-7388
[Quoted text hidden]

Mary Hamburger (mjbhamburger@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 4:57 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Mary Hamburger
1110 Elm Street
Fort Collins, CO 80521
mjbhamburger@gmail.com
(970) 689-3663
[Quoted text hidden]

Ted Walkup (twalkup8@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 7:29 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Ted Walkup
3514 Pratolina Court
Fort Collins , CO 80521
twalkup8@gmail.com
(404) 630-0476
[Quoted text hidden]

Tim Abbott (tjabbott21@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 7:40 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Tim Abbott
5625 Red Willow Ct.
Fort Collins, CO 80528
tjabbott21@gmail.com
(970) 226-0231
[Quoted text hidden]

Katherine Von Loh (vonlohk@comcast.net) Sent You a Personal Message Sat, Jun 6, 2020 at 8:28 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

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Sincerely,

Katherine Von Loh
8343 Sand Dollar Dr
Windsor, CO 80528
vonlohk@comcast.net
(970) 581-9137
[Quoted text hidden]

James Jeffreys (james_jeffreys@msn.com) Sent You a Personal Message Sat, Jun 6, 2020 at 9:41 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

James Jeffreys
2225 Bronson St
Fort Collins, CO 80526
james_jeffreys@msn.com
(970) 223-8894
[Quoted text hidden]

Kate Emerson (kate0emerson@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 9:46 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Kate Emerson
1105 Fairview Dr.
Fort Collins, CO 80521
kate0emerson@gmail.com
(925) 872-0770
[Quoted text hidden]

Sydney Hoffman (sydnymsn@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 10:42 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Sydney Hoffman
301 East Harmony Road Unit 204
Fort Collins, CO 80525
sydnymsn@gmail.com
(720) 378-4470
[Quoted text hidden]

Avery Ridout (averyridout123@gmail.com) Sent You a Personal Message Sat, Jun 6, 2020 at 10:42 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Avery Ridout
616 Horse Mountain Drive
Livermore, CO 80536
averyridout123@gmail.com
(970) 297-8113
[Quoted text hidden]

Angela King (theangelaking@gmail.com) Sent You a Personal Message Sun, Jun 7, 2020 at 5:47 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Angela King
4101 Green Ridge Drive
Laporte, CO 80535
theangelaking@gmail.com
(970) 493-7442
[Quoted text hidden]

William OHalloran (colodpm@aol.com) Sent You a Personal Message Sun, Jun 7, 2020 at 6:27 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

William OHalloran
1032 Linden Gate Ct
Fort Collins, CO 80524
colodpm@aol.com
(970) 484-8672
[Quoted text hidden]

William Fryer (wmfryer49@gmail.com) Sent You a Personal Message Sun, Jun 7, 2020 at 6:59 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

William Fryer
862 Blue Mist Ln
Estes Park, CO 80517
wmfryer49@gmail.com
(970) 613-1503
[Quoted text hidden]

Zane Bamesberger (adidajudo@msn.com) Sent You a Personal Message Sun, Jun 7, 2020 at 7:24 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Zane Bamesberger
1006 Rocky Mountain Way
Fort Collins, CO 80526
adidajudo@msn.com
(719) 351-8402
[Quoted text hidden]

Carla Bamesberger (kenyazero@yahoo.com) Sent You a Personal Message Sun, Jun 7, 2020 at 7:34 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Carla Bamesberger
1006 Rocky Mountain Way
Fort Collins, CO 80526

kenyazero@yahoo.com
(719) 235-1265
[Quoted text hidden]

Yvonne Wootten (sywootten@att.net) Sent You a Personal Message Sun, Jun 7, 2020 at 7:56 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Yvonne Wootten
4802 Prairie vista dr
Fort Collins, CO 80526
sywootten@att.net
(970) 294-5651
[Quoted text hidden]

John Dixon (njdixon1@earthlink.net) Sent You a Personal Message Sun, Jun 7, 2020 at 8:27 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

John Dixon
1704 Brookhaven Circle West
Fort Collins, CO 80525
njdixon1@earthlink.net
(970) 631-8896
[Quoted text hidden]

William Sawyer (buz.sawyer@gmail.com) Sent You a Personal Message Sun, Jun 7, 2020 at 8:59 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

William Sawyer
902 Watercourse Way
Fort collins, CO 80525
buz.sawyer@gmail.com
(914) 563-6058
[Quoted text hidden]

Audrey Vangrove (audreylama@yaho.com) Sent You a Personal Message Sun, Jun 7, 2020 at 9:01 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Audrey Vangrove
278 Pine Bluff Road
Divide, CO 80814
audreylama@yaho.com
(719) 235-1264
[Quoted text hidden]

Joan Paskewitz (joan.paskewitz@gmail.com) Sent You a Personal Message Sun, Jun 7, 2020 at 10:28 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Joan Paskewitz
345 Cree Ct
Lyons, CO 80540
joan.paskewitz@gmail.com
(303) 823-5937
[Quoted text hidden]

Jay Parry (parryjd@hotmail.com) Sent You a Personal Message Sun, Jun 7, 2020 at 10:30 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Jay Parry
2220 carriage dr
Estes Park , CO 80517
parryjd@hotmail.com
(831) 334-5290
[Quoted text hidden]

Adam Vangrove (turrettipper@gmail.com) Sent You a Personal Message Sun, Jun 7, 2020 at 10:38 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Adam Vangrove
1006 Rocky Mountain Way
Fort Collins, CO 80526
turrettipper@gmail.com
(719) 359-6319
[Quoted text hidden]

Dan Racz (raczdan@gmail.com) Sent You a Personal Message <automail@knowwho.com> Sun, Jun 7, 2020 at 11:14 AM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Dan Racz
1233 N CR 29
Loveland, CO 80537
raczdan@gmail.com
(630) 668-2686
[Quoted text hidden]

Megan Thorburn (meganthor@yahoo.com) Sent You a Personal Message Sun, Jun 7, 2020 at 12:41

<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Megan Thorburn
3401 Lancaster Drive
Fort Collins, CO 80525
meganthor@yahoo.com
(970) 412-9410
[Quoted text hidden]

Josh Vangrove (vangrove@realtor.com) Sent You a Personal Message Sun, Jun 7, 2020 at 2:26 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Josh Vangrove
278 Pine Bluff Rd
Divide, CO 80814
vangrove@realtor.com
(719) 687-7821
[Quoted text hidden]

Pamela Franzen (pcfranzen@man.com) Sent You a Personal Message Sun, Jun 7, 2020 at 2:36 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Pamela Franzen
10197 N County Rd 19
Fort Collins , CO 80524
pcfranzen@man.com
(970) 980-3910
[Quoted text hidden]

Darrel Snyder (darrel.snyder@colostate.edu) Sent You a Personal Message Sun, Jun 7, 2020 at 2:49 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Darrel Snyder
619 N. Sunset St.
Fort Collins, CO 80521
darrel.snyder@colostate.edu
(970) 491-5295
[Quoted text hidden]

Em Ess (m.schroo@gmail.com) Sent You a Personal Message <automail@knowwho.com> Sun, Jun 7, 2020 at 3:28 PM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Em Ess
1625 e. Stuart St. #h11
Fort Collins, CO 80525
m.schroo@gmail.com
(970) 223-2321

[Quoted text hidden]

Rob Owens (robertlowens266@gmail.com) Sent You a Personal Message Sun, Jun 7, 2020 at 3:34 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Rob Owens
520 West Oak Street
Fort Collins, CO 80521
robertlowens266@gmail.com
(703) 505-0038
[Quoted text hidden]

Stephen Rosenberg (scott_rosenberg@hotmail.com) Sent You a Personal Message Sun, Jun 7, 2020 at 4:01 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Stephen Rosenberg
856 Ridge Runner Drive
Fort Collins, CO 80524
scott_rosenberg@hotmail.com
(970) 590-6885
[Quoted text hidden]

Richard Carr (carrrj@gmail.com) Sent You a Personal Message <automail@knowwho.com> Sun, Jun 7, 2020 at 5:14 PM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Richard Carr
3569 Granby Ct
Loveland, CO 80538
carrrj@gmail.com
(970) 484-4943
[Quoted text hidden]

Patti Wermeling (patti.wermeling@colostate.edu) Sent You a Personal Message Sun, Jun 7, 2020 at 9:10 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Patti Wermeling
3945 Landings Dr Unit F-1
Fort Colllins, CO 80525
patti.wermeling@colostate.edu
(970) 377-2081
[Quoted text hidden]

Alana Davis (alanamarie6@gmail.com) Sent You a Personal Message Sun, Jun 7, 2020 at 10:30 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Alana Davis

2211 W. Mulberry St, Lot 263
Fort Collins, CO 80521
alanamarie6@gmail.com
(970) 682-4466
[Quoted text hidden]

Russ Ayer (russ.ayer46@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 1:04 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Russ Ayer
5000 Boardwalk Drive #11
Fort Collins, CO 80525
russ.ayer46@gmail.com
(802) 233-6262
[Quoted text hidden]

Mike Kendrick (mkendrick9@icloud.com) Sent You a Personal Message Mon, Jun 8, 2020 at 7:29 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Mike Kendrick
830 Maple Street
Fort Collins, CO 80521
mkendrick9@icloud.com
(970) 237-9684
[Quoted text hidden]

Belinda Barnes (bagbarnes@hotmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 8:12 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Belinda Barnes
8313 Peakview dr
Fort Collins , CO 80528
bagbarnes@hotmail.com
(707) 490-2285
[Quoted text hidden]

Matthew Lafferty <laffermn@co.larimer.co.us> Mon, Jun 8, 2020 at 8:23 AM
To: Rob Helmick <helmicrp@larimer.org>

2168

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project

3 messages

Jan Rothe (lemmule@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 10:12 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Jan Rothe
6521 Placer Ct
Bellvue, CO 80512
lemmule@gmail.com
(970) 467-1415

Khalid Aziz (khalid@gonehiking.org) Sent You a Personal Message Mon, Jun 8, 2020 at 10:46 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Khalid Aziz
3406 Red Mountain Dr
Fort Collins, CO 80525
khalid@gonehiking.org
(970) 282-8751
[Quoted text hidden]

Ben Platt (bplattp@gmail.com) Sent You a Personal Message <automail@knowwho.com> Mon, Jun 8, 2020 at 10:52 AM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Ben Platt
1212 Raintree Dr.
Fort Collins, CO 80526
bplattp@gmail.com
(720) 272-2190
[Quoted text hidden]

2170

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project

29 messages

Jan Rothe (lemmule@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 10:12 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Jan Rothe
6521 Placer Ct
Bellvue, CO 80512
lemmule@gmail.com
(970) 467-1415

Khalid Aziz (khalid@gonehiking.org) Sent You a Personal Message Mon, Jun 8, 2020 at 10:46 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Khalid Aziz
3406 Red Mountain Dr
Fort Collins, CO 80525
khalid@gonehiking.org
(970) 282-8751
[Quoted text hidden]

Ben Platt (bplattp@gmail.com) Sent You a Personal Message <automail@knowwho.com> Mon, Jun 8, 2020 at 10:52 AM
To: pcboard@larimer.org

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Sincerely,

Ben Platt
1212 Raintree Dr.
Fort Collins, CO 80526
bplattp@gmail.com
(720) 272-2190
[Quoted text hidden]

Delaney Worthington (delaneywo@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 10:57 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Delaney Worthington
7051 S Waco St
Foxfield, CO 80016
delaneywo@gmail.com
(720) 427-1976
[Quoted text hidden]

Susan Wannamaker (susanawannamaker@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 11:06 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Susan Wannamaker
320 East Elizabeth Street
Fort Collins , CO 80524
susanawannamaker@gmail.com
(812) 361-7766
[Quoted text hidden]

Fernando Ibarra (f.ibarra@yahoo.com) Sent You a Personal Message Mon, Jun 8, 2020 at 11:09 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Fernando Ibarra
3115 Muskrat Creek Drive
Fort Collins , CO 80528
f.ibarra@yahoo.com
(650) 533-5321
[Quoted text hidden]

Scott Henderson (shenderson1254@yahoo.com) Sent You a Personal Message Mon, Jun 8, 2020 at 11:18 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Scott Henderson
11111 Alcott St Apt A
Westminster, CO 80234
shenderson1254@yahoo.com
(847) 385-8967
[Quoted text hidden]

Sarah Kalert (sarahkalert@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 11:35 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Sarah Kalert
6416 Placer Court
Bellvue, CO 80512

sarahkalert@gmail.com
(970) 420-9361
[Quoted text hidden]

Judson Brown (redcanoe53@msn.com) Sent You a Personal Message Mon, Jun 8, 2020 at 11:58 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Judson Brown
1724 Westview Rd
Fort Collins, CO 80524
redcanoe53@msn.com
(970) 631-9253
[Quoted text hidden]

Leslie Carter (lcarter@colostate.edu) Sent You a Personal Message Mon, Jun 8, 2020 at 12:04 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Leslie Carter
PO Box 271314
Ft. Collins, CO 80527
lcarter@colostate.edu
(970) 391-5407
[Quoted text hidden]

Greg Tjossem (gtjossem@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 12:06 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Greg Tjossem
2204 North Overland Trail
Fort Collins, CO 80521
gtjossem@gmail.com
(563) 419-4685
[Quoted text hidden]

Ed Ogle (edogle.political@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 12:32 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Ed Ogle
608 Sheridan Ave
Loveland, CO 80537
edogle.political@gmail.com
(970) 663-4260
[Quoted text hidden]

Donna Brown (danusia531@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 12:34 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Donna Brown
1724 Westview Road
Fort Collins, CO 80524
danusia531@gmail.com
(702) 525-1642
[Quoted text hidden]

Gina Montalbano (gmarie424@ymail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 2:39 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Gina Montalbano
2300 Montadale Ct
Fort Collins, CO 80526
gmarie424@ymail.com
(970) 371-4635
[Quoted text hidden]

John Stephen (john.sara.stephen@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 3:22 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

John Stephen
PO Box 155
Bellvue , CO 80512
john.sara.stephen@gmail.com
(970) 222-5569
[Quoted text hidden]

Susan Cundiff (suebear210@hotmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 3:38 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Susan Cundiff
917 Sitka Street
Fort Collins, CO 80524
suebear210@hotmail.com
(970) 556-3466
[Quoted text hidden]

Kate Rayner Fried (katerf12@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 6:47 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Kate Rayner Fried
4255 Kingsbury Drive
Fort Collins, CO 80525
katerf12@gmail.com
(970) 213-2129
[Quoted text hidden]

Susan Aubin (1redfly@hotmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 6:55 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Susan Aubin
1103 W Olive Street
Fort Collins, CO 80521
1redfly@hotmail.com
(970) 215-5302
[Quoted text hidden]

Alyssa Dietrich (alyssa.d.hendricks@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 8:48 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Alyssa Dietrich
2978 Southmoor Drive
Fort Collins, CO 80525
alyssa.d.hendricks@gmail.com
(303) 908-7135
[Quoted text hidden]

Pamela Cruse (pjody@lpbroadband.net) Sent You a Personal Message Mon, Jun 8, 2020 at 8:59 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Pamela Cruse
6016 N. County Rd. 29C
Bellview, CO 80512
pjody@lpbroadband.net
(970) 215-7136
[Quoted text hidden]

Matthew Dietrich (dietrichmr@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 9:00 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Matthew Dietrich
2978 Southmoor Dr
Fort Collins , CO 80525

dietrichmr@gmail.com
(719) 648-9448
[Quoted text hidden]

Renee Walkup (rpwalkup@bellsouth.net) Sent You a Personal Message Mon, Jun 8, 2020 at 9:19 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Renee Walkup
3514 Pratolina Court
Fort Collins, CO 80521
rpwalkup@bellsouth.net
(404) 271-7438
[Quoted text hidden]

Gretchen Ibarra (gretchen39@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 9:39 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Gretchen Ibarra
3115 Muskrat Creek Drive
Fort Collins , CO 80528
gretchen39@gmail.com
(650) 222-4864
[Quoted text hidden]

Elizabeth Thompson (liz@finetuned.com) Sent You a Personal Message Mon, Jun 8, 2020 at 10:05 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Elizabeth Thompson
704 Dellwood Dr
Fort Collins, CO 80524
liz@finetuned.com
(970) 846-6564
[Quoted text hidden]

Carol Montgomery (carolbranchmontgomery@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 11:57 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Carol Montgomery
2108 Blue Yonder Way
Fort Collins, CO 80525
carolbranchmontgomery@gmail.com
(908) 872-0091
[Quoted text hidden]

Gary Faris (gfaris22@gmail.com) Sent You a Personal Message <automail@knowwho.com> Tue, Jun 9, 2020 at 7:13 AM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Gary Faris
1015 Akin Ave
Fort Collins, CO 80521
gfaris22@gmail.com
(970) 218-3580
[Quoted text hidden]

Ellen Heath (ellen.m.heath@gmail.com) Sent You a Personal Message Tue, Jun 9, 2020 at 7:17 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Ellen Heath
2545 Spruce Creek Dr
Fort Collins, CO 80528
ellen.m.heath@gmail.com
(970) 237-2329
[Quoted text hidden]

Alanna Snedigar (onetipsytraveler@gmail.com) Sent You a Personal Message Tue, Jun 9, 2020 at 7:58 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Alanna Snedigar
1413 Winfield Dr
Fort Collins, CO 80526
onetipsytraveler@gmail.com
(626) 733-7213
[Quoted text hidden]

Matthew Lafferty <laffermn@co.larimer.co.us> Tue, Jun 9, 2020 at 8:17 AM
To: "Helmick, Rob" <rhelmick@larimer.org>

fyi
[Quoted text hidden]
--

Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project

100 messages

Thora Aldorfer (aldorfert@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 4:33 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Thora Aldorfer
1678 Garnet St
Loveland, CO 80537
aldorfert@gmail.com
(720) 244-2548

Debra Applin (deb@applin.us) Sent You a Personal Message <automail@knowwho.com> Fri, Jun 5, 2020 at 4:35 PM
To: pcboard@larimer.org

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Sincerely,

Debra Applin
1608 Sheely Drive
Fort Collins, CO 80526
deb@applin.us
(970) 441-1207
[Quoted text hidden]

Joan Sayre (jesayre@sbcglobal.net) Sent You a Personal Message Fri, Jun 5, 2020 at 4:37 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

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Sincerely,

Joan Sayre
4777 Forelock Drive
Fort Collins, CO 80524
jesayre@sbcglobal.net
(970) 493-1383
[Quoted text hidden]

Mariah Veach (billybad4u@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 4:37 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Mariah Veach
821 Heather Dr
Loveland, CO 80537
billybad4u@gmail.com
(970) 663-6855
[Quoted text hidden]

Elizabeth Kaiser (ejanekaiser@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 4:39 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Elizabeth Kaiser
4470 S Lemay Ave
Fort Collins, CO 80525
ejanekaiser@gmail.com
(970) 214-1921
[Quoted text hidden]

ED BOUSQUET (teleskees@aol.com) Sent You a Personal Message Fri, Jun 5, 2020 at 4:40 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

ED BOUSQUET
2643 SILVER CREEK DR
FORT COLLINS, CO 80524
teleskees@aol.com
(970) 217-3986
[Quoted text hidden]

Sonia ImMasche (simmasch@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 4:40 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Sonia ImMasche
730 Cottonwood Drive
Fort Collins, CO 80524
simmasch@gmail.com
(970) 221-1517
[Quoted text hidden]

Tom Schultz (schultz@denison.edu) Sent You a Personal Message Fri, Jun 5, 2020 at 4:43 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Tom Schultz
7209 Fort Morgan Drive .
Fort Collins, CO 80525

schultz@denison.edu
(740) 817-1242
[Quoted text hidden]

Louisann Levy (aceparenting@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 4:43 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Louisann Levy
1006 akin ave
ft collins, CO 80521
aceparenting@gmail.com
(970) 482-3828
[Quoted text hidden]

Sue McShane (sueball44@msn.com) Sent You a Personal Message Fri, Jun 5, 2020 at 4:44 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Sue McShane
417 Pearl Street
Fort Collins, CO 80521
sueball44@msn.com
(970) 484-2507
[Quoted text hidden]

Shelley Hines (s.hines@ymail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 4:47 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Shelley Hines
504 Crescent Drive
Loveland, CO 80538
s.hines@ymail.com
(970) 744-0240
[Quoted text hidden]

Deborah Sie (djsie2008@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 4:50 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Deborah Sie
612 MANHEAD MOUNTAIN DR
LIVERMORE, CO 80536
djsie2008@gmail.com
(313) 605-3487
[Quoted text hidden]

Norman Illsley (Norm.illsley@colostate.edu) Sent You a Personal Message Fri, Jun 5, 2020 at 4:50 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Norman Illsley
907 Sailors Reef
Fort Collins, CO 80525
Norm.illsley@colostate.edu
(970) 377-0863
[Quoted text hidden]

Austen Stone MPH (umahorse@aol.com) Sent You a Personal Message Fri, Jun 5, 2020 at 4:51 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Austen Stone MPH
1023 Linden Gate Court
Ft. Collins, CO 80524
umahorse@aol.com
(808) 885-1525
[Quoted text hidden]

Michele Brown (skyemouse22@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 4:51 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Michele Brown
109 W. Myrtle St.
Fort Collins, CO 80524
skyemouse22@gmail.com
(970) 820-0050
[Quoted text hidden]

Teresa Phillips (mymule52@icloud.com) Sent You a Personal Message Fri, Jun 5, 2020 at 4:52 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Teresa Phillips
913 Marshall
Fort Collins , CO 80525
mymule52@icloud.com
(970) 581-9719
[Quoted text hidden]

George Carlisle (carlislegeorge@yahoo.com) Sent You a Personal Message Fri, Jun 5, 2020 at 4:53 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

George Carlisle
826 Jerome St
Fort Collins , CO 80524
carlislegeorge@yahoo.com
(770) 533-1881
[Quoted text hidden]

Betty Weber (pr.bb.weber@comcast.net) Sent You a Personal Message Fri, Jun 5, 2020 at 4:59 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Betty Weber
4348 Chateau Drive
Loveland, CO 80538
pr.bb.weber@comcast.net
(970) 613-1789
[Quoted text hidden]

Rhea-Claire Ferranti (rheaclaire@aol.com) Sent You a Personal Message Fri, Jun 5, 2020 at 4:59 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

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Sincerely,

Rhea-Claire Ferranti
12754 Pingree Park Road
Bellvue , CO 80512
rheaclaire@aol.com
(970) 420-7123
[Quoted text hidden]

Daniel Harber (danieljharber@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:00 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Daniel Harber
716 Pecan Dr
Bellvue, CO 80512
danieljharber@gmail.com
(970) 217-5585
[Quoted text hidden]

Casey McFarland (ofthefarland@yahoo.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:00 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Casey McFarland
425 Garfield St
Fort Collins, CO 80524

ofthefarland@yahoo.com
(505) 944-5547
[Quoted text hidden]

Margaret Exner-Wieszcholek (mexnerw@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:01 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Margaret Exner-Wieszcholek
4901 Fox Ridge Court
Fort Collins, CO 80524
mexnerw@gmail.com
(303) 378-3396
[Quoted text hidden]

Sarah Babbitt (smbmfa@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:02 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Sarah Babbitt
3010 DEAN DR
FORT COLLINS, CO 80521
smbmfa@hotmail.com
(970) 472-0766
[Quoted text hidden]

Warren Snyder (pregnantguppie@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:02 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Warren Snyder
1630 Collindale Dr.
Fort Collins, CO 80525
pregnantguppie@hotmail.com
(970) 666-6969
[Quoted text hidden]

Seanna Renworth (smrenworth@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:03 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Seanna Renworth
1817 Serramonte Drive
Fort Collins, CO 80524
smrenworth@gmail.com
(970) 443-0930
[Quoted text hidden]

Cathie Leslie (csleslie51@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:05 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Cathie Leslie
614 Bristlecone Ct
Berthoud, CO 80513
csleslie51@hotmail.com
(575) 644-2512
[Quoted text hidden]

Rebecca Scherbarth (scherbarth@haberfeld.net) Sent You a Personal Message Fri, Jun 5, 2020 at 5:06 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Rebecca Scherbarth
3149 Stargazer Court
Fort Collins, CO 80521
scherbarth@haberfeld.net
(970) 219-8337
[Quoted text hidden]

Sierra Wunrow (sierracheywun@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:10 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Sierra Wunrow
824 N Garfield Ave
Loveland, CO 80537
sierracheywun@gmail.com
(920) 284-2827
[Quoted text hidden]

Marlon Poole (mpoole61@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:12 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Marlon Poole
7233 Fort Morgan Dr
Fort Collins, CO 80525
mpoole61@gmail.com
(970) 219-3258
[Quoted text hidden]

Marin MacDonald (marin.shane@icloud.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:14 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Marin MacDonald
1209 W.plum st
Fort Collins, CO 80521
marin.shane@icloud.com
(978) 992-1039
[Quoted text hidden]

Weldon Barker (weldonb2@att.net) Sent You a Personal Message <automail@knowwho.com> Fri, Jun 5, 2020 at 5:14 PM
To: pcboard@larimer.org

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Sincerely,

Weldon Barker
2263 Rocky Mtn Avenue #311
Loveland, CO 80538
weldonb2@att.net
(843) 475-3333
[Quoted text hidden]

Betsy Wier (bwier@prescott.edu) Sent You a Personal Message <automail@knowwho.com> Fri, Jun 5, 2020 at 5:14 PM
To: pcboard@larimer.org

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Sincerely,

Betsy Wier
2503 Milton Lane
Fort Collins, CO 80524
bwier@prescott.edu
(970) 218-0631
[Quoted text hidden]

Sandra Cardillo (scardillo919@yahoo.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:15 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Sandra Cardillo
2104 Ideal Lane
Fort Collins , CO 80524
scardillo919@yahoo.com
(402) 201-4107
[Quoted text hidden]

Marshall Cutchin (mcutchin@midcurrent.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:16 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Marshall Cutchin
5615 Northern Lights Dr.
Fort Collins, CO 80528
mcutchin@midcurrent.com
(970) 232-9541

[Quoted text hidden]

Lisha Doucet (lisha_doucet@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:20 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

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Sincerely,

Lisha Doucet
8525 Citation Dr
Wellington, CO 80549
lisha_doucet@hotmail.com
(281) 389-5339
[Quoted text hidden]

Shelley Kilbon (gwyddon33@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:22 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Shelley Kilbon
4575 Keota Pl
Loveland, CO 80538
gwyddon33@hotmail.com
(970) 217-1564
[Quoted text hidden]

Steve Kestrel (skestrel@aol.com) Sent You a Personal Message <automail@knowwho.com> Fri, Jun 5, 2020 at 5:22 PM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Steve Kestrel
14302 N. County Rd 25 E
Loveland, CO 80538
skestrel@aol.com
(970) 225-9154
[Quoted text hidden]

Liz Hobbs (e.hobbs@colostate.edu) Sent You a Personal Message Fri, Jun 5, 2020 at 5:29 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Liz Hobbs
1219 Mathews St
Fort Collins, CO 80524
e.hobbs@colostate.edu
(970) 491-7089
[Quoted text hidden]

Shelly Hudson (shellyloree@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:29 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Shelly Hudson

3320 Wagon Trail Rd
Fort Collins, CO 80524
shellyloree@hotmail.com
(303) 810-6018
[Quoted text hidden]

Linda Graae (lgraae03@aol.com) Sent You a Personal Message <automail@knowwho.com> Fri, Jun 5, 2020 at 5:34 PM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Linda Graae
309 E Swallow Rd
Ft Collins, CO 80525
lgraae03@aol.com
(970) 488-9899
[Quoted text hidden]

D Hinde (dhinde1@msn.com) Sent You a Personal Message <automail@knowwho.com> Fri, Jun 5, 2020 at 5:34 PM
To: pcboard@larimer.org

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Sincerely,

D Hinde
2575 Tupelo Drive
Loveland, CO 80538
dhinde1@msn.com
(970) 669-6247
[Quoted text hidden]

Andrew VILLALOBOS (av0311@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 5:34 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Andrew VILLALOBOS
529 e 6th st
Loveland, CO 80537
av0311@gmail.com
(970) 231-6775
[Quoted text hidden]

Robert Molison (rmolison1@comcast.net) Sent You a Personal Message Fri, Jun 5, 2020 at 5:40 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Robert Molison
1307 Front Nine Drive
Fort Collins, CO 80525
rmolison1@comcast.net
(970) 377-4228
[Quoted text hidden]

Thomas Peterson (tcpete@frii.com) Sent You a Personal Message
<automail@knowwho.com>
To: pcboard@larimer.org

Fri, Jun 5, 2020 at 5:56 PM

Dear Larimer County Commissioners,

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Sincerely,

Thomas Peterson
1125 Oakmont Ct
Fort Collins, CO 80525
tcpete@frii.com
(303) 859-4413
[Quoted text hidden]

Mary Pullen (marypullen68@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 6:00 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Mary Pullen
4355 Sweetgrass Drive
Loveland, CO 80537
marypullen68@gmail.com
(970) 699-0952
[Quoted text hidden]

---

deborah straker (runninghorsevetclinic@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 6:13 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

deborah straker
1837 west county rd 76
wellington, CO 80549
runninghorsevetclinic@gmail.com
(970) 556-3320
[Quoted text hidden]

Allison Threepwood (mulberry_days@yahoo.com) Sent You a Personal Message Fri, Jun 5, 2020 at 6:23 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Allison Threepwood
412 Riddle Dr
Fort Collins, CO 80521
mulberry_days@yahoo.com
(970) 779-1253
[Quoted text hidden]

Beth O'Toole (ba.otoole@comcast.net) Sent You a Personal Message Fri, Jun 5, 2020 at 6:28 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Beth O'Toole
3450 Lost Lake Place J3
Fort Collins, CO 80528
ba.otoole@comcast.net
(970) 213-2042
[Quoted text hidden]

Chris Abshire (cabshi5@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 6:32 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Chris Abshire
1104 Ponderosa Dr
Fort Collins, CO 80521
cabshi5@gmail.com
(225) 573-4594
[Quoted text hidden]

Laura Radcliff (radoza@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 6:36 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Laura Radcliff
412 S Loomis Ave
Fort Collins, CO 80521
radoza@hotmail.com
(970) 581-1350
[Quoted text hidden]

Rob Edwards (rob_edwards@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 6:45 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

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Sincerely,

Rob Edwards
612 Knollwood Court
Fort Collins, CO 80524
rob_edwards@hotmail.com
(330) 348-1971
[Quoted text hidden]

Lee O'Brien (colobrien@bajabb.com) Sent You a Personal Message Fri, Jun 5, 2020 at 6:46 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Lee O'Brien
2021 Bingham Ln
Fort Collins, CO 80521

colobrien@bajabb.com
(970) 817-2197
[Quoted text hidden]

M Lujan (mitexas1@icloud.com) Sent You a Personal Message <automail@knowwho.com> Fri, Jun 5, 2020 at 6:56 PM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

M Lujan
1613 Windsorr Ct
Fort Collins , CO 80526
mitexas1@icloud.com
(210) 274-6526
[Quoted text hidden]

Suzanne Stratford (srosannadanna@msn.com) Sent You a Personal Message Fri, Jun 5, 2020 at 6:59 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Suzanne Stratford
140 W 10th St
Loveland, CO 80537
srosannadanna@msn.com
(970) 290-7355
[Quoted text hidden]

Darwin Leatherman (darwinleatherman@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 7:04 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Darwin Leatherman
242 Conifer St
Fort Collins, CO 80524
darwinleatherman@hotmail.com
(970) 980-8686
[Quoted text hidden]

David Hitchcock (graukki@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 7:07 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

David Hitchcock
108 Big Bend Lane
Bellvue , CO 80512
graukki@gmail.com
(571) 926-5343
[Quoted text hidden]

Matthew Varns (varnzo1@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 7:13 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Matthew Varns
2824 Sombrero Lane
Fort Collins, CO 80525
varnzo1@gmail.com
(970) 988-6400
[Quoted text hidden]

Sylvia Schneider (sylviaschneider49@yahoo.com) Sent You a Personal Message Fri, Jun 5, 2020 at 7:14 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Sylvia Schneider
2531 Longview Dr
Estes Park, CO 80517
sylviaschneider49@yahoo.com
(720) 369-9681
[Quoted text hidden]

Pam Scinto (pamscinto@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 7:15 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Pam Scinto
Pob 54
Bellvue, CO 80512
pamscinto@hotmail.com
(970) 631-4300
[Quoted text hidden]

Tom Libric (t0midrej@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 7:15 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Tom Libric
2320 Silver Oaks Dr
Fort collins, CO 80526
t0midrej@hotmail.com
(970) 402-3328
[Quoted text hidden]

Nick Michell (nmichell@yahoo.com) Sent You a Personal Message Fri, Jun 5, 2020 at 7:23 PM

<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Nick Michell
1670 Freewheel Dr
Fort Collins, CO 80525
nmichell@yahoo.com
(970) 215-9235
[Quoted text hidden]

Mark Houdashelt (mark.houdashelt@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 7:32 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Mark Houdashelt
429 Lyons St
Fort Collins, CO 80521
mark.houdashelt@gmail.com
(410) 369-6203
[Quoted text hidden]

Ann Webb (hikerannie@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 7:39 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Ann Webb
411 South Loomis Avenue
Fort Collins, CO 80521
hikerannie@hotmail.com
(970) 946-9259
[Quoted text hidden]

Shayna OKelley (Shaynaokelley@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 7:41 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Shayna OKelley
5268 Alberta Falls St
Timnath, CO 80547
Shaynaokelley@gmail.com
(270) 731-9235
[Quoted text hidden]

Alfred Arney (anachronal@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 7:43 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Alfred Arney
1728 Aalea Drive
Fort Collins, CO 80526

anachronal@hotmail.com
(970) 482-0672
[Quoted text hidden]

Morgan Hertel (hertelmorgan2@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 7:47 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Morgan Hertel
1828 Crestmore pl
Fort Collins, CO 80521
hertelmorgan2@gmail.com
(307) 899-5155
[Quoted text hidden]

Ruth Potter (ruthspotter@aol.com) Sent You a Personal Message <automail@knowwho.com> Fri, Jun 5, 2020 at 7:59 PM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

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Sincerely,

Ruth Potter
5226 Cornerstone Drive
Fort Collins, CO 80528
ruthspotter@aol.com
(970) 282-1245
[Quoted text hidden]

Katherine Lybecker (kaylybecker@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 7:59 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Katherine Lybecker
3020 Phoenix Dr
Ft Collins, CO 80525
kaylybecker@gmail.com
(970) 226-1485
[Quoted text hidden]

Jacob Sanchez (jacobasanchez93@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 8:03 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Jacob Sanchez
135 NORTH SHERWOOD STREET
FORT COLLINS, CO 80521
jacobasanchez93@gmail.com
(909) 730-7692
[Quoted text hidden]

Rachel Sanborn (vtmorningstar@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 8:03 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Rachel Sanborn
3609 Mayflower Court
Fort Collins, CO 80526
vtmorningstar@gmail.com
(802) 477-3871
[Quoted text hidden]

Paul West (prwest@yahoo.com) Sent You a Personal Message <automail@knowwho.com> Fri, Jun 5, 2020 at 8:11 PM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Paul West
1437 Regency Ct
Fort Collins, CO 80526
prwest@yahoo.com
(970) 225-0508
[Quoted text hidden]

Harper Lowrey (hlak261@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 8:18 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Harper Lowrey
513 Smith Street
Fort Collins, CO 80524
hlak261@gmail.com
(970) 567-9765
[Quoted text hidden]

Justice Hardman (katliz1234@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 8:22 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Justice Hardman
1251 N WILSON AVe
Loveland, CO 80537
katliz1234@gmail.com
(859) 236-8124
[Quoted text hidden]

Nancy Foxley (nancy.foxley@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 8:22 PM
<automail@knowwho.com>

To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Nancy Foxley
3186 Worthington Ave.
Fort Collins, CO 80526
nancy.foxley@gmail.com
(970) 980-7793
[Quoted text hidden]

Tom Griggs (tomgriggs520@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 8:30 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Tom Griggs
520 N Sherwood St #12
Fort Collins, CO 80521
tomgriggs520@gmail.com
(970) 988-5820
[Quoted text hidden]

Travis Croft (tcroft97@gmail.com) Sent You a Personal Message <automail@knowwho.com> Fri, Jun 5, 2020 at 8:40 PM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Travis Croft
318 Pearl St.
Fort Collins, CO 80521
tcroft97@gmail.com
(720) 979-5903
[Quoted text hidden]

David Bye (byedavid@aol.com) Sent You a Personal Message <automail@knowwho.com> Fri, Jun 5, 2020 at 8:56 PM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

David Bye
518 W. Olive Street
Fort Collins, CO 80521
byedavid@aol.com
(970) 493-2217
[Quoted text hidden]

Donna Marie Slack (donna_slack@comcast.net) Sent You a Personal Message Fri, Jun 5, 2020 at 9:02 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Donna Marie Slack
3609 Capulin Dr.
Loveland, CO 80538
donna_slack@comcast.net
(970) 635-9325
[Quoted text hidden]

James Swaney (james.swaney@wright.edu) Sent You a Personal Message Fri, Jun 5, 2020 at 9:03 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

James Swaney
1579 Jacob Rd
Estes Park, CO 80517
james.swaney@wright.edu
(970) 232-5674
[Quoted text hidden]

Steven Ross (sross59@msn.com) Sent You a Personal Message <automail@knowwho.com> Fri, Jun 5, 2020 at 9:13 PM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Steven Ross
3644 Little Dipper Drive
Fort Collins, CO 80528
sross59@msn.com
(970) 590-7465
[Quoted text hidden]

Lucretia Krause (photinus.photuris@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 9:23 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Lucretia Krause
2019 Ridgewood Rd
Fort Collins, CO 80526
photinus.photuris@gmail.com
(512) 736-0006
[Quoted text hidden]

Gail Davis (gdavisnd@yahoo.com) Sent You a Personal Message <automail@knowwho.com> Fri, Jun 5, 2020 at 9:35 PM
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Gail Davis
3284 Gunnison Dr.
FORT COLLINS, CO 80526
gdavisnd@yahoo.com
(970) 229-9334
[Quoted text hidden]

Sherrie Temple (j-stemple@comcast.net) Sent You a Personal Message Fri, Jun 5, 2020 at 9:43 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

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Sincerely,

Sherrie Temple
5608 Pleasant Hill Lane
Fort Collins , CO 80526
j-stemple@comcast.net
(970) 566-2187

[Quoted text hidden]

Lenka Doskocil (lenka.dosk@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 9:44 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Lenka Doskocil
7371 CR 523
Bayfield, CO 81122
lenka.dosk@gmail.com
(970) 759-1672
[Quoted text hidden]

Barbara Curwood (bmcurwood@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 9:47 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Barbara Curwood
7590 McClellan Rd
Wellington, CO 80549
bmcurwood@hotmail.com
(970) 213-8888
[Quoted text hidden]

Elizabeth Madura (liz.madura3@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 9:52 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Elizabeth Madura
1824 Marlborough Ct
Fort Collins, CO 80526
liz.madura3@gmail.com
(630) 631-8931
[Quoted text hidden]

Christina Nelson (christina.nelson78@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 10:01 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Christina Nelson
2819 FIELDSTONE DR
FORT COLLINS, CO 80525
christina.nelson78@gmail.com
(970) 488-9968
[Quoted text hidden]

Morgan Schneider (sheltercvt@yahoo.com) Sent You a Personal Message Fri, Jun 5, 2020 at 10:02 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Morgan Schneider
1209 W Plum St
Fort Collins, CO 80521
sheltercvt@yahoo.com
(720) 254-0199
[Quoted text hidden]

Megan McArthur-Federico (megan_mcarthur@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 10:03 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Megan McArthur-Federico
3118 Worthington Ave.
Fort Collins, CO 80526
megan_mcarthur@hotmail.com
(970) 581-5804
[Quoted text hidden]

Linda Farley (farleywoman@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 10:04 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Linda Farley
5620 Fossil Creek Pkwy
Fort Collins, CO 80525
farleywoman@gmail.com
(970) 219-8089
[Quoted text hidden]

Chloe Arduino (chloe_arduino@aol.com) Sent You a Personal Message Fri, Jun 5, 2020 at 10:04 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Chloe Arduino
2250 w Elizabeth st
Fort Collins , CO 80521
chloe_arduino@aol.com
(630) 765-1037
[Quoted text hidden]

Thomas La Point (tnplapoint@msn.com) Sent You a Personal Message Fri, Jun 5, 2020 at 10:17 PM
<automail@knowwho.com>

To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Thomas La Point
4437 Starflower Dr
Fort Collins, CO 80526
tnplapoint@msn.com
(970) 231-2233
[Quoted text hidden]

Leslie Tassi (lt8247@gmail.com) Sent You a Personal Message <automail@knowwho.com> Fri, Jun 5, 2020 at 10:19 PM
To: pcboard@larimer.org

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Sincerely,

Leslie Tassi
945 4th Street
Berthoud, CO 80513
lt8247@gmail.com
(508) 326-9571
[Quoted text hidden]

Anne Rogers (annemorganrogers@aol.com) Sent You a Personal Message Fri, Jun 5, 2020 at 10:22 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Anne Rogers
1985 Cherokee Drive
Estes Park, CO 80517
annemorganrogers@aol.com
(970) 888-1899
[Quoted text hidden]

Lexi DiNatale (lexidinatale2@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 10:22 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Lexi DiNatale
120 W Stuart St
Fort Collins , CO 80525
lexidinatale2@gmail.com
(708) 336-9085
[Quoted text hidden]

David Hobbs (davidhobbs2002@yahoo.com) Sent You a Personal Message Fri, Jun 5, 2020 at 10:43 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

David Hobbs
4112 Lost Creek Court
Fort Collins, CO 80526
davidhobbs2002@yahoo.com
(970) 691-8411
[Quoted text hidden]

William Sublette (wsublette@yahoo.com) Sent You a Personal Message Fri, Jun 5, 2020 at 10:55 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

William Sublette
1032 Sabatino Ln.
Fort Collins, CO 80521
wsublette@yahoo.com
(970) 217-9730
[Quoted text hidden]

Michelle Wilson (mitzwilson1969@gmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 11:05 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Michelle Wilson
2424 9th Avenue, Apt. 7101
Longmont, CO 80503
mitzwilson1969@gmail.com
(970) 815-6800
[Quoted text hidden]

Kaleigh Schmidt (kaleighfiddler@yahoo.com) Sent You a Personal Message Fri, Jun 5, 2020 at 11:06 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Kaleigh Schmidt
2109 Glenfair Rd
Johnstown, CO 80631
kaleighfiddler@yahoo.com
(720) 400-4452
[Quoted text hidden]

Pam Sheeler (pam-88@hotmail.com) Sent You a Personal Message Fri, Jun 5, 2020 at 11:29 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Pam Sheeler
1868 Muddy Creek Cir
Loveland, CO 80538
pam-88@hotmail.com
(970) 635-0888
[Quoted text hidden]

2250

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project

2 messages

Jan Rothe (lemmule@gmail.com) Sent You a Personal Message Mon, Jun 8, 2020 at 10:12 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

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Sincerely,

Jan Rothe
6521 Placer Ct
Bellvue, CO 80512
lemmule@gmail.com
(970) 467-1415

Khalid Aziz (khalid@gonehiking.org) Sent You a Personal Message Mon, Jun 8, 2020 at 10:46 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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Sincerely,

Khalid Aziz
3406 Red Mountain Dr
Fort Collins, CO 80525
khalid@gonehiking.org
(970) 282-8751
[Quoted text hidden]

2252

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project

7 messages

Calvin Strom (calvinfloyd@earthlink.net) Sent You a Personal Message Tue, Jun 9, 2020 at 8:38 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Calvin Strom
5196 Inspiration Dr
Fort Collins, CO 80524
calvinfloyd@earthlink.net
(970) 420-9720

Julie Pignataro (pignataroj@hotmail.com) Sent You a Personal Message Tue, Jun 9, 2020 at 8:38 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Julie Pignataro
3201 Silverwood Drive
Fort Collins, CO 80525
pignataroj@hotmail.com
(970) 481-2751
[Quoted text hidden]

Jephta Bernstein (jephtabernstein@gmail.com) Sent You a Personal Message Tue, Jun 9, 2020 at 8:39 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Jephta Bernstein
3633 Wild View Drive
Fort Collins, CO 80528
jephtabernstein@gmail.com
(970) 305-2261
[Quoted text hidden]

Judy Wood (ladytrill2001@aol.com) Sent You a Personal Message Tue, Jun 9, 2020 at 10:22 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Judy Wood
3513 Ranch Rd
Loveland, CO 80537
ladytrill2001@aol.com
(970) 667-6105
[Quoted text hidden]

Lynda Hickey (jbwinnerprizes1@centurylink.net) Sent You a Personal Message Tue, Jun 9, 2020 at 10:42 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Lynda Hickey
7184 Mount Nimbus Street
Wellington, CO 80549
jbwinnerprizes1@centurylink.net
(970) 568-7893
[Quoted text hidden]

Sandra McLuckie (sa.mcl67@yahoo.com) Sent You a Personal Message Tue, Jun 9, 2020 at 10:46 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Sandra McLuckie
3842 Tradition Dr
Fort Collins, CO 80526
sa.mcl67@yahoo.com
(970) 207-9653
[Quoted text hidden]

Jocelyn Pronko (jpronko@colostat.edu) Sent You a Personal Message Tue, Jun 9, 2020 at 12:19 PM
<automail@knowwho.com>
To: pcboard@larimer.org

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Sincerely,

Jocelyn Pronko
7200 McMurry Ranch Rd
Bellvue, CO 80512
jpronko@colostat.edu
(970) 420-6200
[Quoted text hidden]

2257

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project

6 messages

Calvin Strom (calvinfloyd@earthlink.net) Sent You a Personal Message Tue, Jun 9, 2020 at 8:38 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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Calvin Strom
5196 Inspiration Dr
Fort Collins, CO 80524
calvinfloyd@earthlink.net
(970) 420-9720

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3201 Silverwood Drive
Fort Collins, CO 80525
pignataroj@hotmail.com
(970) 481-2751
[Quoted text hidden]

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Jephta Bernstein
3633 Wild View Drive
Fort Collins, CO 80528
jephtabernstein@gmail.com
(970) 305-2261
[Quoted text hidden]

2259

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<automail@knowwho.com>
To: pcboard@larimer.org

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3513 Ranch Rd
Loveland, CO 80537
ladytrill2001@aol.com
(970) 667-6105
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(970) 568-7893
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<automail@knowwho.com>
To: pcboard@larimer.org

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Fort Collins, CO 80526
sa.mcl67@yahoo.com
(970) 207-9653
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2261

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project

8 messages

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jpronko@colostat.edu
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Colleen, CO 81122

ammasgopi@aol.com
(970) 884-5401
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Northern Integrated Supply Project

9 messages

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7200 McMurry Ranch Rd
Bellvue, CO 80512
jpronko@colostat.edu
(970) 420-6200
[Quoted text hidden]

Colleen Hoff (ammasgopi@aol.com) Sent You a Personal Message Tue, Jun 9, 2020 at 2:50 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

The NISP is an extremely expensive project that would cause great destruction; disrupt and displace residents around the proposed reservoir, residents along Highway 287, and residents along the proposed pipeline route; and it isn?t needed. There are many conservation actions that would provide all the water proposed to be delivered by Glade, including improved water efficiency by municipal districts, industry, and agriculture; public education and awareness programs; repairs to leaking ditches and pipelines, landscape irrigation improvements, and much more.

The NISP is a controversial project that is of great interest to many people in Larimer County who want full opportunity to comment on the permitting process and to appear at public hearings. Because of the scope and controversy surrounding this proposed project, the Commissioners should wait until the coronavirus pandemic has subsided enough to allow for full in-person public participation.

Sincerely,

Colleen Hoff
13440 County Road 502
Colleen, CO 81122

ammasgopi@aol.com
(970) 884-5401
[Quoted text hidden]

Mary Grant (msgrant026@gmail.com) Sent You a Personal Message Tue, Jun 9, 2020 at 4:10 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

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The NISP is a controversial project that is of great interest to many people in Larimer County who want full opportunity to comment on the permitting process and to appear at public hearings. Because of the scope and controversy surrounding this proposed project, the Commissioners should wait until the coronavirus pandemic has subsided enough to allow for full in-person public participation.

Sincerely,

Mary Grant
3427 W Elizabeth Street
Fort Collins, CO 80521
msgrant026@gmail.com
(970) 999-5702
[Quoted text hidden]

Katie Beilby <beilbykm@co.larimer.co.us>

Planning Commission comment letter- NISP 1041 application

John Barth <barthlawoffice@gmail.com> Tue, Jun 9, 2020 at 3:56 PM
To: Rob Helmick <helmicrp@co.larimer.co.us>, pcboard@larimer.org
Cc: Karyn Coppinger <kcoppinger31@gmail.com>, Karen Wagner <kaswagner@me.com>, Gary Wockner <gary.wockner@savethepoudre.org>, Mike Foote <mjbfoote@gmail.com>, Mike Chiropolos <mike@chiropoloslaw.com>

Rob

Attached is a Planning Commission comment letter on the NISP 1041 application. This email will be followed by a series of emails containing the 23 exhibits to the comment letter. Please confirm receipt of this email, the comment letter, and the 23 exhibits. Please forward all documents to the Planning Commissioners and place all documents in the administrative record for this proceeding. Thank you.

--
John Barth
Attorney at Law
P.O. Box 409
Hygiene, CO 80533
(303) 774-8868
barthlawoffice@gmail.com

Planning Commission 1041 Comment Letter FINAL 06092020.pdf
23713K

No Pipe Dream Corporation
Save Rural NoCo Corporation
Save the Poudre

June 9, 2020

By email
Larimer County Planning Commission (pcboard@larimer.org)
Rob Helmick (helmicrp@co.larimer.co.us)
Larimer County Planning Department
200 West Oak Street, Suite 3100
Fort Collins, Colorado 80521

Re: Planning Commission Hearing Comments to the Northern Integrated Supply Project (NISP) Pending 1041 Permit Application, Project No. 20-ZONE 2657

Dear Mr. Helmick:

On behalf of No Pipe Dream Corporation, Save Rural NoCo Corporation, and Save the Poudre (collectively "Larimer County NGOs"), we submit the following comments and concerns for the upcoming Planning Commission hearing regarding Northern Colorado Water Conservancy District's ("Northern") pending 1041 permit application ("1041 application") for the Northern Integrated Supply Project ("NISP").

By means of background, No Pipe Dream Corporation is a Colorado nonprofit corporation composed of Larimer County property owners and taxpayers established to protect citizens from the intense adverse impacts of multiple proposed pipeline and reservoir projects in Larimer County, including but not limited to NISP. Save Rural NoCo Corporation is a Colorado nonprofit corporation composed of property owners and taxpayers whose mission is to protect existing land, water, and communities in rural northern Colorado from harmful development through research and public education. Save the Poudre is a Colorado nonprofit membership organization primarily composed of residents of Larimer County, including outdoor recreationists, scientists, property owners, and taxpayers that would be adversely impacted by the construction and operation of NISP. Save the Poudre's members live, work, and recreate on and around the Cache la Poudre River ("Poudre River" or "River") in Larimer County. Some members own property or have residences near the Poudre River in the City of Fort Collins.

The membership of these three (3) nonprofit corporations would be uniquely and adversely impacted by construction and operation of NISP. More specifically, landowners and taxpayers may lose their homes and/or property either by forced easements or outright eminent domain. The affected citizens will also be adversely

impacted by the noise, air pollution, water pollution, and aesthetic injury associated with the multi-year construction of NISP. Save Rural NoCo members will be permanently impacted by the construction and operation of a new public recreation area at Glade Reservoir resulting in increased traffic, noise, litter, increased fire danger, trespass, and other impacts associated with opening an area to the general public. Further, No Pipe Dream and Save Rural NoCo members will be forced to live with a traffic nightmare for several years while the pipeline, dam, and reservoir construction results in road closures in their neighborhoods. Members of Save the Poudre will also be injured by NISP's adverse impacts to the Cache la Poudre River. More specifically, Save the Poudre members' interests in clean water and maintaining flows for swimming, fishing, kayaking, and aesthetic enjoyment would be detrimentally impacted by NISP. NISP would add to negative impacts to the ecological health and beauty of the Cache la Poudre River through Fort Collins and natural areas valued by Save the Poudre members. Further NISP will negatively impact the downstream riparian ecosystem, including fish populations, insects, birds, mammals and the wetland and riparian vegetation along the river.

To summarize some of our comments and concerns, the Larimer County NGOs believe that the Planning Commission should recommend denial of Northern's 1041 application because: 1) the proposal suffers from similar deficiencies as did the Thornton Water Project, which resulted in a precedent setting Board denial of a water pipeline 1041 application; 2) the proposal does not meet the Land Use Code criteria for approval of a 1041 application; 3) the application is incomplete, speculative, and fails to evaluate the cumulative impacts of the various pipeline and water projects proposed for Larimer County; and, 4) the proposal would result in numerous significant adverse impacts to Larimer County residents and the Cache la Poudre River that cannot be mitigated.

I. Request for Group Presentation by Larimer County NGOs.

The Planning Commission Bylaws specifically allow for "group presentations."[1] The Larimer County NGO's hereby collectively request 45 minutes at the July 8, 2020 Planning Commission hearing to make a joint group presentation. The presentation will be well organized allowing each group to present for approximately 15 minutes each. The group presentation will save time by minimizing repetition. Further, it is impossible to adequately comment on a 1041 permit application composed of thousands of pages within 2-minute individual comment time limit. Please confirm in writing no later than June 24, 2020 that the Larimer County NGO's have a 45-minute time slot for their group presentation on July 8, 2020. Because the groups will have their attorneys and technical experts present at the hearing, we request that our time slot be immediately after Northern's presentation or at the commencement of the hearing.

[1]Exhibit 1 hereto (Planning Commission Bylaws, p. 3, Section V. A.4. "Procedure for Consideration of Agenda Items" dated 4/28/2020).

II. Recusal of Sean Dougherty and Jeff Jensen.

The Larimer County NGOs hereby request that Planning Commissioners Sean Dougherty and Jeff Jensen recuse themselves from participating in the adjudication of the NISP 1041 application.

Mr. Dougherty has publicly stated his support for NISP. More specifically, Mr. Dougherty has unequivocally stated, "I am in full support of the Northern Integrated Supply Project, known as NISP."[2] Mr. Dougherty also publicly stated, "NISP and Windy Gap Firming Project need to be completed…"[3]

Mr. Jensen is running for Steve Johnson's seat on the Board this November. Mr. Jensen has been publicly endorsed by Steve Johnson.[4] Mr. Johnson has endorsed and supported NISP.[5] Having requested and received the endorsement of the sitting Commissioner who himself has endorsed the project that is the subject of the 1041 application, Mr. Jensen's independent and impartial participation in this quasi-judicial process has been tainted. These facts create the appearance of bias within the citizenry of Larimer County. Mr. Jensen must recuse himself.

Further, it is the practice of the Planning Commissioners to recuse themselves when they may be required to act on a pending land use application in a potential future role as a Larimer County Commissioner. For example, Sean Dougherty recused himself as a Planning Commissioner from participation in the Loveland Ready Mix Laporte gravel pit Special Review application based on the fact that he was a candidate for an open Board seat following the death of Lew Gaiter. Since Mr. Jensen is a candidate for Commissioner in November 2020, he too should recuse himself based on the practice of the Commission.

The constitutional floor of due process requires "a realistic appraisal of psychological tendencies and human weakness" to determine whether these undisputed facts pose "such a risk of actual bias or prejudgment that the practice must be forbidden if the guarantee of due process is to be adequately implemented." *City of Manassa v. Ruff*, 235 P.3d 1051, 1057 (Colo. 2010)(quoting *Caperton v. A.T. Massey Coal Co.,* 556 U.S. 868, 883-84 (2009).

Further, Article XXIX(1)(c) of the Colorado Constitution requires that local governments "avoid conduct that is in violation of their public trust or that creates a justifiable impression among members of the public that such trust is being violated." The Larimer County Land Use Code requires that a quasi-judicial officer, recuse himself

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[2] Exhibit 2 hereto (screen shot of https://instabusters.net/hashtag-photos/SeanForLarimerCounty taken 6/9/2020).
[3] Exhibit 3, p. 6 hereto (Fort Collins Business Community Candidate Endorsement Questionaire).
[4] https://www.jensen4lcc.com/endorsements/
[5] Exhibit 4 hereto (Northern's NISP website, November 2019)

from any quasi-judicial decision if he "believe[s] they have a conflict of interest or for any other reason believes that they cannot make a fair and impartial decision."[6] The Code also states that quasi-judicial officers must avoid any conflict of interest and that all official actions "must represent unconflicted loyalty to the interest of the citizens of the entire county."[7]

Under Colorado law a local government's land use application determinations are quasi-judicial in nature. *Margolis*, 638 P.2d at 304-05. A quasi-judicial decision must provide for due process and adhere to fundamental principles of fairness. *Canyon Area Residents v. Bd. of Cnty Comm'rs,* 172 P.3d 905, 908 (Colo. App. 2006). A quasi-judicial hearing must be conducted in an atmosphere evidencing fairness in the adjudication. *Id.* Due process requires recusal of a quasi-judicial decision maker when such decision maker has a direct, personal, substantial, pecuniary interest in the pending matter; or when "extraordinary" facts create an impermissible probability of bias. *Tumey v. Ohio*, 273 U.S. 510, 523 (2000); *Caperton*, 556 U.S. at 887.

Mr. Dougherty and Mr. Jensen must recuse themselves from this quasi-adjudicative process. Their prior statements supporting NISP, or their association with others that support NISP, creates an atmosphere of bias in favor of the project within the Larimer County community.

We ask that Mr. Dougherty and Mr. Jensen each respond in writing to this request for recusal at least one (1) week prior to the first Planning Commission hearing on the NISP 1041 application.

III. Incorporation of DEIS and FEIS comments.

Northern's 1041 application repeatedly refers to the pending National Environmental Policy Act Final Environmental Impact Statement ("EIS"). However, because the County's 1041 process evaluates criteria that are separate and distinct from the federal EIS process, Northern's 1041 application must stand on its own and be adjudicated independent of any EIS filings. Nevertheless, since Northern repeatedly refers to documents in the federal EIS proceeding, the Larimer County NGOs hereby incorporate herein by reference their comment letters submitted to the federal agencies in the EIS process.[8] Four filings were made to the Army Corps in response to the DEIS (2008), SDEIS (2015), FEIS (2018), and a request for "Supplemental NEPA studies" (2019). Further, we also incorporate herein by reference the County's own comments on

[6] Larimer County Land Use Code ("LUC") § 2-67(10).
[7] LUC § 2-71.
[8] Exhibit 5 (DEIS comment letter); Exhibit 6 (SDEIS comment letter); Exhibit 7 (FEIS comment letter); Exhibit 8 (SEIS comment letter).

the EIS.[9] Finally, we incorporate the City of Fort Collins' comments on the DEIS and SDEIS.[10]

IV. The Cache la Poudre River is ill and NISP will make it worse.

The Cache la Poudre River is in crisis. The River is already over-appropriated. *Three Bells Ranch Associated v. Cache La Poudre Water Users Ass'n,* 758 P.2d 164, 166 (*en banc* Colo. 1988). As shown below, segments of the river near Fort Collins are often dry.

Photo: Save The Poudre, October 2009, near Lions Park, Laporte, CO.

The River has been seriously altered by heavy agricultural and urban water use since early settlement in the 1870's.[11] "The human footprint continues to expand, placing additional pressure (or stresses) on the river ecosystem and the natural processes that sustain it."[12] Extensive existing dam and diversion infrastructure, as well as proposed additional water development, such as the proposed Northern Integrated Supply Project,

[9] Exhibit 9 hereto (County's comments on DEIS).
[10] Exhibit 10 hereto (Ft. Collins comments on DEIS) and Exhibit 11 hereto (Ft. Collins comments on SDEIS).
[11] Exhibit 12 hereto, p. 2 ("Bestgen study").
[12] Exhibit 13 hereto, p. 3 of pdf ("State of the Poudre River 2017" (SOPR)).

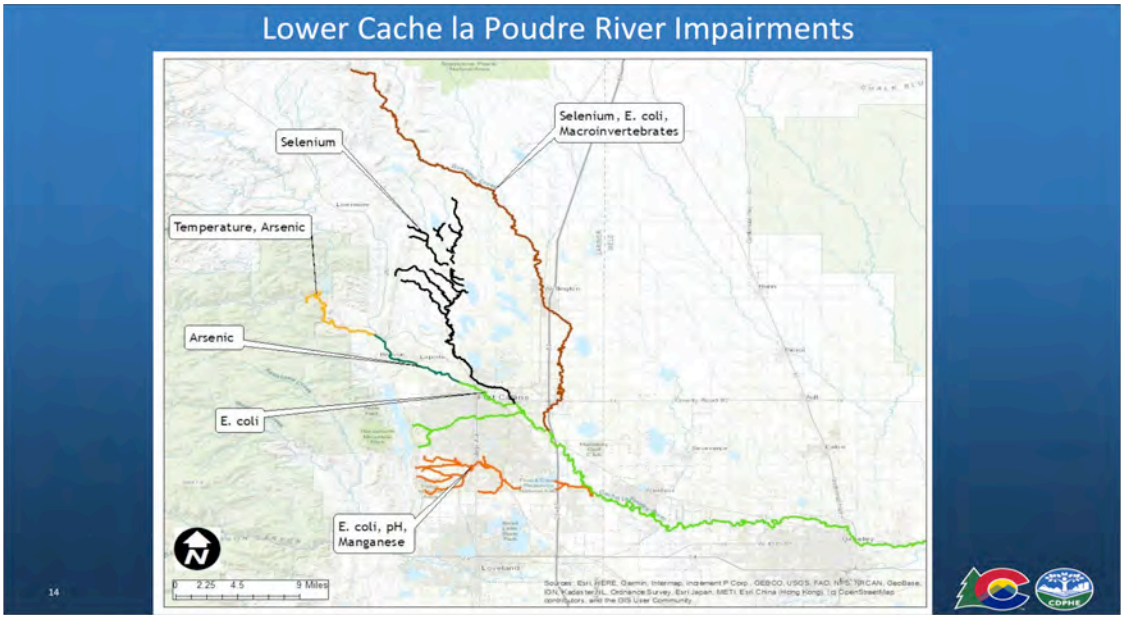
"have significantly altered the peak and base flows, the effects of which are exacerbated the further one travels downstream. Diversions also cause unnatural fluctuations in flow volume, which likely affects critical habitat and reproductive needs of fish and insects in the river."[13]

The towns and cities in the thirsty Denver metro area, including Boulder County and Weld County, have exhausted the local water supplies in Clear Creek, Boulder Creek, the mighty St. Vrain River and other watersheds. Now they are moving north to grab water from the Cache la Poudre River. Currently proposed water diversion and/or storage projects in the upper Cache la Poudre River watershed include NISP, the Halligan Reservoir expansion, the Seaman Reservoir expansion, and the Thornton Water Project. These water grabs are often accomplished by implementing a "buy and dry" strategy whereby these irresponsible and rapidly growing municipalities buy irrigated farms in the Cache la Poudre River watershed, convert the water to municipal use, and attempt to pipe it south and east to towns and cities. Both NISP and the Thornton Water Project would take Cache la Poudre River water out of its natural watershed south to these metro communities. In some cases, as with NISP, the water developer has not even secured the water rights needed to fully supply the water project, but still moves forward in attempting to acquire necessary permits, such as this 1041 permit application, theoretically making it possible for construction to proceed and serving up all the impacts and none of the benefits.

In the Cache la Poudre River, "populations of native fish are [also] in sharp decline. These declines are most likely due to fragmented habitat and extended periods of extremely low base flows. Other stresses likely influencing fishery health include rapid fluctuation of flows…and altered water temperatures."[14] The flow regime in the Cache la Poudre River score poorly in all segments of the river "suggesting substantially-impaired functionality…[i]mpairment mainly arises from the effects of water management."[15]

As shown below, the River also suffers from numerous existing water quality impairments, including *Escherichia* coli.

[13] *Id.*, p. 4 (SOPR).
[14] Exhibit 12, p. ii (SOPR).
[15] *Id.*, pp. 41, Table 4.1, and p. 42 (SOPR).



These water quality impairments will worsen if additional stream flow is removed from the River.

In 2019 Fort Collins Utilities ("FCU") commissioned the Water Supply Vulnerability Study ("WSVS") to evaluate the future risks associated with meeting the water needs of its service territory.[16] The #1 risk was climate change. The WSVS Report states:

> Climate change is the most important vulnerability faced by the FCU system. Future climate conditions may be more impactful to FCU's ability to meet its water supply planning policy criteria than the occurrence of any particular infrastructure outage or environmental condition simulated by the WSVS risk scenarios.[17]

Based on a review of previous climate change studies for the Front Range region, the WSVS study evaluated a worst case climate change temperature range increase from 0 to 8 degrees F compared to average annual 1981 to 2010 observed temperature and precipitation risk ranges from -10% to +15% of average annual 1981 to 2010 observed

[16] Exhibit 14 hereto ("WSVS study").
[17] *Id.* at p. ES-16 ("WSVS study").

precipitation ("P").[18] The WSVS Study concludes:

> Temperature and precipitation changes in the range adopted for the WSVS were found to have significant effects on streamflow contributing to the FCU water supply. The hottest/driest climate condition (T = +8 degrees F, P = -10%) reduced the Poudre River at the Canyon Mouth mean annual streamflow by an average of 30%...[19]

Even if precipitation does not change (delta P=0%), the WSVS Study shows that an increase in temperature ("T") of +8 degrees F is predicted to reduce streamflow at the mouth of the Canyon by more than 10 percent.

Meteorological data provides ample evidence that air temperature along the Front Range has increased over time. Data collected at the Joe Wright Reservoir SNOTEL site, located just east of the continental divide at 10,120 feet and within the Poudre River watershed, is critically important for assessing how climate change has impacted temperature and precipitation within the watershed. Average winter, spring, summer, and September daily temperatures at this site have increased by between 3 and 4 degrees F since 1990 – particularly after year 2004. The effect of post 2005 drought conditions on reservoir storage in the proposed Glade Reservoir is evaluated by Save Rural NOCO below in this document.

Winter temperatures determine if precipitation occurs as snow or rain, spring temperatures control the timing of runoff, and summer and fall temperatures affect the soil moisture deficit that impact streamflow volumes in the next snowmelt season. Additional studies reveal that climate change will significantly reduce flows in Western watersheds.[20]

The Cache la Poudre River is in dire need of restoration, not further flow depletion. "River restoration requires understanding linkages between specific flow conditions and ecosystem attributes to provide ***clear, quantified management targets."***[21] Recently a group of researchers developed an Ecological Response Model ("ERM") for the Cache la Poudre River to design a river management system to improve the health of the river in light of current and future water extraction and storage. *Id*. The purpose of the study "was to produce a scientifically credible and comprehensive analysis to inform the public and assist water managers interested in sustainable management of the Poudre River ecosystem." *Id.* at p. 2.

The Bestgen Study incorporated climate change data and information. "To

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[18] *Id.* at ES-3.
[19] *Id.* at ES-4.
[20] Exhibit 15 hereto, p. 2404 hereto ("The twenty-first century Colorado River hot drought and implications for the future." Water Resources Research 2017 ("Udall and Overpeck Report").

[21] Exhibit 12, p. 2 (Bestgen Study).

incorporate climate change impacts, the present operations scenario was modified using predictions from global climate circulation models…that describes climate-changed hydrologic scenarios for the western United States."[22] The Bestgen Study concluded that "additional flow regime modification [such as from NISP] would further alter the structure and function of the Poudre River aquatic and riparian ecosystems due to multiple and interacting stressors." *Id.* at p. 1. The ERM found that the river would benefit from "higher and more stable base flows and high peak flows." *Id.*

V. Objection to the narrow scope of Northern's 1041 application

Northern incorrectly states that "the scope of the 1041 Permit evaluation is the siting and development of proposed conveyance pipelines and the site selection and construction of Glade Reservoir and its appurtenant facilities…" According to Northern, an analysis of the Highway 287 relocation and alternatives to the siting and development of Glade Reservoir are beyond the scope of its 1041 application.

The Larimer County NGO's object to Northern's limitation of the scope of the 1041 application. Northern has the burden to comply with all review criteria for the "site selection and construction of a new water storage reservoir."[23] This includes a presentation of alternatives to constructing the Glade Reservoir—including all environmental impacts associated with those alternatives-- as well as reservoir siting alternatives.[24] Because Northern attempts to illegally limit the scope of the 1041 analysis, its 1041 application completely fails to undertake an alternatives analysis for Glade Reservoir.

Northern's 1041 application is also required to analyze impacts and alternatives to the Highway 287 relocation. More specifically, Northern has the burden of complying with 1041 review criteria for "all appurtenant uses" of its proposed "new water storage reservoir" which include "all…roads."[25] This includes a presentation of alternatives to the relocation of Highway 287 as well as siting alternatives.[26] This also includes alternatives to constructing the access road to Glade Reservoir as well as road siting alternatives.

In summary, Northern's application is fatally defective due to its illegal attempt to limit its scope in violation of the plain language of the LUC. For this reason alone, the Planning Commission must summarily recommend denial of Northern's 1041 application.

VI. There is precedent for denying Northern's application.

In 2018 the Planning Commission recommended denial of a similar water

[22] Exhibit 12 at pp. 9-10.
[23] LUC §14.4.K.
[24] LUC §14.10.D.2.
[25] LUC §14.4.K.
[26] LUC §14.10.D.2.

pipeline project, namely the Thornton Northern Project ("TNP", aka "Thornton Water Project"). Thornton proposed construction of a pumping plant and raw water conveyance pipeline from Water Supply and Storage Company ("WSSC") Reservoir #4 in a corridor east along either Douglas Road or County Road 56 to I-25. In a hearing on May 16, 2018, the Planning Commission voted to recommend denial of the pumping plant and pipeline.[27] The reasons for the Commissions recommendation of denial were: 1) the application was incomplete; 2) there was an inadequate presentation of alternatives; 3) there was inadequate mitigation of harm; and, 4) the application did not balance the benefits to the County.[28]

Ultimately, the Board of County Commissioners ("Board") agreed with the Planning Commission and denied Thornton's 1041 application.[29] Among the reasons for the Board's denial of the Thornton 1041 application were: 1) the Board's inability to assess the impacts on private property because Thornton proposed a ¼ mile wide pipeline "corridor" instead of identifying with specificity the alignment of the pipeline;[30] 2) the application did not contain adequate "information about and consider the cumulative impacts of irrigated farmland turning to dryland";[31] 3) "the siting alternatives proposed by Thornton are not reasonable and cannot be sufficiently evaluated by the Board" and "Thornton failed to present reasonable siting alternatives"[32]; 4) "noise and visual impacts from the pumphouse are of concern"[33]; 5) "impacts will significantly impair residents' quality of life and use of their properties"[34]; 6) the proposal "would require an unreasonable lengthy construction cycle, up to four years, which neighbors of the route testified would cause significant disruption to their homes and daily lives"[35]; 7) "The sheer size and uncertainty of the proposed 500' to ¼ mile wide corridor prevents the Board and private property owners from reasonably considering all impacts. This uncertainty is, in itself, a significant impact of this project"[36]; 8) the application "does not account for the cumulative impacts of the project as a whole"[37]; 9) "a balancing of those impacts with the benefits must be performed"[38]; and, 10) "The Board is not yet convinced, however, that the two proposed routes for the pipelines and the location for the pump house are the only and/or best and least impactful and that other routes are not

[27] Exhibit 16 hereto (Transcript of May 16, 2018 Planning Commission hearing, pp. 199-200).
[28] *Id.* at pp. 170-200.
[29] Exhibit 17 hereto (Findings and Resolution Thornton Northern Project, March 19, 2019).
[30] *Id.* at p. 7.
[31] *Id.*
[32] *Id.* at p. 8.
[33] *Id.* at p. 9.
[34] *Id.*
[35] *Id.*
[36] *Id.* at p. 10.
[37] *Id.*
[38] *Id.*

viable."[39]

Ultimately, the Board found that Thornton's 1041 application failed to meet the following review criteria of the LUC: Section 14.10.D.1. ("consistent with the master plan"); Section 14.10.D.2. ("reasonable siting and design alternatives"); Section 14.10.D.3 ("conforms with adopted county standards"); Section 14.10.D.4. ("proposal will not have a significant adverse affect"); Section 14.10.D.6. ("proposal will not negatively impact public health and safety"); Section 14.10.D.10 ("the benefits of the proposed development outweigh the losses of any natural resources or reduction of productivity of agricultural lands"); and, Section 14.10.D.11 ("a reasonable balance between the costs to the applicant to mitigate significant adverse affects and the benefits achieved"). The Board recently defended its position in Court by opposing Thornton's efforts to overturn the decision.[40]

Other important reasons for the rejection of the TWP that are applicable and parallel to the NISP Northern Tier pipeline proposal are: 1) the likely use of disfavored eminent domain processes in order to put the pipeline in place, as no private landowner agreements along the proposed route have been found through a public records search or Colorado Open Records Act ("CORA") request to Northern; 2) the significant impact upon lands, especially between WSSC Reservoirs 3 and 4; and 3) a CORA request showing there still has been no meaningful discussion or consultation between Northern Water and Thornton about the possibility of co-locating multiple pipelines, despite the BOCC specifically mentioning the difficulty of planning for the possibility of multiple pipelines in its Thornton 1041 denial.

It is undisputed that Northern's proposal will cause exponentially greater adverse impacts than would the Thornton pipeline, which was rejected both by this Commission and the Board. For example, Northern's 1041 application involves similar pipeline design and siting and pump station impacts, but also involves relocating a federal highway and construction of a new dam, reservoir, a new diversion structure on the Poudre River upstream of the Mulberry Treatment Plants for the Poudre River Intake, and recreation area. In summary, Northern's 1041 application suffers from the same deficiencies as did Thornton's application, but is also compounded by numerous, even more significant adverse impacts. This Commission must apply the same analysis to Northern's application that it used to recommend denial of Thornton's application. For the reasons stated herein, the Planning Commission must recommend denial of Northern's 1041 application.

[39] *Id.*
[40] Exhibit 18 hereto (County's legal brief opposing Thornton's challenge to the decision).

VII. The NISP 1041 application does not comply with review criteria.

A. Applicable law.

The Larimer County Land Use Code ("LUC") establishes a standard of approval of a 1041 application. Review of 1041 applications is governed by Section 14 of the Larimer County Land Use Code ("LUC").[41] Section 14.10.B of the LUC states:

> A 1041 permit application may be approved **only when** the **applicant has satisfactorily demonstrated** that the proposal, including all mitigation measures proposed by the applicant, **complies with all of the applicable criteria** set forth in this section 14. If **the proposal does not comply with all the applicable criteria, the permit shall be denied**, unless the county commissioners determine that reasonable conditions can be imposed on the permit which will enable the permit to comply with the criteria (emphasis added).

This standard is consistent with the State 1041 law which states, "[i]f the proposed activity does not comply with the guidelines and regulations, the permit shall be denied." C.R.S. § 24-65.1-501(4). If a proposed project fails to satisfy even one criterion, the Planning Commission must recommend denial of the requested permit. *Colo. Springs v. Eagle County*, 895 P.2d 1105, 1110 (Colo. Ct. App. 1994).

This standard requires the Planning Commission to recommend denial of the 1041 application unless the applicant demonstrates compliance with all criteria ("the permit **shall** be denied"). Use of the word "shall" in the above standard of review is mandatory, meaning that the Planning Commission does ***not*** have discretion to recommend approval of a 1041 permit application that fails to comply with all applicable criteria.[42] The Planning Commission may not presume all criteria have been met. Instead, the applicant bears the burden of proof that each 1041 criterion has been "satisfactorily demonstrated."[43]

The County's 1041 regulations contain a list of criteria that must be satisfied by the applicant before a 1041 permit may be issued.[44] These criteria include requirements that: the proposal be consistent with the Master Plan; that the applicant present reasonable siting and design alternatives or explain why no reasonable alternatives are available; the proposal conforms with adopted county standards and review criteria contained in the Code; the proposal will not have a significant adverse impact on lands

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[41] This comment letter incorporates herein by reference the entire Larimer County Land Use Code found at: https://library.municode.com/co/larimer_county/codes/code_of_ordinances?nodeId=PTIILAUSCO. The Larimer County NGOs request that the County include the entire current land use code in the administrative record for this 1041 permit application proceeding.
[42] LUC § 3.3.C.
[43] LUC § 14.10.B.
[44] LUC § 14.10.D.

and natural resources; and the benefits of the project will outweigh, or be reasonably balanced against, the adverse affects. Section 14.10.A. of the LUC also states that a 1041 permit "applicant must submit a complete and sufficient application…"

For the reasons stated herein, the Planning Commission must recommend denial of the NISP 1041 application.

B. The NISP 1041 application is incomplete.

As noted above, Section 14.10.A. of the LUC also states that a 1041 permit "applicant must submit a complete and sufficient application…" In adopting the State legislation for the 1041 law, the legislature recognized that, "[a]dequate information on land use and systematic methods of definition, classification, and utilization thereof are either lacking or not readily available to land use decision makers." C.R.S. §24-65.1-101(1)(b). The purpose of Colorado's 1041 statute is to remedy this lack of information to land use decision makers by requiring developers to provide information on the full scope of development "which may have an impact on the people of the state beyond the immediate scope of the project." *City County of Denver v. Bergland*, 517 F. Supp. 155 (D.Colo. 1981); *City County of Denver v. Bd. of County Comm'rs*, 760 P.2d 656 (Colo. App. 1988), aff'd, 782 P.2d 753 (Colo. 1989). Northern's 1041 application violates the letter and spirit of Colorado's 1041 statute by denying Larimer County and its residents the opportunity to evaluate the direct and indirect impacts of NISP.

Northern's 1041 application provides only fragments of the whole picture and actually states "*Plans and designs presented in this 1041 Permit application have been developed at a conceptual level*."[45] This is the opposite of the level of detail that should be undertaken on a project such large impacts on land, water, and communities and that has previously been required by this Commission and the Board. Further, the project has had two major changes since the FEIS was published in 2018. The application does not, therefore, provide a complete project description.

On April 17, 2020 the Larimer County NGOs submitted a letter to Leslie Ellis, Director of the County Community Development Department identifying significant deficiencies with the NISP 1041 application as posted to the County's webpage at: https://www.larimer.org/planning/NISP-1041.[46] These 1041 permit application deficiencies include, but are not limited to:

- The application is incomplete as to the relocation of Highway 287. The relocation of 7 miles of a major federal highway would not occur "but for" the NISP project, so attempting to bifurcate major components of NISP and treat the highway relocation as a separate "CDOT" project would unacceptably leave out major impacts to Larimer County resources and

[45] Technical Memo #1, p. 31.
[46] Exhibit 19 hereto (Larimer County NGOs' April 17, 2020 letter to Ellis, which is incorporated in its entirety by reference).

residents. The relocation of U.S. Highway 287 is part and parcel of NISP, it must be included in the 1041 application.

- The application is incomplete because it doesn't provide sufficient and necessary information on the feasibility of the project, specifically with regards to water rights. The project is relying on a farm-buying scheme that 1) the Corps of Engineers has deemed doesn't meet the purpose and need for the project and 2) will have significant environmental and socio-economic impacts which aren't analyzed in any environmental document.
- The application states, "Plans and designs presented in this 1041 Permit application have been developed at a conceptual level." The project has had 2 major changes in the past year, since the final EIS was published. The application does not, therefore, provide a complete project description. Because significant impacts from the project as currently proposed to the County have not been fully disclosed and mitigation has not been appropriately developed, determinations regarding evaluation criteria cannot be made.
- The application is incomplete because it relies on an outdated County Master Plan. The application refers to the 1997 Master Plan and provides rationale for project compliance with that plan. However, the County adopted The Larimer County Comprehensive Plan in 2019. Based on our correspondence with the County, this is the appropriate governing document for this 1041 permit application (and the existing land use code is still in effect, although it is being revised).
- The application does not address the questions posed by The Larimer County Comprehensive Plan for the Mountains and Foothills and Natural Resource Areas that Glade Reservoir would occupy.
- The application is incomplete because it presents no alternatives. The application refers to the alternatives analysis conducted for the federal EIS process, which is unnecessarily limited to a water storage project and is out of date. There are many less costly and less environmentally destructive alternatives for water development now available.
- The application is for an alternative that involves both the Glade Reservoir and a farm-buying scheme that has not been evaluated in any of the federal EIS or Clean Water Act Section 404 documents. Failing to present alternatives is a "my way or the highway" approach that would preclude informed decision-making contrary to the letter and spirit of the LUC.
- The application is incomplete because it does not adequately identify environmental impacts, analysis of key impacts to the land and natural resources is incorrect or inadequate, is not specific enough for local land use decision-making, or is deferred to some later permitting/approval process. For example: the noise analysis did not identify sensitive receptors in the residential areas around the proposed dam or reservoir and did not monitor or model expected noise increases due to construction or

recreation at these sensitive receptors; the air quality impact analysis is incorrect because it is based on a faulty calculation that it would take an 80-mph wind to raise any dust off the lakeshore; the visual/aesthetic impacts would be significant; the visual impacts from the relocation of Highway 287 would also be significant. The elevated highway would be visible for miles, and the light pollution from nighttime headlights, also elevated to be seen for miles, would also severely impact visual resources in and around the reservoir; noise associated with the elevation of highway 287 is not addressed. Once the highway rises above the topographic screens, the noise from over 6,000 vehicle trips per day, much of it large trucks, would have a unobstructed path into the surrounding hills; the effects on property values of dam and a partially full reservoir with exposed, un-vegetated lakeshores have not been disclosed; most of the mitigation planning is deferred to a later date, to another agency, to another process, etc.

- The application is incomplete because it does not adequately analyze wildfire impacts. Public safety may be adversely affected by wildfire.
- The application is incomplete because it fails to evaluate the possible public health issues the project's many air emissions may exacerbate.
- Larimer County would pay 25% of the $21.8 million cost to develop the recreational facilities, or $5.5 million. The application predicts that total economic benefits would be between $13 and $30 million, but these estimates are incorrect because they are based on the 1) a full compliment of water rights, which Northern Water does not possess, 2) the proponent's modeling (which does not account for future hydrologic conditions and therefore likely overstates reservoir fill levels, and 3) the proponents faulty calculations regarding revenue. The application, therefore, lacks a realistic forecast of recreational income. Operation of Horsetooth Reservoir costs over $2 million per year, and most of the costs are paid for by entrance fees. If Glade would rarely be "full enough" to provide recreational (especially in the form of motorized watercraft with its high entrance fees), then who will pay the operational fees? The risks and costs to taxpayers must be thoroughly explained in the application.
- The FEIS does not assess potential impacts from the range of risks to water supplies to Glade. Climate change, including rising temperatures and the very real threat of increasing frequency of prolonged droughts, and uncertainties in future water policy and water rights acquisitions, represent plausible risks to water supplies to Glade. A robust water supply vulnerability study that considers the range of plausible risks to water supplies at Glade should be part of the County's review process. As it stands, the FEIS does not provide decision-makers and the public the information necessary to evaluate the feasibility, levels of service, and potential value of proposed recreation at Glade.

- The application is incomplete because it does not identify the farms that will be purchased to acquire the water needed to implement the project. Without information on the location of the farms and water rights to be purchased in Larimer County, it is impossible to determine whether the benefits of the proposed development outweigh the losses of any natural resources or reduction of productivity of agricultural lands as a result of the proposed development.
- The application is incomplete because it fails to analyze the negative impact to the Cache la Poudre River from removing vast quantities of water from the watershed. There is no analysis of the "benefit" of draining the River and storing water in Glade Reservoir versus keeping the water in the River.
- The application is incomplete because there is no discussion of costs and adverse impacts to the River versus the benefit of such mitigation.

Despite these numerous and significant deficiencies with the NISP 1041 permit application, we never received a response from Ms. Ellis.

The following comments provide a more detailed examination of several incomplete aspects of the 1041 application.

Northern's indefinite, incomplete, and speculative pipeline corridor.

Like Thornton, Northern also proposes a 100' wide pipeline "corridor" rather than a detailed identification of the location of the pipeline and properties it will impact.[47] Northern's application also states, "the final route designed and constructed may deviate from the presented route as more information is gathered and final design is completed."

As noted above, both the Planning Commission and Board previously denied a 1041 permit application for the vague and speculative Thornton pipeline corridor. The Board found that the lack of specificity of a pipeline corridor prevented the Board from assessing actual impacts, resulting in denial of Thornton's 1041 permit application.

Having set this precedent, the Planning Commission must apply the same analysis and conclusion to Northern's 1041 application. The Planning Commission must remain consistent and find that Northern's 1041 application is incomplete and recommend denial.

Relocation of U.S. Highway 287.

The proposed relocation of Highway 287 has been handled inconsistently throughout this 1041 process. The relocation of the highway is included in several of the alternatives analyzed in the FEIS, was included on the NISP website as an anticipated

[47] Technical Memorandum #3, p. 4.

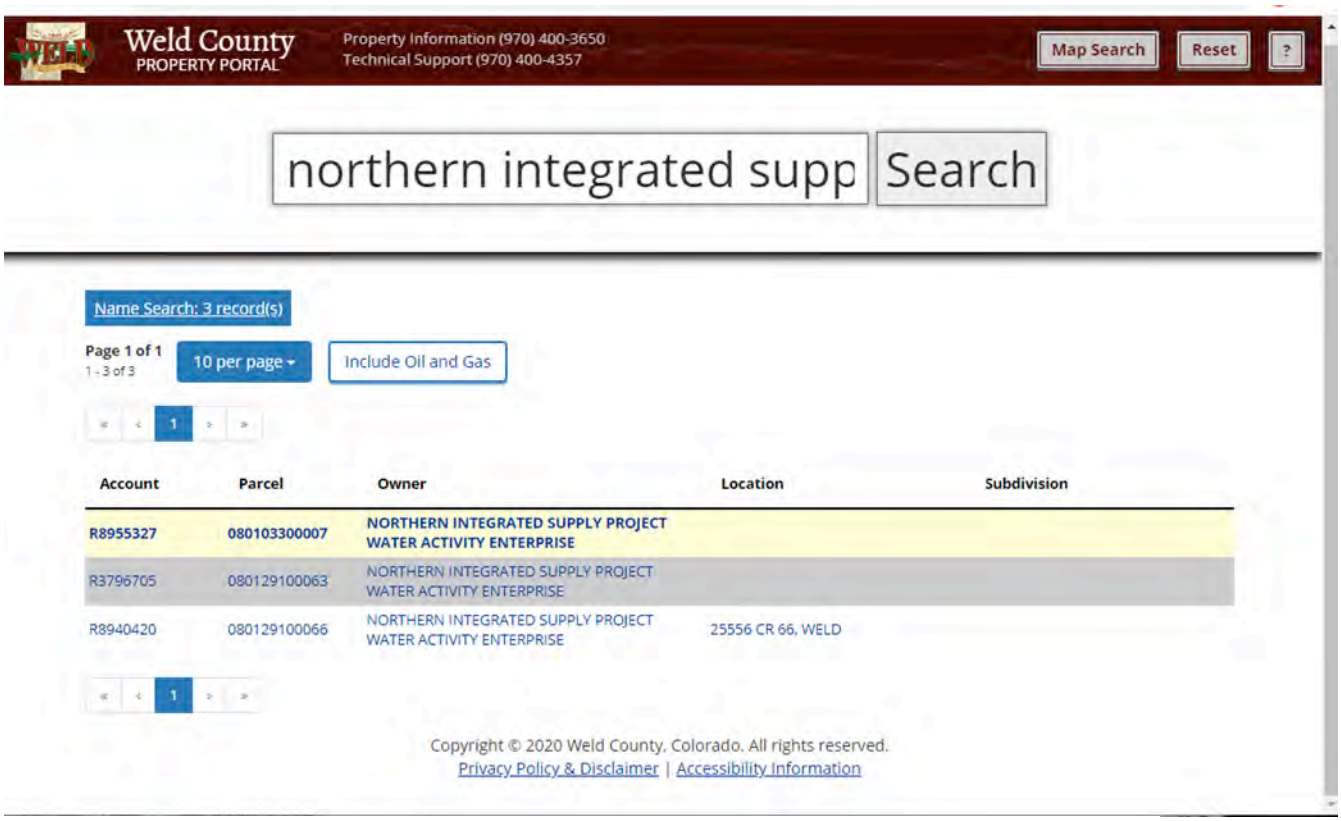
part of the county permitting process until late in 2019, but was excluded from the 1041 permit application, submitted February 2020. For a period of 16 years, the highway relocation has been presented to the public as part of the project, yet, at the last minute, this major construction project was unaccountably dropped from the county process.

The relocation of 7 miles of a major federal highway would not occur "but for" the NISP project, so attempting to isolate this major component of NISP and treat the highway relocation as a separate "CDOT" project unacceptably leaves out major impacts to Larimer County resources and residents. The relocation of U.S. Highway 287 is part and parcel of NISP, it must be included in the 1041 application, and everything to date lead the public to believe it would be.

Information on the farms and water supply is incomplete

The project is, in fact, not feasible and highly speculative specifically with regards to water rights. The project is relying on a farm-buying scheme, announced by Northern Water in early 2019, that the FEIS (p. 2.5.8) states: "*Implementation of the No Action Alternative would take about 10 to 12 years and would differ from the Applicant's Preferred Alternative due to the additional time required to procure a change in agricultural water rights, and it is unknown whether the Participants could acquire sufficient agricultural water rights to meet their future firm yield*." In other words, the path that Northern Water is currently taking is documented, in the FEIS, as speculative and does not meet the purpose and need for the project. In addition, the program would have significant environmental and socio-economic impacts that aren't analyzed in any environmental document.

Northern Water is conducting a farm-buying program in Weld County to obtain 22,000 acre-feet of water for the NISP project (Loveland Herald Reporter 2/28/19). At approximately $11,000/acre-foot, the purchase of 22,000 acre-feet will cost over $242,000,000. The FEIS states that water rights costs will be zero, and that no farms would be bought in order to fill Glade. The figure below is a screen shot from the Weld County assessors' website and shows that Northern Integrated Supply Project in 2019 purchased three parcels. The very real fact that the NISP project lacks over half its water rights wasn't revealed until about 12 months after the FEIS was finalized. In spite of over 15 years of development and environmental analysis, the project lacks over half of its key ingredient, water.



About half of the water rights required for Glade were purported to come from an exchange with ditch users in Weld County. The plan was to exchange clean Poudre River water for less clean South Platte River water, and the clean Poudre water would be taken out of the Poudre and pumped into Glade. The users in Weld County rejected the proposal and opted to retain the clean Poudre water, leaving the project with its current, severe, shortfall.

Throughout the permit application, the project relies on the FEIS as a crucial part of the 1041 permit decision. The application even encourages and "directs" the Larimer County Board of Commissioners to rely on the EIS. However, the 2019 after-the-fact change to a buy Weld County farms instead of exchanging the water with farmers means the EIS is no longer a reliable source – not for land use issues, not for comparing costs of the alternatives, not for water modeling (and thus for fish and wildlife), not for recreation. For example:

- the FEIS says that no farms will be bought, yet now at least 20,000 acres of farms must be bought
- the FEIS says there will be no costs associated with water rights acquisition, but the costs will actually be <u>at least</u> $242,000,000
- whereas it's stated that water deliveries would occur in 2030, there would, in reality, be an unknown but very long amount of time to acquire the water rights
- the FEIS says that the No Action Alternative (which was a farm-buying approach) was not feasible technologically and it was too expensive. The NISP project is

currently more expensive than some of the previously dismissed alternatives, and it is relying on the farm-buying approach the FEIS claims doesn't meet the project needs

- what if the Weld County farmers won't sell? How would the very purpose of this project be met?

The federal government should have recognized that the 2019 change to the proposed action would warrant a supplemental EIS, but so far has failed to act even though a comprehensive legal document was given to the Army Corps requiring a supplemental EIS. Even so, the 1041 application continually urges Larimer County to rely on the FEIS and to remember its participation as a cooperating agency, i.e., it is being asked to rely on a document that is fundamentally flawed. Furthermore, the FEIS states that the farm-buying approach, presented as part of the No Action Alternative in the FEIS, has been deemed 'not feasible" in the FEIS, and the County has no choice but to not approve the project. A robust evaluation of risks facing water supplies to Glade should be part of Larimer County's decision-making process when considering Northern's 1041 permit application. The FEIS fails to provide such an assessment.

Further, Save The Poudre sent a request to the U.S. Army Corps of Engineers for "Supplemental NEPA analysis" in response to this failure of the FEIS. That request has been inserted into this record.

Lack of water means lack of recreation

Northern Water claims the proposed Glade Reservoir would provide a "high-quality" recreation experience with economic benefits to Larimer County, ranging from $13 to $30 million per year (there is no documentation for these very high projections, and we show below that the project would result in a financial burden for the County). What Northern doesn't mention is the many years when water levels at Glade would be too low to attract boaters and other recreationalists.

As noted above, Northern Water does not have the water rights to fill Glade during low water years. NISP's obligations to deliver water to municipalities outside Larimer County would severely deplete water levels at Glade when water supplies are stressed.

Further, droughts are predicted to increase in frequency and duration in response to climate warming. Extended droughts would turn Glade into a vast mud pit that provides little or no recreation value to the County. A once pristine natural glade (the Hook and Moore Glade) would be rendered an eyesore for local residents and visitors alike.

The FEIS claims overall economic benefits from recreation at Glade would range from $13 to $30 million per year. For comparison, recreation at Horsetooth generated $2.5 million in 2019. Even by generous estimates, visitation at Glade would be roughly

half of that at Horsetooth. The FEIS provides no evidence to support Northern's overinflated recreation value at Glade.

In fact, during dry years, visitation to Glade could be much less than predicted in the FEIS. Neighboring Horsetooth Reservoir is often used as a yardstick to estimate recreation value at Glade. Historical data from Horsetooth show that recreation opportunities, such as boat access, are provided during more than 90% of the peak (May-August) recreation season, even during drought years. However, during low water years, recreation at Glade would be compromised due to Northern's junior water rights on the Poudre. Northern's own hydrological modeling predicts that recreation opportunities, such as motorized boat access, would be severely restricted, if not curtailed altogether, during dry years. This situation would become worse in the future.

The effects of climate change, including a widely accepted increasing frequency of prolonged droughts, could severely undermine recreation value at Glade. The City of Fort Collins recently commissioned a water supply vulnerability study that considered a range of risks that could plausibly impact the City's future water supplies. The study concluded that "climate change is the most important vulnerability" facing Fort Collins' water supplies. A robust water supply vulnerability study that assesses risks facing water supplies to Glade was not conducted for the NISP FEIS.

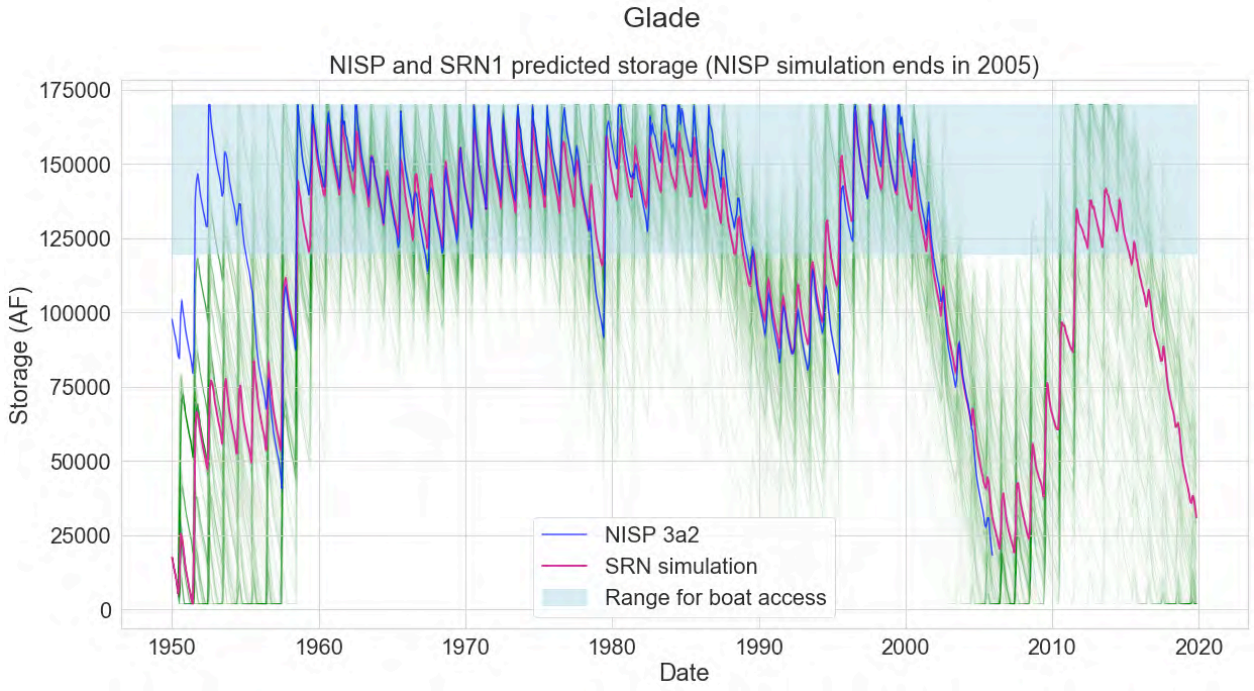
Neither Northern's Recreation Plan for Glade nor their 1041 permit application, address ***levels of service*** for recreation at Glade. For example, ***how often*** would water levels be high enough to provide access for motorized boating, ***how long*** would low water levels last, and ***how severe*** would water drawdowns be during droughts? Save Rural NoCo conducted its own analysis of storage volumes at Glade to answer these questions.

Save Rural NoCo developed a statistical model to evaluate a range of plausible operational scenarios at Glade, including: realistic estimates of the time required for the initial fill; refill characteristics following the severe water drawdowns resulting from cyclical drought conditions that are common to this region; and impacts of more frequent and prolonged droughts (which are widely anticipated in response to regional climate warming). The model was used to predict how each of these scenarios would affect water levels, and ultimately recreation services, at Glade. The results show that recreation services, such as recreational boat access via the proposed boat ramp, would be considerably reduced under any of these scenarios. The resulting decline in recreation use will undermine recreation value at Glade and result in lost revenue to the county. A technical report with details of SaveRuralNoCo's analysis is available on the organization's website.

The lack of a robust vulnerability study, akin to the 2019 Fort Collins Water Supply Vulnerability Study, is an unacceptable omission from the NISP EIS and Northern's 1041 application. Since streamflow data are readily available it is particularly concerning that hydrological modeling for the NISP does not include 2006-2019 Poudre River streamflow data. The importance of recent streamflow observations cannot be

understated because they follow a severe water drawdown at Glade predicted by Northern's own hydrological modeling at the end of 2005. The omission of recent streamflow data denies the public and the county valuable information on refill characteristics at Glade following severe water drawdowns.

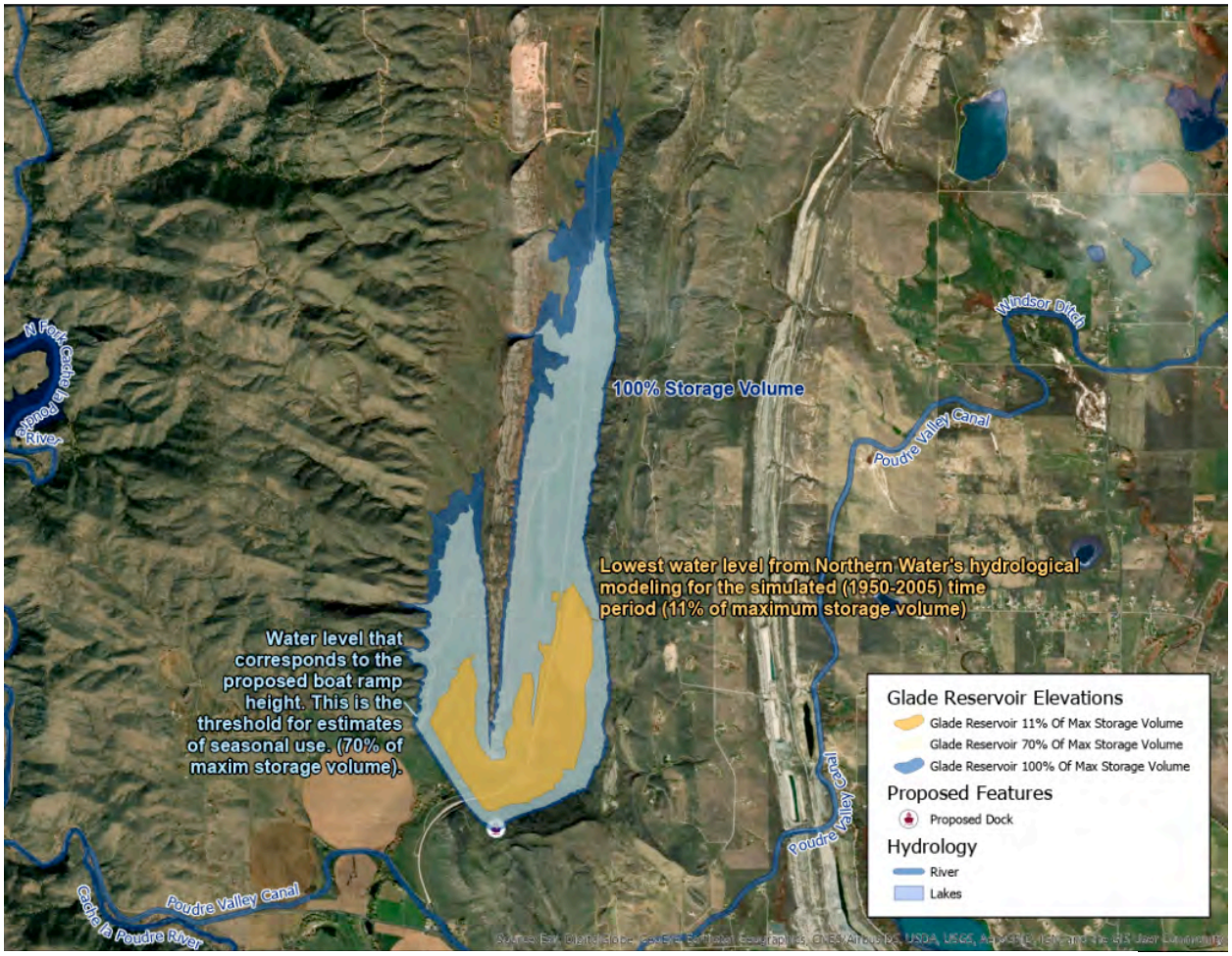
The figure below shows how such severe water drawdowns would affect the water surface area at Glade. In the last year of Northern's simulation (2005), storage volumes dropped precipitously, resulting in water storage at 11% of full capacity and water levels more than 160 feet below the high-water line.



The potential adverse impacts of extreme low water levels at Glade are enormous. However, such conditions are not acknowledged in the application or the FEIS, despite being predicted by Northern's own hydrological modeling.

Northern Water's "if you build it, they will come" approach would be costly. The County would have to pay 25% of the price tag (Larimer County's portion is currently estimated to be almost $6 million) to develop recreation facilities at Glade. In the many years when the boat ramp won't reach the water, the County will be faced with on-going annual losses. Not only will motorized boating be precluded, but the non-motorized experience will be poor due to miles of exposed, barren, aesthetically unappealing shoreline. If the County cannot recover upfront costs and future operating expenses, the burden will be on the taxpayer. Northern Water has not demonstrated that revenue from recreation would cover costs, particularly during droughts that are increasingly common to the region.

The economic value of recreation at Glade should be informed by a robust study that considers the current realities (the project lacks 22,000 acre-feet of water rights, drought, climate change) and the range of plausible future risks to water supplies at Glade. Neither the FEIS nor the 1041 permit application provides decision-makers and the public the information necessary to evaluate the feasibility and potential value of proposed recreation at Glade. In fact, the information presented to date demonstrates that recreation would be limited for years on end. When Glade is nearly empty, Larimer County's citizens will get nothing but the bill.



Northern's simulated water levels at Glade. The high-water line (dark blue), the minimum water level for the proposed boat ramp (35 feet below the high-water line), and the severe low water level from Northern Water's hydrological modeling (orange) 165 feet below the high-water line. Save Rural NoCo's modeling shows more frequent low water conditions when the water wouldn't reach the boat ramp and recreational opportunities would be negligible.

In conclusion, the county cannot approve a permit authorizing almost a decade of construction impacts for a project that has grossly insufficient water rights to meet any of its objectives. The erection of a huge industrial and commercial complex in rural northern Colorado, one that simply sits and waits for some, as yet unknown (and likely

never available, due to trend towards drier conditions), future water supply, does not even begin to comply with Larimer County's Comprehensive Plan or Land Use Code ("LUC").

For the reasons stated above and otherwise in this letter, the NISP 1041 application fails to comply with Section 14.10.A. of the Larimer County LUC requiring that a 1041 permit "applicant must submit a complete and sufficient application…" For this reason, we request that the Planning Commission recommend denial of the application.

There is recent precedent for such a recommendation. In the Planning Commission's review of the Thornton water pipeline 1041 application, the Planning Commission recommended denial of the application based in part on the fact that the application was incomplete with regard to the scope of the application, lack of alternatives analyzed, lack of mitigation, and inadequate balancing of the benefits to Larimer County.[48] Citing these inadequacies with the Thornton 1041 application, Commissioners Jensen, Dougherty, Cox and Carraway voted to recommend denial. Because the NISP application suffers from these same deficiencies, we ask that the Planning Commission vote to recommend denial of the NISP 1041 application. Consistency in the application of the LUC is the hallmark of good government. Having established a standard and precedent for completeness of a 1041 application, the Planning Commission is bound to apply this same standard to the NISP application.

C. The NISP 1041 application does not comply with review criterion D.1.

Section 14.10.D.1. of the LUC review criteria imposes a burden on the applicant to prove that the "proposal is ***consistent with the master plan*** and applicable intergovernmental agreements affecting land use development." For the reasons stated below, Northern has failed to prove that its NISP proposal is consistent with the master plan.

First, when county land use codes include a master plan compliance requirement, the master plan requirements become mandatory and not merely advisory. *See also, Beaver Meadows v. Bd. County Com'rs*, 709 P.2d 928, 936 ftn 6 (Colo. 1985 *en banc*) and *Board of County Commissioners of Larimer County v. Conder*, 927 P.2d 1339, 1345-46 (Colo. 1996 *en banc*)(both cases interpreting provisions of the Larimer County Code and Master Plan).

Second, the Larimer County NGOs request that the Planning Commission issue a ruling regarding which version of the Master Plan is applicable to Northern's 1041 application. We believe the current Master Plan is applicable. The County adopted its new Comprehensive Plan on July 17, 2019.[49] Northern's 1041 application was not

[48] Exhibit 16 hereto, pp. 184-200 (Thornton Planning Commission hearing transcript).
[49] The current Comprehensive Plan can be found at: https://www.larimer.org/planning/documents and is incorporated herein by reference.

submitted until February 14, 2020.[50] The purpose of the LUC is to "implement the Larimer County Master Plan adopted Nov. 19, 1997 ***and any future amendments***." (emphasis added). Further, projects "will be reviewed under regulations in effect on the date of the application."[51] Despite this clear language of the LUC, Northern's 1041 application fails to evaluate consistency with the effective July 2019 Comprehensive Plan and instead provides a very cursory discussion of consistency with the 1997 Master Plan.[52]

The Planning Commission must recommend denial of Northern's 1041 application because it fails to evaluate compliance with the Comprehensive Plan in effect at the time of the submission of its 1041 permit application.

Moreover, NISP does not comply with the 2019 Comprehensive Plan. The project is not in alignment with the Larimer County Comprehensive Plan for the Mountains and Foothills and Natural Resource Areas that Glade Reservoir would occupy. The Plan indicates that projects proposed for these areas should adequately address the following resource issues:

- *How does the project adequately protect air and water quality, cultural and natural resources, and minimize fragmentation of the landscape?* The application defers air quality and cultural resources protection to some later permitting/planning effort. The project would not adequately protect natural resources, as described in Section F below. The landscape would be severely fragmented by the project's huge and sprawling infrastructure (plus the relocation of a major federal highway).
- *How does the project avoid impacts to the open character of rural areas, unique or highly visible viewsheds, landforms and ridgelines?* The project would not avoid such impacts.
- *How does the project consider the natural terrain in its design and siting to minimize environmental impacts and avoid or reduce hazard risk to an acceptable level?* The project would severely alter the natural terrain and exacerbate hazard risks.
- *How does the project mitigate risks and reduce economic costs of natural hazard events to increase resiliency?* The projected influx of up to 500 people per day during construction and almost 400,000 people per year during operations to this high fire risk area would only increase the potential for fires. More human activity would increase the likelihood and frequency of human-caused fires, putting local homeowner's lives and property at risk.
- *How does the project comply with County policy, Code, Master Plans, and initiatives in relation to hazard risk reduction?* It doesn't. The application presents only conceptual plans (see section 12.0 in the application); a massive

[50] Northern's NISP 1041 application, p. 1.
[51] LUC § 3.6.D.
[52] Northern's 1041 application, Technical Memo #2, pp. 7-8.

construction project, with huge infrastructure and the potential for hordes of visitors only increases hazard risk, especially fires and medical emergencies.

Further, even if the 1997 Master Plan was effective, Northern's cursory evaluation is woefully incomplete. By means of example, the 1997 Master Plan states:

> **"ES-16-s1: Larimer County will not support future transfers of existing water resources out of the County without consideration of the impacts on present and future land uses including agriculture."[53]**

Thus, the Master Plan contains a strong statement disfavoring Thornton's proposal to transfer water out of the County that has historically irrigated agricultural lands. This requirement of the Master Plan also imposes a duty on Northern to satisfactorily demonstrate "the impacts on present ***and future*** land uses" from NISP. As such, the Planning Commission may "***not support***" (recommend approval of) Northern's 1041 application without full and complete consideration of all impacts on present and future land uses resulting from Northern's diversion of water from the County. Because Northern has yet to acquire the farms and associated water rights needed to implement NISP, it is completely unable to prove consistency with the requirements of ES-16-s1 and the 2019 Comprehensive Plan containing similar requirements.[54]

The failure to fully evaluate the affects of drying irrigated agriculture was one of the Board's reasons for denying the Thornton 1041 application. Having set this precedent, the same analysis and conclusion must be reached here.

Because Northern's 1041 application fails to evaluate consistency with the currently effective Comprehensive Plan, or even adequately evaluate consistency with the 1997 Master Plan, it has failed to meet its burden of proof on all applicable criteria in the LUC and thus the Planning Commission must recommend denial of the permit application.[55]

D. The NISP 1041 application does not comply with review criterion D.2.

Section 14.10.D.2. of the LUC review criteria imposes a burden on the applicant to prove that the "applicant has ***presented reasonable siting and design alternatives*** or explained why no reasonable alternatives are available." For the reasons stated below, Northern has failed to prove that it has presented reasonable siting and design alternatives or explained why no reasonable alternatives are available.

Northern's 1041 application does not present any alternatives or adequately explain why no reasonable alternatives are available.[56] Instead, Northern only presents

[53] Plan at p. 6-15.
[54] *See,* 2019 Comprehensive Plan, Vol. 1, pp. 44-47 and Vol. 2, pp. 122-123.
[55] LUC Section 14.10.B.
[56] Northern 1041 application, Technical Memorandum No. 1 (Project Description) p. 18.

"the final alignment" of its self-selected alternative.[57] Northern refers to its self-selected sole alternative as the "Northern Tier Delivery Pipeline."[58]

Northern's 1041 application claims that "[d]iscussions related to alternatives considered and evaluated" by Northern can be found in the "Project Summary Memo, the 1041 Evaluation Memo, and the Conveyance Pipeline Memo."[59] However, a narrative of "discussions related to alternatives considered and evaluated" by Northern is not the same as a presentation of alternatives from which the citizens of Larimer County and the Board may choose. Northern's presentation of a single "final alignment" does not satisfy the requirements of LUC § 14.10.D.2. Further, Northern's application fails to meet its burden of proving why no reasonable alternatives are available.

Importantly, Northern's 1041 application did not consider any alternatives to the Glade Reservoir. The 1041 application also did not present alternatives to relocating Highway 287 or siting alternatives for any such relocation. Northern also fails to present any alternatives to its "refined-conveyance concept." Northern's so-called alternatives analysis for its self-selected Northern Tier did not analyze any pipeline routing alternatives to the Glade Release/Poudre Release Pipeline in Project Area 0.[60]

Alternatives to NISP have been forwarded by multiple groups including Save The Poudre and Western Resource Advocates. The "Healthy Rivers Alternative" promoted by Save The Poudre includes enhanced water conservation and efficiency, better growth management, using 'growth displaced water', and pursuing water transfer mechanisms with farmers.[61]

The "Better Future for the Poudre River" alternative promoted by Western Resource Advocates also advocates for enhanced water conservation, better growth management, and using "growth displaced water."'[62]

Save The Poudre also supports the approach of "**Cleaning the River through Fort Collins and using the river as a conveyance, instead of the pipeline."** This alternative approach is described in Save The Poudre's comment letter to the Colorado Water Quality Control Division in Dec. 2019, wherein it notes that this approach also applies to the Larimer County 1041 permit process.[63] Northern Water claims that they could only run 1/3rd of their water down the Poudre River, again due to the pollution

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[57] Technical Memorandum No. 2 (Larimer County 1041 Review Criteria), p. 9.
[58] NISP 1041 application, "Northern Tier Delivery Pipeline Alternatives Analysis" Feb. 2020.
[59] *Id.*
[60] *Id.* at pp. 1-2.
[61] Exhibit 22 hereto. See also: http://savethepoudre.org/docs/stp_healthy_rivers_alternative.pdf
[62] Exhibit 23 hereto. See also: https://westernresourceadvocates.org/publications/a-better-future-for-the-poudre-river/
[63] Exhibit 20 hereto (STP Dec. 2019 comment letter to WQCD).

level in the river. The "Clean The River" alternative describes how stormwater technology can allow all of the NISP water to flow through Fort Collins at a significantly cheaper cost than building the Northern Tier Pipeline.[64]

Again, the Board and this Commission found that Thornton had failed to present adequate alternatives when it only offered the County the choice between two pipeline routes (Douglas Road and CR 56). Northern's 1041 application is even more defective because ***it fails to offer any presentation of alternatives for any aspect of the project.*** Having set a precedent in the Thornton pipeline case, the Planning Commission must apply the same analysis and reach the same conclusion that Northern has failed to comply with LUC § 14.10.D.2.

E. The NISP 1041 application does not comply with review criterion D.3.

Section 14.10.D.3. of the LUC review criteria imposes a burden on the applicant to prove that the 1041 application "conforms with adopted county standards, review criteria and mitigation requirements concerning environmental impacts, including but not limited to those contained in this Code." For the reasons stated below, Northern has failed to prove that its 1041 application conforms to adopted county standards, review criteria and mitigation requirements concerning environmental impacts.

Northern's pump station at Glade Reservoir would be "approximately 40,000 horsepower with a capacity of approximately 1,200 cfs."[65] The Glade pump station would require a 40 mega-volt ampere power supply need to be served by Xcel Energy, which would run a new transmission line to the station from a Tri-State 115 kV transmission line.[66] The Glade pump station would also require a new electrical substation.[67]

The new pump station upstream of the Mulberry plant would be "1,000 to 1,300 horsepower" with a capacity of "18 to 25 cfs."[68]

Very little information is presented in Northern's 1041 application related to the new Larimer County pump stations. However, pump stations are industrial uses of land. Pump stations generate significant noise, ground vibration, glare, aesthetic, and other impacts.

The requirement to "conform with adopted county standards" includes compliance with zoning requirements. More specifically, Section 14.10.D.3 of the LUC requires that "[t]he [1041] proposal conform[] with adopted county standards, review criteria and mitigation requirements concerning environmental impacts, including but not

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[64] *Id.*
[65] Technical Memorandum No. 1, p. 4.
[66] Northern's 1041 application, Memorandum, Glade Reservoir Preliminary and Detailed Design, February 14, 2020, p. 5.
[67] *Id.*
[68] Technical Memorandum No. 1, p. 6.

limited to those contained in this Code." The zoning requirements are county land use standards contained in the Code.[69]

Northern's 1041 application is incomplete because it fails to demonstrate that the pump stations conform with zoning restrictions. Northern is a water "utility." Section 4 of the Larimer County LUC identifies which "utility" uses are allowed in each zoning district. For example, in "Open" zoning district the only uses allowed for "utilities" are "commercial radio service" and "radio and television transmitters."[70] The LUC recognizes "pumping stations for water" as an industrial type use by utilities and thus any argument that such industrial uses are allowed in all zoning districts must be rejected.[71]

Yet again, the Board rejected the Thornton 1041 application because it failed to prove that the pump station would comply with county standards. The same is true with regard to Northern's deficient 1041 application which contains even less information about the zoning and standards applicable to the pump station and whether the facility is in compliance with those requirements. Northern's application fails to meet its burden of compliance with review criteria Section 14.10.D.3 because it fails to identify the zoning for each parcel upon which it plans to located each pump station and it fails to prove that each parcel is zoned to allow such a utility use. As such, the Planning Commission must recommend denial of Northern's 1041 application for failure to conform with zoning standards.

In light of climate change, we must also consider the carbon footprint of creating a pump station and its subsequent power lines and transmission towers. To get the Poudre River water into Glade reservoir, it will take 80MW of power supplied by huge transmission towers similar to those used at Glen Canyon Dam (see below image). The forebay is the holding reservoir for water from the Poudre River, and from where the Poudre water will be pumped 400 feet up into the Glade Reservoir. The proposed peak pumping rate in Northern's application to Larimer County, from the forebay, is 1,200 cubic feet per second and will require 81 MW (megawatt) of power. To put 81 MW in context, it is equivalent to the power required by Fort Collins' approximately 62,000 residences and 90% of the reported generation capacity of Glen Canyon Dam. This begs the questions – How will NISP get the required electrical power to the pumps? If the power comes from coal or gas fired-power plants, operation of the pumps will generate significant greenhouse gas emissions. Additionally, what is the visual impact of these enormous power lines?

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[69]LUC § 2.4(C)("[t]his code and the official zoning map govern the application of the zoning districts and related standards."); and, LUC § 3.4(A)("[t]he location and boundaries of the zoning districts established by this code are shown on the official zoning maps of Larimer County. These maps have been adopted by the county commissioners and are incorporated as part of this code").

[70] LUC § 4.1.5.

[71] LUC § 2.2.E.5.e.

F. The NISP 1041 application does not comply with review criterion D.4.

Section 14.10.D.4. of the LUC review criteria imposes a burden on the applicant to prove that the proposal "will not have a significant adverse affect on or will adequately mitigate significant adverse affects on the land or its natural resources, on which the proposal is situated and on lands adjacent to the proposal." For the reasons stated below, Northern has failed to prove that its proposal will not have a significant adverse affect on or will adequately mitigate significant adverse affects on the land or its natural resources.

NISP would involve seven years of heavy construction. According to the application, there would be five years of construction in and around the dam site impacting our communities, and an additional two years in the South Platte portion of the project, impacting other rural communities. For a project of this magnitude and complexity, delays are inevitable. The rural public would be subjected to 6-days-a-week heavy traffic and heavy machinery operations, and the unwelcome, intrusive, and obnoxious presence of a massive construction project, with all of its activity, congestion, noise, dust, and danger, over a long period of time. Helicopter noise would spoil the skies. Construction would turn the hundreds of acres of the landscape into a heavy industrial zone, and take away the attractiveness, the clean air, the quiet – the things we depend on for health and happiness. The average life expectancy of Colorado residents is 80.5 years – the approval of this project would force us to endure a huge construction project for <u>over 10% of our adult lives</u>. Project construction, therefore, would have a significant adverse affect on the land and its natural resources, both on project area land and on lands adjacent to the proposal. Furthermore, project construction contravenes Larimer County's goals for Rural Heritage or Environmental Stewardship (Larimer County Comprehensive Plan, pp. 18-19).

The Board denied the Thornton 1041 application because it would result in 4 years of adverse impacts to county residents. Again, Northern's application would result in longer and more severe adverse impacts. The Planning Commission and Board must remain consistent and deny Northern's 1041 application.

Further, the following significant adverse impacts have not been analyzed or mitigated.

<u>Noise</u>

The noise analysis did not identify sensitive receptors in the residential areas around the proposed dam or reservoir and did not monitor or model expected noise increases due to construction or recreation at these sensitive receptors.

As an example, Bonner Peak Ranch (Bonner Peak) is a community occupying 3,200 acres between Ted's Place and Livermore. Other small communities occur both south and north of Bonner Peak, west of Highway 287, and a larger community occurs near the dam site, along county road 29C (see figure below for the location of rural communities near proposed Glade). Bonner Peak's 75 homes are either due west or

northwest of the northern part of the proposed reservoir. Without Glade, the principle noise impacting Bonner Peak homeowners and neighboring communities is from traffic on 287. According to the FEIS, Highway 287 has an annual average daily traffic of 6,100 vehicles. Larger trucks (3 or more axles and single or multiple trailers) account for 830 of the 6,100 daily vehicles according to 2018 CDOT traffic counts available online. Homeowners can hear this traffic, always or sometimes; it depends on atmospheric absorption, wind/temperature gradients, and the location of the home. Trucks account for most of the audible traffic, with large trucks creating sound levels of 90-100 decibels (dBA) at a fifty-foot distance.[72] Sound levels decrease with the distance from the source to the receiver. Homes on Bonner Peak are anywhere from about 4,000 to over 14,000 feet from 287. Using the inverse square law between sound levels and distance[73], we determined that most homes on Bonner Peak are exposed to maximum truck noise between 51 and 74 dBA depending on geographic features, atmospheric absorption and wind/temperature gradients. To place in perspective, Larimer County standards consider 55 dBA for residential areas "excessive and unusually loud and is unlawful." (Noise Level Policy, Ordinance No. 97-03, https://www.larimer.org/policies/noise), and the Colorado Department of Transportation (CDOT) sets 66 dBA as the noise level at which noise abatement is recommended.

The proposed Glade reservoir operations would increase noise on Bonner Peak and the neighboring communities for two main reasons: a) the 287 realignment, and b) planned recreation on and near the reservoir. The current 287 passes directly by the Bonner Peak and other entrances. A rerouted 287 would continue to do so, but about a mile south of the entrance it would diverge from the existing highway and head roughly due east and cut through the easternmost hogback before turning south toward Fort Collins. Traffic that is now running north-south would be replaced by traffic running east-west. The realigned route would be elevated above the existing route, so the noise would likely exceed the noise from the existing route, because the proposed route will be in a direct line of sight to some homes (the existing topographic barrier would no longer block noise). In spite of the fact that traffic noise from the existing 287 can always or sometimes be heard by residents, the FEIS makes no mention of this situation. Information on noise in Section 4.15 of the FEIS is derived from the Hankford Noise Impact Analysis (2014) in which forty-one noise receptors were placed along the existing and rerouted 287 within 500 feet of the highway. However, no receptors were placed on Bonner Peak or any other communities.

The FEIS estimates that 379,000 visitors per year would recreate on or near the proposed reservoir, with substantially higher visitation levels in the warmer months (Headwaters 2017). Motor boating and jet skis would be among the recreation uses and would be new sources of noise to these communities. Similar to or exceeding large truck noise, an individual motorboat or jet ski creates sound levels of 90-100 or higher decibels (dBA) at a fifty-foot distance. However, there is no analysis of these new noise sources in

[72] Bureau of Reclamation. 2008. Resource Management Plan Navajo Reservoir area, Colorado and New Mexico, Final Environmental Assessment, Appendix E.
[73] https://www.engineeringtoolbox.com/inverse-square-law-d_890.html

any of the project documentation. The table below shows two estimates for the number of motorboats per day on Glade: the first is proportional to water surface areas, and the second is proportional to annual visitation. The range for the number of motorboats reflects low to high water levels predicted in the FEIS (which now are speculative, see "Information on farms and water supplies are incomplete" and "Lack of water means lack of recreation" above).

Estimated number of daily motorboats on the proposed Glade Reservoir.

Avg. Surface Area	Motorboats/day	Visitors/year	Motorboats/day
1240	59-248	379,000	52-218

How 52 to 248 motorboats impact noise levels on the neighboring communities will depend on where they recreate on the proposed reservoir. The further north they cruise, the more the impact on Ingleside and Bonner Peak; further south, the residents along 29C would be impacted. Moreover, unlike large trucks that drive by, motorboats can cruise up and down a reservoir as they set out for fishing spots or engage in sightseeing, water skiing, etc. In other words, while the noise from one large truck traveling on 287 may be heard for minutes, the noise from one motorboat may be heard for much more extended time periods. Because no noise analysis was conducted in the FEIS regarding motorboats, we will appeal to the table below to approximate the noise levels at points within Bonner Peak, as an example. The residences on Bonner Peak vary in distance from the proposed reservoir with the closest residences about 4,000 feet and more distant residences exceeding 14,000 feet. Noise levels from one motorboat at 4,000 feet distance would be 62 dBA while at 14,000 feet noise levels would be 51 dBA. These levels are for one motorboat: more boats will create more noise. If four boats are plying the waters of the proposed reservoir, then their cumulative dBA are 68 dBA for the closest residence and 57 dBA for the furthest.[74]

Decibel levels measured at residences located from 50 ft to 14,000 ft from motorboats.

	Feet from Motorboat									
No. Boats	50	100	1,000	4,000	5,000	6,000	8,000	10,000	12,000	14,000
1	100	94	74	62	60	58	56	54	52	51
4	106	102	80	68	66	64	62	60	58	57
10	110	104	84	72	70	68	66	64	62	61

These dBA levels would be a significant new source of noise to Bonner Peak, and for some residences they would exceed the 55 dBA which in Larimer County is considered "excessive and unusually loud and is unlawful" as pointed out above.

[74] Cumulative noise levels can be determined using the website: http://www.sengpielaudio.com/calculator-spl.htm.

Again, the FEIS does not investigate recreation as a new source of noise to residences, although it does investigate vehicle traffic noise along the proposed rerouted Highway 287. As mentioned above, according to the CDOT's Noise Abatement Criteria, residential locations are considered impacted by new traffic noise when: noise levels are predicted to approach or exceed CDOT's Noise Abatement Criteria (66 dBA), or where design-year noise levels are predicted to be a substantial increase (10 dB or more) over existing noise levels.

According to the FEIS (see Hankford 2014 for detail), estimated future traffic noise levels from a rerouted highway 287 require no noise mitigation for this Glade project. Some predicted traffic noise levels are very close to the 66 dBA criterion at which noise abatement is recommended, but the residences impacted in this way are along the rerouted 287 and its intersection with the current 287. Bonner Peak was not considered in these traffic noise studies, in addition to not being considered with respect to the motorboat noise.

Property values would be affected by the additional noise. For many residents, who desire a quiet, rural way of life, motorboat noise would diminish the quality of life. The FEIS states that the vehicle traffic noise impacts from the proposed Glade Reservoir will be minor, where minor is defined as noise "from new noise sources above existing levels but below existing noise standards." (FEIS, vol. 4, Table 4-111, p. 4-472 & p. 4-469) However, for some residents, motorboat noise would exceed these standard (see table below). In addition, if we consider the value of the lost quality of life for residents, the point is not whether the new noise is below noise standards, but rather is the new noise above existing noise levels.

Although placing a value on resident losses from motorboat noise is challenging, it is not novel. There are numerous economic studies that estimate losses that people experience from diminished environmental quality, where the sources of loss may be air, water or light pollution, or in the present case, noise pollution. Basically, these studies estimate how much people would be willing to pay not to be subjected to more noise. Economists do study housing property values, because house prices reflect what people are willing to pay for the bundle of characteristics that houses represent.[75] These studies are sometimes referred to as hedonic property value studies. (See Freeman (1995) for a survey of hedonic pricing.) One house characteristic is the noise level the house is exposed to; people have a choice of their residential location, so they have a choice between houses in noisy or peaceful locations. Because noise is undesirable, we would expect that if two houses are identical except for their exposure to noise, the house with the lower exposure will sell for a higher price. Examples of the use of property value studies applied to noise include Delucchi and Hsu (1998), Nelson (1982) and Wilhelmsson (2000). Using results from Nelson, we can estimate the loss in property

[75] Housing attributes may include, besides noise exposure, square footage, number of bathrooms, property size, presence of a pool or fireplace, neighborhood school quality, distance to work, and many others.

values on Bonner Peak associated with motorboat noise on the proposed Glade Reservoir. Nelson finds that for houses exposed to noise, there will be a mean reduction in the value of the house of 0.4% per each dBA of exposure. The range around the 0.4% is [0.16% - 0.63%] with a standard deviation of 0.23%. For example, take two $100,000 houses that are identical and are both exposed to 55 dBA. If one house experiences an increased exposure to 65 dBA, the increase in exposure is 10 dBA. Using the 0.4% for each dBA, the value of the higher exposed house will decrease by (10)(0.4%) = 4%. In dollars this is (4%)($100,000) or a $4,000 loss in value.

The total loss in Bonner Peak property values for houses within 14,000 ft of the proposed reservoir is $1,456,000. This averages almost $30,000 per household which would a significant burden to many property owners. These losses are completely ignored in the FEIS and the 1041 application.

Estimated Property Values Losses Due to Noise for Residences 4,000 to 14,000 feet from the Proposed Glade.

Distance from Reservoir (ft)	(A) Number of houses	(B) 10-boat dBA	(C) (B) – 50 dBA	(D) (C) x (0.4%)	(E) (A) x (D) x ($500,000)
4,000	3	72	22	8.8%	132,000
5,000	4	70	20	8.0%	160,000
6,000	3	68	18	7.2%	108,000
8,000	13	66	16	6.4%	416,000
10,000	8	64	14	5.6%	224,000
12,000	10	62	12	4.8%	240,000
14,000	8	61	11	4.4%	176,000
Total	49	--	--	--	1,456,000

We can point to several assumptions that if relaxed might increase or decrease the total loss.

- The number of motorboats used was ten, but this may be very low considering that 52 to 248 motorboats per day may be using the proposed reservoir based on visitation levels at Horsetooth. Obviously, increasing the number of boats would increase the noise levels and the total loss would be greater.
- The motorboats would ply the reservoir waters in the warm months only. Because the noise is not year-round, it may lower the total loss. However, there are insufficient data to establish this.
- Motorboat muffling technology may make some boats less noisy, but it is likely that many boats would be unmuffled.
- Jet skis were not included in the analysis for lack of data. Adding them at any level would increase the noise and the total loss.

- No traffic noise from a rerouted highway 287 was considered. Adding truck traffic could increase the dBA exposure and increase total loss.

People choose where they live based on a variety of reasons. Some people choose suburban or urban areas owing to the availability of cultural activities, or the convenience of being near schools and workplaces. These amenities are not as easily available to the affected rural northern Colorado residents; instead, residents are willing to tradeoff these amenities for a rural lifestyle and for peace and quiet. The proposed Glade Reservoir would be a major disruption to this peace and quiet, and it would irreversibly spoil rural ways of life.

Furthermore, the county must consider the fact that this type of analysis was completely overlooked in all of the environmental documentation for this project. So, while the application encourages and reminds the county of its long involvement in the development of the FEIS, the FEIS clearly did not adequately address these potential impacts and loss of property values.

Impacts to Visual/Aesthetic Quality of the Natural Landscape

The existing scenic quality of Hook and Moore Glade and surrounds is very high, with its gently sweeping natural valley of grasslands bordered by striking, tall, red, layered hogbacks. If you are traveling downslope, this view gradually opens onto the mouth of Poudre Canyon and the agricultural valley with its floodplains, cottonwoods, pivot irrigation, and dairy. If you are traveling upslope, you move into stunning rangeland and the sculpted hoodoos of Sherman Granite. It's spectacular, it's rare, and residents cherish it. The construction of Glade Reservoir would irreparably damage this unique scenery. The FEIS states that the scenic quality of residential areas near the reservoir would increase because the water would provide "texture". This smacks of jargon to put a shine on unmitigated folly. This landscape is beautifully, naturally textured, and the reservoir, with its bathtub ring, would be an industrial scar. The application, and the FEIS, fail to consider the extreme negative visual impacts of a partially filled reservoir and a barren shoreline. The avoidance and mitigation measures (re-vegetation and planting) don't even begin to address this issue – once it's gone, it's gone.

Visual and noise impacts from the relocation of Highway 287 would also be significant. The elevated highway would be visible for miles, and the light pollution from nighttime headlights, also elevated to be seen for miles, would also severely impact visual resources in and around the reservoir. Noise associated with the elevation of highway 287 is also not addressed. Once the highway rises above the topographic screens, the noise from over 6,000 vehicle trips per day, much of it large trucks, would have a unobstructed path into the surrounding hills.

The FEIS provides estimates of the number of acres that would be impacted due to road relocation. While much of the realigned highway would cross the Holcim Mine, which is currently begin reclaimed, the FEIS does not address land use issues associated

with the elevation of the highway across the eastern hogback, and how that would affect land and communities in the Hook and Moore Glade and foothills to the west. The FEIS provides a cursory evaluation of how the realignment might affect future land uses, but egregiously overlooks one very important current land use: rural communities.

With regards to the aesthetic effects of the realignment, the FEIS also notes that "vehicles traveling on the realignment would be noticeable from all visibility areas in northern, eastern and south portions of the study areas. Vehicles traveling on the realignment would also introduce visible light (from headlights at nighttime….the presence of vehicles on the realignment would reduce the scenic quality of portions of the study areas…. Additionally, the realignment would have relatively small cuts and or fills due to the nearly flat topography of the prairie [north of the Holcim Mine and east of the hogback]. Scenic quality would be reduced by the realignment due to the visible contrasting changes in landform, rock form, color, and texture. Visibility of the contracts would extend beyond the study are a predominately to the west and **would affect travelers on the highway**…..The realignment of U.S. 287 would unavoidably alter scenic quality in the realigned areas north of Holcim Mine." (emphasis added).

The glaring omission from this is that there is no mention of impacts to residents in the many small communities in the vicinity.

With regards to noise, the FEIS states that "Because predicted Leq (hourly) is below 66 dBA at all residential and campground receptors….minor permanent noise impacts are predicted…." However, the analysis did not consider sensitive receptors in the communities in and adjacent to Hook and Moore Glade. The analysis used 41 receptor locations within 500 feet of the centerline of the westernmost alignment and modeled noise levels for distances between 500 and 1000 ft of the alignment and construction areas. impacts based on those. Again, noise wasn't measured or explicitly modeled in our rural communities. The FEIS repeatedly ensures us that noise levels would be below standards, which a) isn't documented for the affected rural communities and b) doesn't consider the fact that we would be subjected to increased noise, within standards or not, that impact our quality of life.

By removing dramatic amounts of water from the Poudre River, NISP would case unmitigatible and dramatic negative impacts to the River, including to fish and aquatic species, wildlife habitat, riparian forest, wetlands, and to the recreational opportunities at the new Whitewater Park. These impacts have been described at length in Save The Poudre comments to the U.S. Army Corps of Engineers in the DEIS, SDEIS, FEIS, and Supplement NEPA process. Through previous comments in this letter, those comments to the Corps have already been incorporated by reference into this letter for the Larimer County 1041 permit process.

G. The NISP 1041 application does not comply with review criterion D.5.

Section 14.10.D.5. of the LUC review criteria imposes a burden on the applicant to prove that the proposal will not adversely affect any sites and structures listed on the

State or National Register of Historic Places. For the reasons stated below, Northern has failed to prove that its proposal will not adversely affect any sites and structures listed on the State or National Register of Historic Places.

The FEIS states that there are 82 eligible or potentially eligible cultural sites present in the Glade Reservoir Area of Potential Effect (APE). Eight of the sites are officially eligible and 74 require additional data and formal evaluation. There are numerous additional sites in the APEs of the 287 reroute and other proposed project facilities. The FEIS then states that all unavoidable adverse effects on historical properties would be mitigated following the process described in an as yet to be developed Final Programmatic Agreement. The Corps anticipates the Final Programmatic Agreement will contain a number of provisions for cultural resources mitigation. The Corps then anticipates that Northern Water would implement all feasible and prudent measures to avoid and minimize effects on historic properties and to mitigate all adverse effects. With all these yet to be conducted evaluations, agreements, and anticipations, the Corps (FEIS p.4-527: Section 4.19.14 Effect Determination) reaches the conclusion: "*Consequently, effects on directly affected historic properties would be either minor or moderate. Effects on indirectly affected historic properties would be either minor or moderate*."

According to the definition of moderate provided by the Corps in that same section: "*In accordance with criteria in 33CFR325, Appendix C, the following terms are used to describe potential effects on cultural resources: Moderate: The effect on a designated historic property would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Measures identified in the Programmatic Agreement to minimize or mitigate adverse effects reduce the intensity of impacts under NEPA from major to moderate. The determination of effect for Section 106 would be an adverse effect."* Thus, the determination of effect for Section 106 of Northern's proposed action on those affected historic properties that consequently end up post-mitigation as moderate as concluded by the Corps will by definition be adverse effects.

In summary, there are more than 82 cultural sites that are eligible for listing on the state or national Register of Historic Places, and some will be adversely affected. While none of the sites are currently "listed", they might indeed be important enough to our cultural heritage to warrant such listing. The listing determinations should be made, and if any site is listed, the project cannot be authorized. But doing it the other way around – i.e., granting the permit and then dealing with eligible sites, does not meet the letter or the spirit of this criterion.

H. The NISP 1041 application does not comply with review criterion D.6.

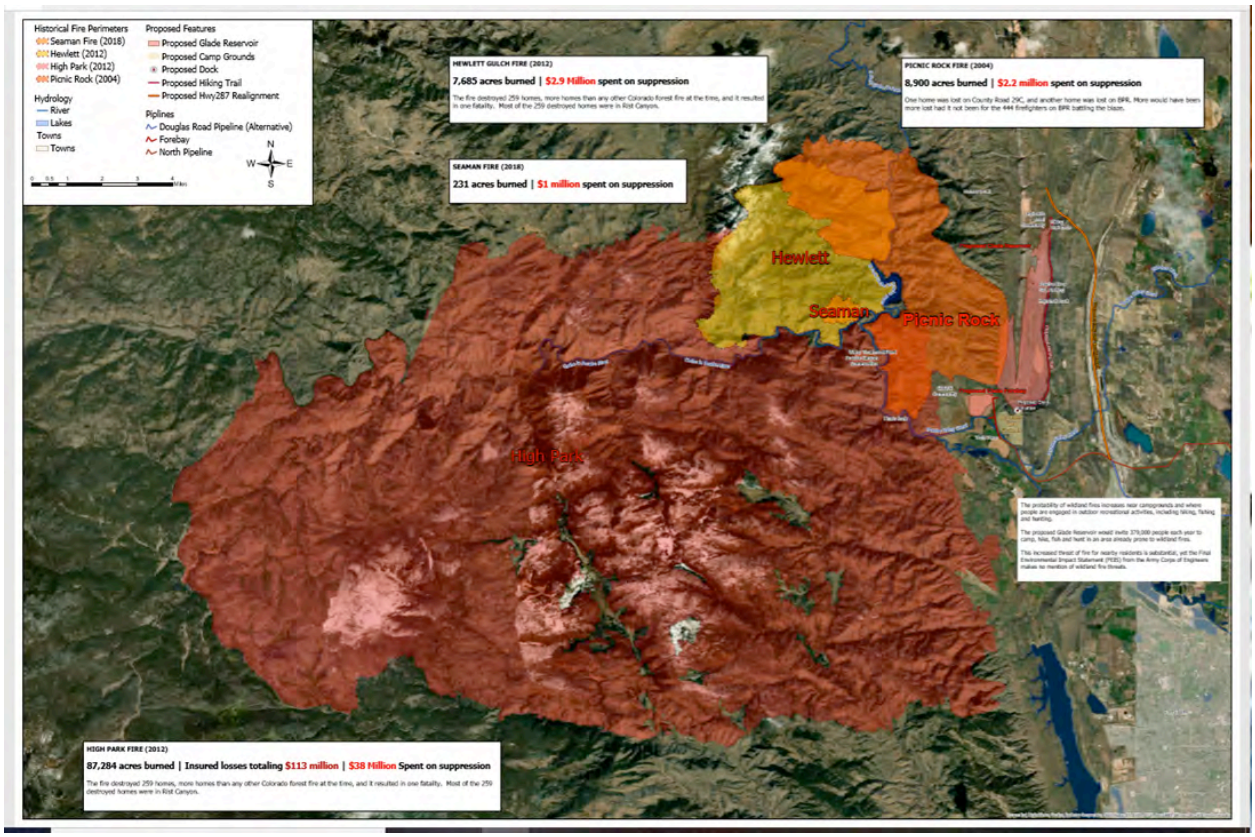
Section 14.10.D.6. of the LUC review criteria imposes a burden on the applicant to prove that the proposal "will not negatively impact public health and safety." For the reasons stated below, Northern has failed to prove that its proposal will not negatively impact public health and safety."

Impacts to Public Health from Wildfire.

An un-ignorable hazard in the hundreds of square miles west of the proposed reservoir is wildfire. The 87,284-acre High Park fire of 2012, the 7,685-acre Hewlett Gulch fire of 2012, the 8,900-acre Picnic Rock Fire of 2004, 231-acre Seamen Fire of 2018, burned over 100,000 acres (see figure below). Collectively, suppression costs were over $40,000,000 (in taxpayer dollars) and the High Park fire resulted in over $100,000,000 in insurance claims from rural residents, like us, whose property was destroyed.

Communities on these lands (see figure below) encompass hundreds of homes that have been threatened, and in many cases, destroyed by the fires. For examples, there are 26 homes along County Road 29C which lie directly west of the proposed campgrounds, with some homes less than a mile away. Residences on Ingleside Road and Bonner Peak sit adjacent to the proposed Glade Reservoir. North of Bonner Peak are another 30 or so homes (west of 287 and south of Livermore). More distant but still within reach of wildland fires that may ignite around the reservoir is Rist and Poudre Canyons which are a few miles from the campgrounds planned near the dam. There are hundreds of homes in Rist and Poudre Canyons.

The fires caused evacuations on County Road 29C, Bonner Peak and Rist Canyon. In the Picnic Rock Fire one home was lost on County Road 29C, and another home was lost on Bonner Peak. More would have been more lost had it not been for the 444 firefighters on Bonner Peak battling the blaze. The forest that remains on Bonner Peak is now in isolated patches instead of being on the eastern edge of a vast forestland. The High Park Fire destroyed 259 homes, more homes than any other Colorado forest fire at the time, and it resulted in one fatality. Most of the 259 destroyed homes were in Rist Canyon. Two fires were human caused, the third was caused by lightning. In addition to forest fires, there have been a significant number of grassland wildfires over the years adjacent to the proposed reservoir.

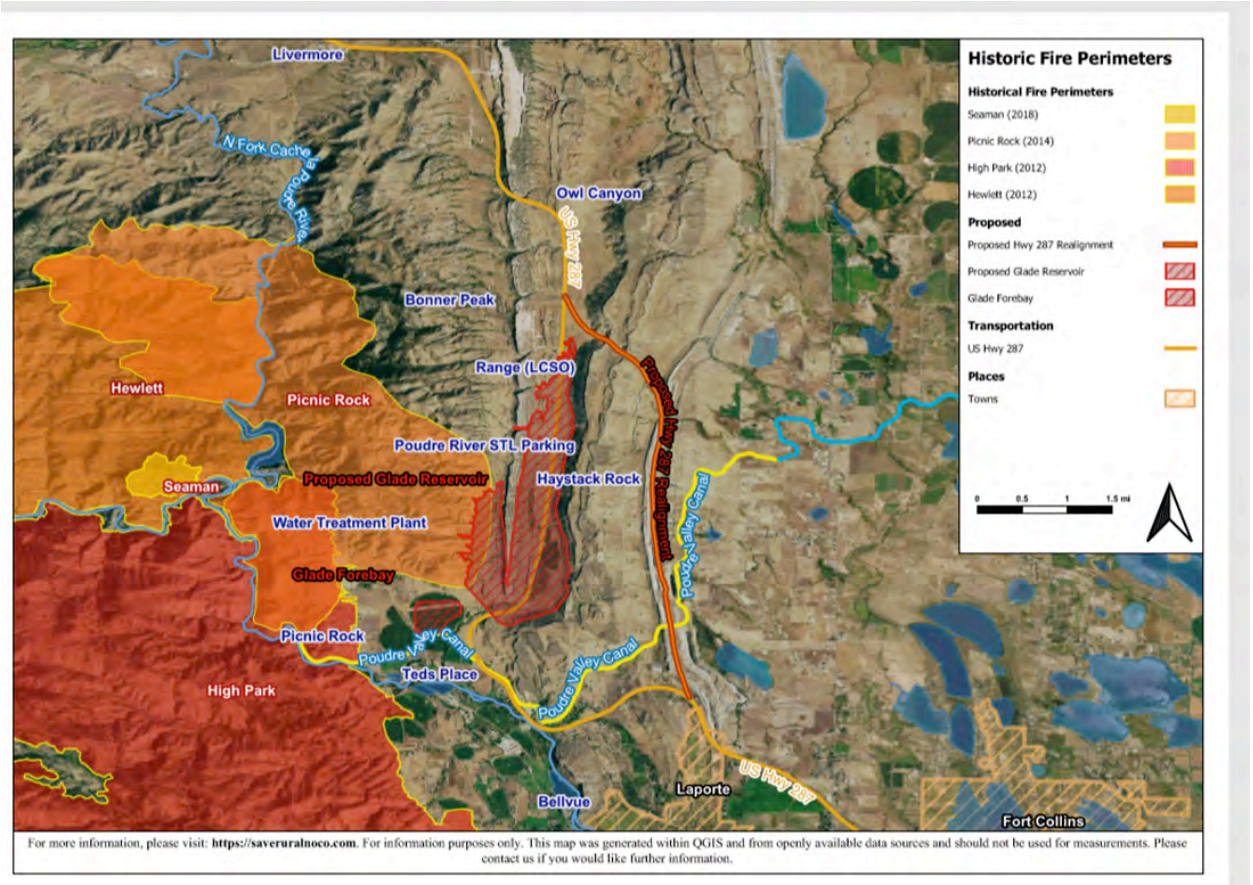


Past wildfire footprints relative to Glade Reservoir and facilities, estimated suppression and property damage costs.

Wild land fire frequency, intensity and duration have increased in the West in recent years, and according to the 2016 *Larimer County Multi-Jurisdictional Hazard Mitigation Plan*, Colorado is expected to experience greater fire risk in the future as the State becomes hotter and drier owing to climate change.[76] Larimer County has been ranked 2nd highest in Colorado for its level of wild land fire risk, and in the U.S. it is ranked 19th highest (Gude *et al*. 2008; Headwaters 2010; Radeloff *et al*. 2005; Brenkert-Smith *et al*. 2013). The Bonner Peak subdivision near proposed Glade is listed as being "high risk" according to the County's *Subdivision Wildfire Hazard Review*.[77] Presumably the adjacent communities, while not "subdivisions" per se, have similar risk.

Many factors contribute to the risk of wild land fires including topography, meteorological conditions, fuel type, and human activity. These factors are often categorized into natural caused fires and human caused fires. Worldwide, most fires are caused by people (Martinez *et al.* 2009). For instance, in California humans are currently responsible for approximately 95% of wild land fires (Mann *et al.* 2016).

[76] See https://www.larimer.org/sites/default/files/larimer-hmp.pdf.
[77] See https://www.larimer.org/emergency/fires/wildfire-review#/list/.



Past wildfire footprints the many affected rural communities.

The probability of wild land fires increases where people engage in outdoor recreational activities (Romero-Calcerrada *et al.* 2010; Vilar del Hoyo *et al.* 2011), and in locations close to campgrounds (Pew and Larsen 2001; Gonzalez-Olabarria *et al.* 2011; Mann *et al.* 2016) or fishing and hunting areas (Chang *et al.* 2013; Sitanggang *et al.* 2013). In Larimer County, lightning is a common natural cause of wild land fires.

The proposed Glade Reservoir would invite 379,000 people each year to camp, hike, fish and hunt in an area already prone to wild land fires. This increased threat of fire for nearby residents is substantial, yet the FEIS makes *no mention* of wild land fire threats and the 1041 permit application states that that "*After construction is complete, wildfire mitigation will follow Larimer County's Recreation Regulations*." (Wildfire Hazard Mitigation Plan, 2020, p. 3) To state the obvious, it's not the people who follow the regulations that cause the problems. This is passively "hoping for the best," ignoring the unacceptable risk to rural properties and lives and livestock, and is not a credible mitigation strategy.

The proposed Glade Reservoir would substantially increase access for people to recreate on lands that border our communities. Five new campgrounds would be developed near the proposed dam and less than a mile from homes on County Road 29C. The campgrounds would have at least 70 campsites to accommodate tent, car or RV

camping. Because campgrounds have been shown to be significant sources of wildland fires, and that "*Across all landscapes the number of fires increases with proximity to public and private campsites*." (Mann *et al.* 2016, p. 11). The location of these campgrounds would significantly increase the wildfire threat in the region.

Whether the number of hunters would increase or decrease as a result of a reservoir is not known, but a reservoir that generally brings more attention to the area may be expected to increase hunting usage, and with it, the potential for fires. The public is being told that fishing and hiking would also be available. While most visitors may obey trail rules, some would not and would trespass in our communities, innocently or otherwise. Most people would come in summer, when the land is hottest and driest, so this adds to the risk. Many visitors would not be aware of how easy it is to cause a wildfire in this landscape and may not take precautionary steps to prevent fires. Others would be careless, with campfires, with cigarettes, with illegal fireworks, or with firearms, and wildfires would be inadvertently ignited. Vehicles can start fires. The area is windy. Our climate is getting drier. One wrong fire in the right conditions could be very destructive.

Unfortunately, arson is possible. Data suggest that arson is not necessarily rare. For example, in the Daniel Boone National Forest in Kentucky more than 75% of forest fires are caused by arsonists (Maingi et al., 2007).

Construction of the project would bring 500 people and lots of heavy equipment, which can start fires, to the construction sites during summer, when fire hazard is highest. The Wildfire Mitigation Plan states that "*During construction of the Glade Unit, it is anticipated that the Contractor will employ fire mitigation strategies that include water trucks, coordination with the local fire department (Poudre Fire Authority), and other standard safety practices*." The fact that the proponent "anticipates" some future fire mitigation strategy is not an acceptable mitigation strategy, and is yet another example of how the application, and indeed the project, is full of empty promises, while the impacts will be real and could be devastating. The influx of heavy equipment and operators for the long-term construction period would increase the risk of fires.

The fire mitigation plan is grossly inadequate[78] and unaccountably fails to recognize the seriousness of this issue. Our homes, our property, our animals would all be put at risk of wildfire due to construction and high visitation. Both construction and operation would cause an unacceptable public safety risk.

Public Health Impacts on Air Quality

[78] The fire mitigation plan fails to acknowledge the serious fire danger in Larimer County and leaves dealing with fire to Poudre Fire Authority. The thousands of acres that have burned have required huge mutual aid efforts involving local and federal fire-fighting agencies, including out-of-state agencies. The plan falls far short, lacking any commitments to address a very real and potent risk of loss of life and property or the costs to taxpayers.

Lakeshore Dust. The FEIS, on which the 1041 application bases its environmental analysis, states that fugitive dust emissions during operation of Glade Reservoir would be negligible (FEIS Section 4.14.3.2, page 4-461). The "analysis" says that wind speeds would have to be over 80 mph before any dust would be raised from the lakeshore (see the Technical Memorandum attached to the FEIS). For those who live in rural northern Colorado, this doesn't pass. There is usually dust in the air, even with the slightest wind: we watch it lifted from the native prairie and foothills' surfaces, where, because of the area's dryness, vegetation doesn't completely cover the ground, and little rills, rivulets, and wind blown pockets expose soils to wind erosion. Residents watch it lifted from semi-vegetated slopes and from stream banks. They sweep it in clouds from our front steps and porches, and they wipe if off their furniture. Dust is part of everyday life, so the claim in the FEIS that the threshold wind velocity for fugitive dust emission is 79.7 mph, cannot be accurate. The every-day winds make this a very dusty environment.

The technical analysis for fugitive dust emissions was flawed because it relied on an Environmental Protection Agency guidance document AP-42, Chapter 13.2.5, as its starting point. It assumed that "Industrial Wind Erosion" is a good fit for the barren shorelines of a reservoir in northern Colorado. Industrial Wind Erosion is defined as follows:

> *Dust emissions may be generated by wind erosion of open aggregate storage piles and exposed areas within an industrial facility. These sources typically are characterized by nonhomogeneous surfaces impregnated with nonerodible elements (particles larger than approximately 1 centimeter [cm] in diameter). Field testing of coal piles and other exposed materials using a portable wind tunnel has shown that (a) threshold wind speeds exceed 5 meters per second (m/s) (11 miles per hour [mph]) at 15 cm above the surface or 10 m/s (22 mph) at 7 m above the surface, and (b) particulate emission rates tend to decay rapidly (half-life of a few minutes) during an erosion event. In other words, these aggregate material surfaces are characterized by finite availability of erodible material (mass/area) referred to as the erosion potential. Any natural crusting of the surface binds the erodible material, thereby reducing the erosion potential.*

The FEIS uses an Area Source Methodology used to estimate emissions of fine particulate matter less than 10 microns (PM10) from exposed lake beds in the San Joaquin Valley Air Basin to estimate fugitive dust from the shoreline of Glade. Erosion potentials are calculated using wind velocity data acquired by the National Climatic Data Center and then used to calculate PM10 emissions from wind events that may occur throughout the year.

The flaws with the fugitive dust emissions estimates in the FEIS are numerous and substantive:

- Open aggregate storage piles are not an appropriate surrogate for the shores of the proposed reservoir—a lakebed

- Non-homogeneous surfaces impregnated with non-erodible elements (particles larger than approximately 1 cm in diameter) are not remotely comparable to the shores of a reservoir where the source materials are silty-clay-loam soils that are continually pounded by water into finer and finer particle sizes
- Because of the repeated and continued cycles of seasons (ice in the winter, wave action on the shores the rest of the year, and the repeated raising and lowering of the water level, there in an infinite—not finite—availability of erodible material
- The potential for "natural crusting" is remote since waves and ice will keep breaking up the soils on the shoreline

Many of the native soils in and adjacent to the Glade footprint are fine sandy loams, clay loams, and silty clay loams, and fall into wind erodibility groups 3 and 4 (are moderately erodible), but the characteristics of native soils is only part of the dust problem.

Reservoir processes that affect shoreline erosion include reservoir operation (water levels), waves, reservoir currents, freeze-thaw cycles, slope, groundwater, and overland flow. Overall erosion potential depends on the frequency and magnitude of these processes, and how they interact on the specific landscape. In Hook and Moore Glade, the natural cycles of freezing and thawing, and strong winds, suggest that these forces would be major players in fugitive dust from the shores of a huge reservoir, yet they are not even mentioned.

Each winter, soils will freeze, then thaw in the spring, a process that will reduce particle size, destroy soil structural elements that hold soils in place, and increase erodibility. Each winter, the water would freeze and ice would scour the shoreline, pulverizing soil particles into smaller, looser particles.

Waves are the predominant erosional force on shorelines. This part of Larimer County is very windy (potential for gusts of over 150 mph[79] such that structures must be designed to withstand strong winds)(Larimer County Structural Design Information 1609 Wind Loads)), so strong and constant wave action caused by wind would occur on the shores of Glade Reservoir. Boats would also cause waves. Wave forces would reduce particle size. The effect of waves on shorelines is also influenced by water levels which control where and how waves hit the shore. Glade Reservoir would cycle up and down,

[79] According to the Colorado Front Range Gust Map (Cermak, Peterka, Petersen 2013), "*high wind speeds in the Front Range area on the plains adjacent to the Rocky Mountains and in the mountains east of the Continental Divide are well known to residents as winter and spring events that are sometimes damaging. The winds are known to occur from roughly the Continental Divide/Larimer County Line (the line of highest terrain running approximately north to south that marks the high terrain western edge of the Front Range area) to approximately I-25 (that runs north-south about 8-15 miles east of the intersection of the mountains with the plains). The Continental Divide is very close to the plains in the Front Range area, resulting in high downslope wind speeds where the mountains and plains intersect*."

and its shoreline (a bathtub ring) would be repeatedly exposed to these erosive forces, and without vegetation to help hold it in place, the small particles would easily become airborne.

Therefore, the shorelines of Glade Reservoir would not be "nonerodable particles" and a "finite source", as was incorrectly assumed in the FEIS: there would be an unlimited source of fine and highly erodible particles. The constant strong winds in the area will blow this dust all over the surrounding landscape, degrading the quality of life, impacting aesthetics (e.g., the clarity of the air) and threatening public health because air quality will be degraded.

As with the noise analysis, the FEIS upon which the 1041 application relies, fails to provide a realistic analysis of the effects on rural northern Colorado lands and its communities. We again urge the county to treat the FEIS with a large degree of skepticism, because was not developed for the purposes of local-scale land use decision-making and Larimer County's public would be adversely affected in ways that are not disclosed in <u>any</u> environmental document for the project.

<u>Construction and Operation Air Pollution</u>. Furthermore, the project would contribute to air pollution both during construction, due to 6-days-per week operation of heavy equipment and vehicles traveling to and from the site, and during operations, should almost 400,000 visitors per year travel to and from the reservoir. Emissions from vehicles includes particulates and gases, including gases that form ozone. Most of the visitation would occur on hot summer days when ozone readily forms from nitrogen oxides (NOx) and volatile organic compounds (VOC), and northern Colorado is already in an area rated has severe non-attainment for ozone. The environmental documents do not disclose how much ozone would be formed, whether it would travel up the valleys into the rural communities or down the valleys towards Bellevue, Laporte, and Fort Collins, and how it would impact Larimer County's residents.

<u>Air Quality Mitigation Plan</u>. The air quality mitigation plan punts any mitigation commitments to the future.

- In the first section (8.11.2) of the air quality mitigation plan, it states that "*the full state and federal applicability analysis will be completed as the dates of construction becomes closer and the Full Project parameters are known.*"
- Section 8.11.3 states "*Some of the engines in the construction fleet would be expected to meet Environmental Protection Agency (EPA) nonroad Tier 4 standards. As stated in the FEIS, Nitrogen Oxides (NOx) emissions can be reduced significantly if even a portion of the construction vehicles meet Tier 4 standards. The FEIS emission calculations make the assumption that there will be a 75% NOx reduction from vehicle exhaust emissions*."
- Section 8.11.3 states "*this submittal does not include the development of a separate air quality mitigation plan*." After identifying air pollution and emissions sources, this section goes on to say, "*The main strategy* [for minimizing

emissions] *is to develop air management plans that will be followed where appropriate*."

- In section 8.11.5, the "plan" unbelievably declares that "*It is also expected the Project will exceed CDPHE thresholds of 25 acres and the six-month duration requiring the development of a fugitive dust control plan. The fugitive dust control plan will be developed…..*"

The mitigation plan also notes that spraying water may be used for dust control: "Watering or treating with chemical dust suppressant roadways, storage piles, and loaded trucks." Further, it notes that it may undertake "washing…the exterior of haul trucks." In an era when water conservation is critical, it defies logic to spend almost a decade dumping water on a huge construction site and washing construction vehicles to minimize fugitive dust pollution. And if the dust suppression water is taken from municipal sources, is it not possible to trace those sources back to the Poudre River, or our other already over-taxed water supplies? Myopically treating one environmental issue (air quality) with water only compounds the much larger social and environmental issues associated with water supply.

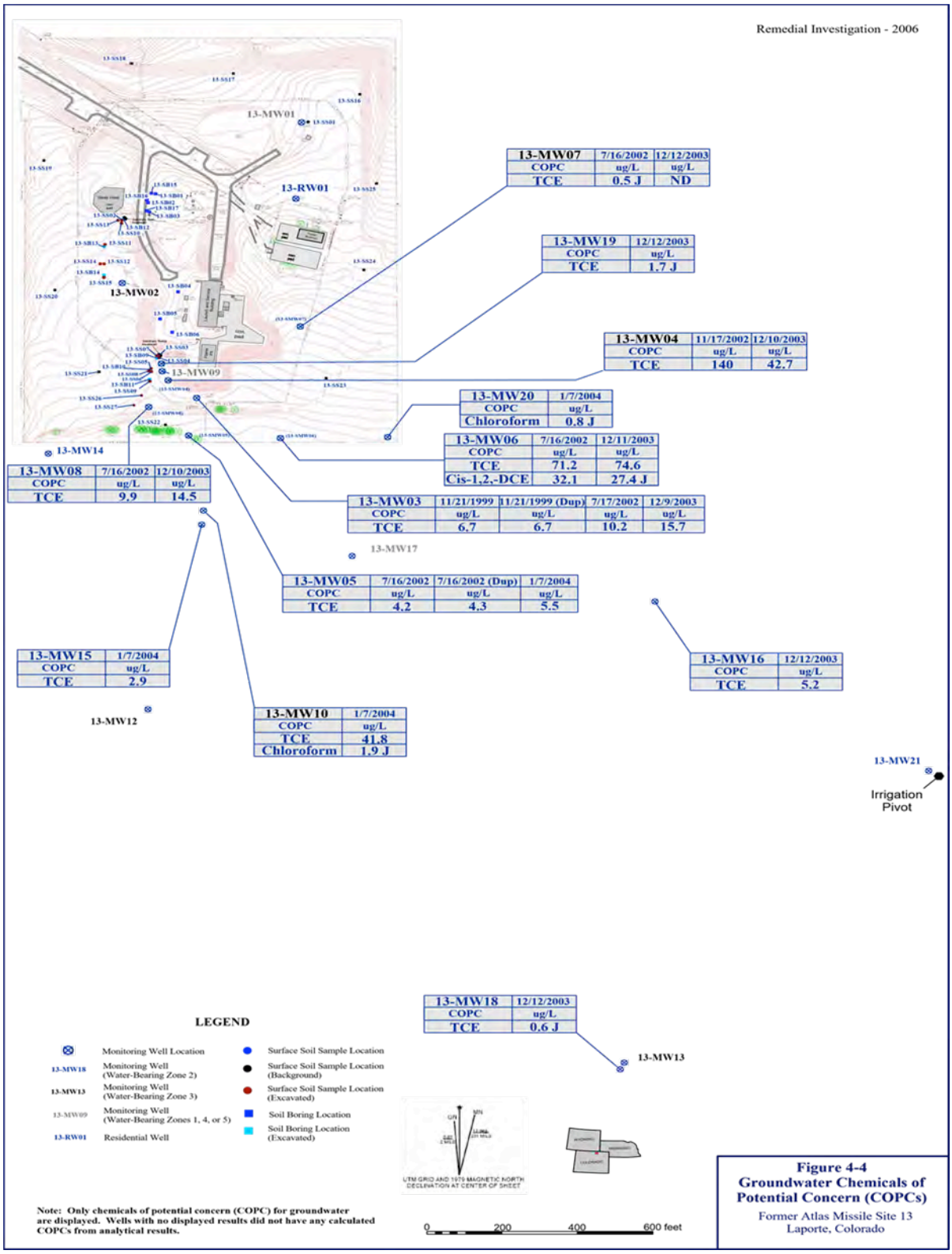
In summary, the air quality mitigation plan provided with the 1041 permit application is nothing but promises and examples. Any and all commitments for protecting air quality and reducing emissions are deferred to the permitting process of the Air Pollution Control Division of the Colorado Department of Public Health and Environment (CDPHE): all of the emissions and control plans for almost a decade of construction, and all of the emissions and control plans for the dust from operations, including the pump stations, barren shoreline, jet skis, motorboats, 78,200 vehicles during summer, are not disclosed to the county or the public in time for this important permitting process. The magnitude of this project ensures that the numerous and substantive sources of air pollutants and greenhouse gases (GHG) will be emitted, some in large quantities, and will degrade the quality of our air and exacerbate factors contributing to climate change.

<u>Public Health Impacts from the Trichloroethylene (TCE) Plume at the from the Former Atlas Missile Silo Site</u>

There is no satisfactory determination that the TCE plume is "gone" and will not spread into residential wells. Vias correspondence with the Army Corps of Engineers and CDPHE regarding the site, it appears that the plume is below a 5 ppm "acceptable" drinking water threshold, yet it should be noted that at least one monitoring well continued to show higher levels of TCE. According to the Colorado Division of Natural Resources permit records, Northern Water has recently drilled over a 20 monitoring wells in the vicinity. Residents have reached out to federal and state agencies, and to Northern Water, but are unable to understand how residential water wells and the Poudre River would be affected, or why the additional monitoring wells were installed. This needs to be fully disclosed by the county and to the public prior to taking action on this permit application.

Plumes of this nature last many lifetimes and it is implausible that site specific efforts to clean up the plume have been effective. Northern installed more than 20 monitoring wells in 2019 located through the plume, but no public records are available regarding data from the Northern 2019 monitoring well network." The forebay is a below dam small reservoir of the Poudre water which will be pumping water 375 feet up into Glade Reservoir. This groundwater carcinogenic contamination must be addressed thoroughly before the 1041 application is deemed complete.

The figure below shows the 2006 situation, in which several wells contained TCE levels in excess of standards. Monitoring by Northern Water and disclosed in the FEIS show that TCE levels were below standards in all but one well.



Ground water chemicals of potential concern at the former Atlas Missile Silo site, located near the proposed dam and forebay.

If portions of the plume continue to contain high TCE levels, and the weight of the dam, or the water in the forebay and/or behind the dam cause the plume to move in ways it has not previously moved, it may contaminate wells at the homes along county road 29C or the Poudre River.

Public Health Impacts from Greenhouse Gas Emissions.

In 2019, Governor Polis signed House Bill 19-1261, the Climate Action Plan, into law. The legislation amends Colorado's Air Pollution Prevention and Control Act and commits the state to economy-wide greenhouse gas emissions reductions goals of 26% below 2005 levels by 2025, 50 percent by 2030, and 90 percent by 2050 (M.J. Bradley and Associates 2020). Meeting the goals will require significant emission reduction across Colorado's economy. Repeat, across Colorado's economy.

Project sources of GHG emissions include:

- Biogenic sources
- Recreational vehicles traveling to and on Glade Reservoir
- Electrical pumping

With regards to GHG from biogenic sources, the FEIS states "*Given the lack of available data and accepted methodology for quantifying these emission, GHG emission have not been quantified for the NISP Alternatives*." Unfortunately, it is well known that lakes and reservoirs are significant emitters of harmful GHGs, and Glade would be a source. The FEIS goes on to state that "*Due to the relatively low temperature, low terrestrial net primary productivity, and non-tropical latitude of the NISP reservoirs, it is likely that the NISP Alternatives would produce far fewer GHG emissions from biogenic sources than similar projects in warmer regions at tropical latitudes*." First, this is the wrong approach, the analysis should disclose conditions with the project compared to current conditions without the project. Second, contrary to what this statement implies, reservoirs in temperate regions are known to emit large amounts of GHGs from biogenic sources. Biogenic methane (a significant GHG) emissions may be especially high. Although none of these emissions are quantified, its fair to say that if the state is looking to reduce emissions across all sectors, then emissions from a new, large reservoir and its pump stations and vehicles, the project is not in alignment with the new legislation.

The project will require pumps to move water from the forebay into Glade Reservoir, as well as for moving water at other segments of the project. According to the FEIS, the project would emit about 35,000 tons per year of CO_2 and about 4 tons per year of methane (FEIS Technical Memorandum, Maul, Foster, and Alongi 2018). The GHG emissions are equivalent to emissions from about 7,000 cars.

Save The Poudre did an independent analysis of the GHG emissions of the project and determined that it would create yearly emissions to the emissions from almost 13,500

automobiles on the road every year. Our analysis includes emissions from construction, pumping, and the destruction of carbon-sequestering wetlands[80].

Furthermore, since the project does not have sufficient water rights and is implementing a farm-buying program, emissions might be closer to those described for the No Action Alternative in the FEIS, which predicts 47,000 tons per year of CO_2 and 5 tons per year of methane. So, again, another problem with the post-FEIS plan to buy farms is that these emissions are not adequately and transparently disclosed.

Regardless, the project would emit significant GHG and thus would impede the state reaching its GHG emissions reduction goals.

I. The NISP 1041 application does not comply with review criterion D.7.

Section 14.10.D.7. of the LUC review criteria imposes a burden on the applicant to prove that the proposal "will not be subject to significant risk from natural hazards including floods, wildfire or geologic hazards." For the reasons stated below, Northern has failed to prove that its proposal will not be subject to significant risk from natural hazards especially related to wildfire as discussed in section VII.H.

Two large faults, the North Fork Fault and the Bellvue Fault, pass under the proposed Glade Dam site. Tom Sale, geological expert, and CSU Engineering professor stated in a recent letter to the County Commissioners, " 1) the faults represent vertical intervals of broken rock and 2) that they pass directly under the proposed dam site (that will have up to 400 feet of differential water level) it seems highly likely that leakage under the dam along the faults will be severe. NISP admits in their application that "there are two earthquake faults mapped within the Glade unit. The Bellvue Fault and North Fork Fault have been intercepted at depth by test holes advanced during the project's geotechnical investigations."... "Both faults are inactive and do not present a seismic risk to the project." Yet, as any geologist will tell you, all faults are inactive until they are not. NISP's remark that these faults "do not present a seismic risk to the project" is just that. Northern gives no reference to a government agency verifying there is no seismic risk. Any seismic risk, no matter how small, is unacceptable when it involves a dam holding back 170,000 acre feet of water. A more thorough analysis is needed from a governing authority. At the very least, a certification stating that the two faults do not present a seismic risk to the project is needed.

NISP would increase flooding downstream of the diversion point, including through Fort Collins and Greeley. These comments were presented in the City of Fort Collins comments on the DEIS, previously incorporated in this letter.

J. The NISP 1041 application does not comply with review criterion D.8.

[80] See Exhibit 21 hereto. See also, http://savethepoudre.org/stp-correspondence/2014-05-16-stp-letter2-corps-ghg-emissions-nisp.pdf

Section 14.10.D.8. of the LUC review criteria imposes a burden on the applicant to prove that there are "adequate public facilities and services available for the proposal or will be provided by the applicant, and the proposal will not have a significant adverse effect on the capability of local government to provide services or exceed the capacity of the service delivery system." For the reasons stated below, Northern has failed to prove that its proposal ensure adequate public facilities.

The application fails to disclose how the siting, construction, and operation of an industrial facility in a rural setting will impact sheriff, fire, and other emergency services. For example, the fire mitigation plan states that fires won't be an issue because the campgrounds will be operated in accordance with Larimer County regulations. But this ignores the fact that wildfires are often started by accident, or even by arson, and in this area, one wrong fire in the right conditions could be devastating. In addition, how will the LCSO deal with the additional traffic (~78,000 vehicles during the recreation season, FEIS Technical Memorandum, Maul, Foster, and Alongi 2018). How will the emergency services teams (some of which are all volunteers) that protect these rural areas compensate for or be compensated for the increased number of calls? What is the expected increase in number of calls? How will service to existing communities be impacted by the need to serve visitors? We have not been provided with sufficient information to evaluate these questions, and unless the county has been provided information that has not been made public, it too lacks sufficient information. However, we do know that county resources are limited, and can surmise that additional demands on law enforcement, fire suppression, and EMS would strain existing providers. Would the taxpayer have to pick up the bill to expand these services?

K. The NISP 1041 application does not comply with review criterion D.9.

Section 14.10.D.9. of the LUC review criteria imposes a burden on the applicant to prove that the "applicant ***will mitigate any construction impacts to county roads, bridges, and related facilities***." Northern has failed to prove that its proposal will adequately mitigate any construction impacts to roads, bridges and related facilities.

As noted herein, Northern has failed to present any alternative to relocating Highway 287 or any siting alternatives for any Highway 287 realignment. As such, Northern has completely failed to undertake its mitigation obligations with regard to Highway 287. Further, Northern's 1041 application is incomplete with regard to construction impacts associated with the proposed access road to the proposed Glade Reservoir. As such, Northern has failed to meet its burden of complying with LUC Section 14.10.D.9. and its application must be denied.

L. The NISP 1041 application does not comply with review criterion D.10.

Section 14.10.D.10. of the LUC review criteria imposes a burden on the applicant to prove that the "***benefits of the proposed development outweigh the losses of any natural resources*** or ***reduction of productivity of agricultural lands*** as a result of the proposed development." For the reasons stated below, Northern has failed to prove that

the proposed benefits of the proposed development outweigh the losses of any natural resources or reduction of productivity of agricultural lands.

One significant impact of NISP to natural resources is the interference with long term peak flows in the Cache la Poudre River needed to maintain a health river. NISP will substantially reduce peak flows of the river and then manage releases from Glade Reservoir. However, Northern's proposed flow program does not restore the volume or time period of peak flows necessary to protect and restore the health of the river.

The Refined Conveyance system was conceptually designed to maintain low flows in the Poudre River between the proposed reservoir and the Poudre River Intake (PRI) yet these flows would be variable in time and are inflated in the FEIS and the Mitigation Plan. Water would only be released to the Poudre when Northern is delivering water to NISP participants; thus, when demand is too low, releases would be curtailed. In addition, only one-third of the deliveries will be routed through the Poudre to the PRI. Per the FEIS, the projected full benefit of the Refined Conveyance mitigation would not be achieved until 2050 yet Northern claims the full benefit in the FEIS and the 1041 permit application inflating the long term benefit of the Refined Conveyance system. In fact, the Refined Conveyance system does little to mitigate low flows and by extension the health of the stream for an extended period of time.

Northern's 1041 application does not quantify the losses to these natural resources versus the benefits of NISP (if any) to the Cache la Poudre River. As such, Northern has not proven compliance with Section 14.10.D.10. of the LUC.

Northern has not provided the county with information on the number and location of farms they will buy and dry to obtain one-half of the water needed to fill Glade Reservoir. To obtain 22,000 AF likely will require purchase of 20,000 acres of farms or more (Section VII B in this document). Northern has not explained how the recreational benefit of Glade Reservoir outweighs the vast reduction of productivity of agricultural lands when water rights are severed from the land.

The recreational benefit of Glade Reservoir depends entirely on reservoir storage being at 70 percent of maximum storage. Modeling of storage levels in the proposed Glade Reservoir (Save Rural NOCO in Section VII B of this document) from 2005 to 2019 shows that, in dry years, Northern will not be able to maintain the reservoir at sufficient levels for power boating. Climate change impacts on streamflow will exacerbate this situation – further reducing the number of years where recreation at Glade Reservoir will be possible and the benefit of the project.

Northern's 1041 application does not quantify the loss of agricultural productivity versus the recreational benefits of NISP (if any). As such, Northern has not proven compliance with Section 14.10.D.10. of the LUC.

In 2017, Colorado Parks and Wildlife (CPW) entertained a draft "Fish and Wildlife Mitigation and Enhancement Plan". Save The Poudre provided comments to

describing the enormous lack of mitigation in the draft plan, most of which carries over into the final plan. Those comments are incorporated here as Exhibit 22.[81]

M. The NISP 1041 application does not comply with review criterion D.11.

Section 14.10.D.11. of the LUC review criteria imposes a burden on the applicant to prove that the proposal "demonstrates a reasonable balance between the costs to the applicant to mitigate significant adverse affects and the benefits achieved by such mitigation." Northern has failed to prove that its proposal demonstrates a reasonable balance between the costs to the applicant to mitigate significant adverse affects and the benefits achieved by such mitigation.

As noted herein, the costs of mitigation have not been fully evaluated because the impacts of the project have not been adequately disclosed. For example, impacts to agriculture from Northern's purchase of farms and water rights in Larimer County remain speculative and have not been quantified. Further, Northern's ability to mitigate adverse impacts to the Cache la Poudre River are flawed and speculative because Northern does not own the water rights to implement river mitigation measures and its ability to release water from Glade Reservoir is dubious. These flaws equally affect Northern's ability to accurately assess the benefits to be achieved by the speculative mitigation.

For the reasons stated in this comment letter, Northern has failed to meet its burden of complying with Section 14.10.D.11. of the LUC and its 1041 application must be denied.

N. The NISP 1041 application does not comply with review criterion D.12.

Section 14.10.D.12. of the LUC review criteria imposes a burden on the applicant to prove that the "recommendations of staff and referral agencies have been addressed to the satisfaction of the county commissioners." For the reason stated below, Northern has failed to prove that the recommendations of staff and referral agencies have been addressed to the satisfaction of the county commissioners.

The County previously submitted a comment letter identifying deficiencies with the NISP EIS.[82] Northern's 1041 application does not discuss whether the County's comments have been addressed, and if so, how. As such, Northern has not met its burden of proving compliance with Section 14.10.D.12. of the LUC. Further, the Larimer County NGO's do not have the benefit of the written staff recommendations and referral agencies at the time of submission of this comment letter because such comments have yet to be completed and/or posted to the public website. The Larimer County NGO's incorporated herein by reference all comments and recommendations of staff and referral agencies.

[81] Exhibit 21 hereto (STP comments on FWMEP).
[82] Exhibit 9 hereto (County's DEIS comments).

VIII. Reasonable Alternatives to NISP

Alternatives to NISP have been forwarded by multiple groups including Save The Poudre and Western Resource Advocates. The "Healthy Rivers Alternative" promoted by Save The Poudre includes enhanced water conservation and efficiency, better growth management, using 'growth displaced water', and pursuing water transfer mechanisms with farmers[83]. The "Healthy Rivers Alternative" would allow NISP communities to meet their water needs while protecting the Poudre River.

The "Better Future for the Poudre River" alternative promoted by Western Resource Advocates also advocates for enhanced water conservation, better growth management, and using 'growth displaced water'[84].

Save The Poudre also supports the approach of "**Cleaning the River through Fort Collins and using the river as a conveyance, instead of the pipeline". T**his alternative approach is described in Save The Poudre's comment letter to the Colorado Water Quality Control Commission in Dec. 2019, wherein it notes that this approach also applies to the Larimer County 1041 permit process. Northern Water claims that they could only run 1/3rd of their water down the Poudre River, again due to the pollution level in the river. The "Clean The River" alternative describes how stormwater technology can allow all of the NISP water to flow through Fort Collins at a significantly cheaper cost than building the Northern Tier Pipeline[85].

IX. Financial Issues

In light of the extensive adverse economic impacts and budget shortfalls resulting from the Coronavirus pandemic, which were unforeseen and unaccounted for during project planning, the permit review process must include a careful and detailed independent analysis of the financial feasibility of this project. No permit should be approved unless a review by Larimer County conclusively demonstrates that highway relocation (which as been punted to another review process), reservoir completion (construction details not yet disclosed), water rights acquisition (currently speculative), and implementation of all necessary mitigation measures (critically not yet developed or disclosed) is fully assured in light of the current budget and economic climate. Failure to perform such a thorough and careful analysis would create an unacceptable risk that the many well documented adverse impacts would begin to accrue upon project initiation, only for the so-called benefits of the project to never materialize, and for the county and it's citizens to be left holding the financial and environmental bag.

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[83] Exhibit 22 hereto. See also: http://savethepoudre.org/docs/stp_healthy_rivers_alternative.pdf

[84] Exhibit 23 hereto. See also: https://westernresourceadvocates.org/publications/a-better-future-for-the-poudre-river/

[85] Exhibit 20 hereto.

X. Conclusion

For the reasons stated herein, No Pipe Dream Corporation, Save Rural NoCo Corporation and Save the Poudre and their collective Larimer County membership request that the Planning Commission recommend denial of Northern's 1041 application.

Sincerely,

s/ Robert Kitchell, President

No Pipe Dream Corporation

s/ John Dettenwanger, Chairman

Save Rural NoCo

s/ Gary Wockner

Save the Poudre

Exhibit List to June 9, 2020 Planning Commission Comment Letter

Exhibit

1. **Bylaws**
2. **Dougherty screen shot**
3. **Dougherty questionnaire**
4. **Northern's Nov. 2019 List of NISP Endorsers/Supporters**
5. **STP DEIS comment letter**
6. **STP SDEIS comment letter**
7. **STP FEIS comment letter**
8. **STP SEIS comment letter**
9. **Larimer County comment letter on DEIS**
10. **Ft. Collins comment letter DEIS**
11. **Ft. Collins comment letter SDEIS**
12. **Bestgen study**
13. **State of the Poudre report**
14. **WSVS Study**
15. **Udall report**
16. **Thornton Planning Commission hearing transcript.**
17. **Thornton Findings and Resolution**
18. **County response brief in Thornton 1041 litigation.**
19. **Larimer County NGO's letter to Leslie Ellis**
20. **STP letter to WQCD on 401 certification.**
21. **STP Greenhouse Gas letter**
22. **Healthy Rivers report**
23. **WRA's "A better future report."**

RULES AND BY-LAWS OF THE LARIMER COUNTY PLANNING COMMISSION

I. MEETINGS

A. Regular meetings shall be held on the third Wednesday of each month in the Hearing Room of the Larimer County Courthouse, Fort Collins, Colorado. Meetings shall begin at 6:00 p.m. All meetings and actions shall be in compliance with C.R.S. 24-6-402 regarding open meetings and any subsequent amendments to said statute. If the Chair and Commissioners determine that any application cannot be heard and considered for action by 10:00 p.m., it may be continued, heard, and considered at a specifically scheduled meeting or the next regularly scheduled meeting. Such application shall have priority at the next meeting and may be heard before any other matters or applications.

B. Special meetings of the Larimer County Planning Commission may be held at any time upon call of the Chair; by a majority of the entire membership of the Planning Commission; or upon request of the Board of County Commissioners. Notice of at least seven (7) calendar days shall be given to each member of the Planning Commission by telephone or by fax. Time, place and proposed agenda of Special Meetings shall be specified with information sent to each Commissioner of the Planning Commission notifying them of a Special Meeting.

II. MEMBERS/QUORUM

A. The Planning Commission shall consist of nine (9) Commissioners, appointed by the Board of County Commissioners. Term limits shall be in accordance with Larimer County Administrative Procedure 100.1. The Chair of the Planning Commission may be asked to interview applicants for vacancies by the Board of County Commissioners.

B. A quorum for transaction of business shall consist of half of the membership, plus one.

C. Actions shall be by a majority vote of Commissioners when a quorum is present except that any change to the Master Plan for Larimer County, or approval of a new Master Plan (Comprehensive Plan) for Larimer County, shall require an affirmative vote of not less than six (6) of the Planning Commission.

D. In cases where a quorum is not present, applications shall be rescheduled for hearing at the next regular Planning Commission meeting, or at a special meeting set by the Chair of the Commission.

III. OFFICERS

A. The Planning Commission, at the end of their regular meeting in July of each year, shall elect a Chair, Vice- Chair, and a Secretary. The Director of Planning shall designate a Recording Secretary.

B. The duties and powers of the officers of the Planning Commission shall be as follows:

The Chair shall:

1. Preside at all meetings of the Planning Commission and maintain proper decorum by controlling the meeting, avoiding duplication of testimony, and avoiding demonstration(s). In cases where decorum cannot be maintained, any commissioner may request the Chair to recess, continue the agenda item, or adjourn.
2. Call special meetings of the Planning commission in accordance with the by-laws.
3. Sign the documents of the Planning Commission.
4. Insure that all actions of the Planning Commission are properly taken.

The Vice-Chair shall:

1. During the absence, disability, recusal, or disqualification of the Chair, exercise and perform all of the duties and be subject to all the responsibilities of the Chair.

The Secretary shall:

1. Sign or attest to the signature of the Chair or Vice-Chair on the documents of the Planning Commission.

The Designated Recording Secretary shall:

1. Keep the minutes of all meetings of the Planning Commission in an appropriate and designated file.
2. Give and serve all notices required by State Statute, regulations or by the by-laws.
3. Prepare the agenda for all meetings of the Planning Commission.
4. Be custodian of Planning Commission records.
5. Inform the Planning Commission of correspondence relating to business of the Planning Commission and attend to such correspondence.

IV. ATTENDANCE

A. Regular attendance by members of the Planning Commission is expected. Field trips are taken monthly to visit the sites scheduled for hearing. Site visits are encouraged, either with the group or separately by the Commissioners if they are unable to join the group

B. Any Commissioner who has been absent from three consecutive regular monthly hearings, without a leave of absence or having advised the Chair of the circumstance of the absence, shall be reported to the Board of County Commissioners by the Recording Secretary. Leaves of absence shall be submitted to the Chair and the Recording Secretary 2 days in advance when possible, noting the reason for the leave and how long the Commissioner will be gone. The Recording Secretary shall forward this information to the entire Commission.

C. When necessary because a member of the board is unable to to attend in person, one or more members the board may participate in such meetings and may vote through the use of telecommunications devices. Such participation may include but not be limited to the use of a conference telephone, video conferencing or similar communications equipment. Such participation through telecommunications devices shall constitute presence in person at such meeting.

V. PROCEDURE FOR CONSIDERATION OF AGENDA ITEMS

A. The following procedure will generally be followed by the Planning Commission when considering agenda items:

1. Introduction of the item by the Chair.
2. County Staff presentation.
3. Applicant presentation.
4. Testimony from the audience relating to the agenda item. The Chair may set a reasonable time limit per individual and group presentations and may establish an order of testimony in support of or in opposition to the application.
5. Applicant's rebuttal, limited to points of opposition. The Chair may set a reasonable time limit.
6. Inquiry by the Commissioners of the applicant and staff.
7. Final staff comments.
8. Discussion among the Commissioners.
9. Motion and second by the Commissioners.
10. Discussion by the Commissioners on the motion.
11. Roll Call Vote.

B. The Chair may modify the above procedure for individual items if necessary for expeditious conduct of business.

C. Agendas for items to be considered by the Planning Commission will be available to the public at the meeting.

VI. CONSENT AGENDA

A. An item is placed on the consent agenda if it is non-controversial and Staff and Applicant agree on the findings and conditions of approval.

B. The following procedure will generally be followed by the Planning Commission when considering consent agenda items:

1. Introduction of the consent item by the Chair.
2. Any Commissioner or member of the public may request that an item be removed from the consent agenda. The reason for the request should be stated.
3. An application pulled from the consent agenda will normally be placed at the end of the regular hearing agenda. The Chair may determine if the matter removed from the consent agenda can be expeditiously resolved or should be placed at the end of the agenda.
4. The Chair may call for staff to provide a brief report on any item remaining on the consent agenda.
5. The Chair may call for a motion to approve the item(s) remaining on the consent agenda.

Only one motion is required for all consent items. After being duly seconded, the consent agenda shall be voted on by a roll call vote of the Commissioners.

VII. GENERAL

A. All maps, plats, correspondence, and other documentation shall be filed in the office of the Planning Department. The staff will make every effort to provide the Commissioners with a staff report and adequate documentation, including maps and comments of referral agencies approximately one week before the scheduled meeting. Any materials presented at a hearing or meeting by the applicant or public shall become part of the official record, and at the discretion of the Chair, may not be returned.

B. Voting on all applications shall be by roll call. The order of voting will be alternated, except that the Chair shall vote last.

C. If a conflict of interest exists, any Commissioner shall depart from the dais and abstain from discussion and voting on the issue affected from the time such conflict of interest has been identified.

D. The Chair may allow "personal appearances" at the beginning of each meeting by any citizen desiring to speak on any planning matter not on the agenda. The Planning Commission shall not take action on items presented under personal appearances. Any statement made shall be relevant to land use matters and shall be not more than five minutes per person in duration.

E. In its' discretion, the Planning Commission may consider any material that may result in significant modification to a pending application even though the material has not been submitted to the staff planner assigned to that application at least ten (10) business days prior to the Planning Commission meeting at which the application is to be considered.

F. The by-laws may be amended at any meeting of the Planning Commission by a majority of the Commissioners; provided that notice of said proposed amendment

be given to each Commissioner in writing at least ten (10) days prior to said meeting.

G. Robert's Rules of Order shall govern the proceedings of the Planning Commission, although strict adherence is not required so long as the meetings are conducted to allow fundamental fairness to all participants

H. Commissioners are encouraged to involve themselves in discussion before presenting a Motion. Commissioners are encouraged to clearly state their viewpoints.

Adopted pursuant to Section 30-28-103(1) C.R.S. 1973 this 5TH day of MAY, 2020.

Chairperson Date: MAY 5, 2020

Secretary Nancy A. Wallace Date: 5/5/2020

LARIMER COUNTY CLERK SEAL COLORADO

LARIMER COUNTY BOARD OF COUNTY COMMISSIONERS

Steven Johnson, Chair

Attest:

Deputy Clerk: Date: April 28, 2020

DATE 4/20/20
APPROVE AS TO FORM
ASSISTANT COUNTY ATTORNEY

Sean Dougherty

Larimer County Commissioner

#CountyCommissioner

9 0 2 Exactly Years Before

"Larimer County needs a practical, community-minded leader, not an extremist. Sean Dougherty's county government and small business experience make him the clear choice for Larimer County Commissioner." -Tom Donnelly, Larimer County Commissioner, District III . . . #tomdonnelly #larimercountycommissioner #fortcollins #fortcollinscolorado #loveland #lovelandcolorado #estespark #estesparkcolorado #greeley #greeleycolorado

4 0 2 Exactly Years Before

I am in full support of the Northern Integrated Supply Project, known as NISP. This plan only makes sense, as it will assure participating water providers in Northern Colorado a reliable supply of water for the future. This is integral not only for the health of irrigated farms and their crops, but for smart, attainable, growth. It's time we utilize a proper storage plan for our state's water supply. Like, comment, and share this post with your friends. I'd love to hear your thoughts. . . .

#waterrights #waterprojects #waterproject #freshwater #irrigationwater #NISP #NorthernIntegratedSupplyProject #LarimerCounty #PoudreValleyCanal

FORT COLLINS BUSINESS COMMUNITY
CANDIDATE ENDORSEMENT QUESTIONNAIRE
2018 COUNTY COMMISSIONER ELECTION

Questionnaires are due back to ahutchison@fcchamber.org
by noon on Monday, September 10, 2018

Please note that all questionnaire answers
will be shared with the business community.

Office Sought: County Commissioner	District (If Applicable): 1
Name: Sean M. Dougherty	
Home Address: 1344 Catalpa Drive, Fort Collins, CO 80521	
Daytime Phone: 970-402-5642	Evening Phone: 970-402-5642
Fax:	Email: SeanForLarimerCounty@Gmail.com
Employment: REALTOR®	
Length of Residence: In County: 19.5 Years In District: Same	

Please limit responses to approximately 200 words per section.

(1) Education:
Associate's Degree in Hotel & Restaurant Management, Paul Smith's College
Bachelor's Degree in Hospitality Management, Florida Int'l University

(2) Past and Present Community Service Including Offices Held:
- 8.5 years on the Larimer County Planning Commission (Past Chair)
- 3.5 years on the Red Feather Lakes Planning Advisory Committee
- 7 years on the BOD for the Fort Collins Board of REALTORS® (Past President)
- 5 years on the Colorado Association of REALTORS® Grievance Committee (Current Chair)
- 4 years on the Colorado Association of REALTORS® Legislative Policy

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Committee (Current Chair)
- 7 years on the Fort Collins Chamber Local Legislative Affairs Committee
- 13 years volunteering with Realities for Children, currently an Ambassador
- 6 years as Assistant Scoutmaster for Troop 87, Boy Scouts of America
- 5 years as a partner with Neighbor to Neighbor Charities
- 4 years working with Disabled Resource Services

(3) Past and Present Employment/Business Experience:
Nearly 18 years as a successful REALTOR
Past small business co-owner, North College Discount Liquors
I was in Hotels for 8 years, mainly in Accounting. Last hotel job was Comptroller, working with financials, budgeting and forecasting.

(4) Current Employment and Responsibilities:
- Real Estate. I help families buy and sell property.
- I am also a mentor for newer agents in my office. Have helped many agents achieve Real Estate Success over the past 10 years.

(5) Specific Qualifications for This Office:
- Volunteering on, and leading, the Larimer County Planning Commission has enabled me to work directly with our County Commissioners, and to learn the roles and responsibilities of the position. Additionally, this position has taught me about Land Use, Master Plans, 1041 powers, Metro Districts, and other required knowledge that will allow me to be able to perform the job of County Commissioner.
- I have leadership experience, having been President of a 1,000 member organization, as well as leading multiple other local and state committees, commissions, and non-profit organizations.
- Real Estate has given me skills in negotiation, finding a way to Yes.
- My small business and hotel experience in Budgeting will help me to be fiscally responsible with your money.

(6) Why are you running for this office?
I'm running for Larimer County Commissioner because I believe that the business experience that I have gained over the past (nearly) 20 years in Larimer County, combined with the knowledge of land use, budgeting, Master Plans, facility infrastructure, and roads that I have learned from our County officials will allow

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me to serve the residents of Larimer County well.

The years I've spent working directly with our Board of County Commissioners while on the Planning Commission have taught me the roles and responsibilities of a County Commissioner, while teaching me the duties they perform. Additionally, the leadership experience earned serving various business and charity organizations has given me the necessary skills to lead Larimer County in the direction laid out by our residents.

(7) What have you done to prepare for election to this office and how you will you conduct yourself if elected to this office? What experiences have you had that makes you qualified to serve in office?

- I have been working with my mentor, Lew Gaiter, our current District 1 County Commissioner, for 9 years to learn about the roles & responsibilities of the office. Plus, he and I have been working actively to prepare me to succeed him for about 2.5 years.
- I plan to conduct myself with the utmost professionalism, of course. My goal is to be fair, hear all sides of an application or request, and stick to my basic principles when making a decision.
- I know that what I learned while leading the Fort Collins Board of REALTORS has prepared me for the responsibilities of leading Larimer County.
- My time on the Planning Commission has very much prepared me for this position. The Planning Commission hearings are recommendations to the Board of County Commissioners.

(8) If you are elected, what are the top three accomplishments you want to have completed by the end of your term and how will you get them done?

- **Facilitating smart growth management with the eight municipalities in Larimer County.** To do this, we will need to be continue to cultivate our partnerships with all of the communities in the county. Our quarterly Municipal Leaders meetings are a good start, but we will need to talk with those leaders about the possibility of working together on a framework and goals so that all of NoCo can be smart about growth. This also includes working with Weld County.
- **Assisting with the planning and development of the future Behavioral Health Facility public/private partnership**. If approved by the public, we need to make sure that we not only abide by the requirements of the ballot language, but also that we abide by the desire of the people. We build the

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facility, and private providers staff it. We want to be sure that there is transparency and accountability throughout the process, and for the future.

- **Prioritizing the maintenance, repair, and replacement of our County Infrastructure including our roads & bridges, as well as our facilities such as the Jail, Landfill, Court Buildings and Maintenance Sheds.** We have over $500 million of Infrastructure needs in the next 20 years, well over $300 million of that is needed in the next 5 years. The citizens have spoken, they want our roads fixed. Per statute, we need to have enough room in the Courts Building to house the Courts and Staff. We want a Jail that has the capacity and safety for our Deputies and the inmates. The Landfill will be full in the next 5 – 7 years. And we have six figure trucks that have to sit outside because our Maintenance Shed doors are not tall enough to house them. These all need to be handled in an efficient, cost-effective way. I will research every opportunity we have to get these items completed with the least pain for the residents.

(9) <u>What do you think are the top 3 economic priorities the county government should undertake during the next four years? What role should Larimer County have in economic development? How will you make the economy a County budget priority?</u>

While this is not about Economic Development, we do need to plan the budget around the likely reduction of the assessment rate by Gallagher. If there is a reduction in the residential assessment rate in 2019, to the expected 6.11%, that will end up being a 15% reduction in the property taxes received from residential properties, in one year (23% in 3 years). Now, this doesn't mean that we will have a reduction in tax revenues of 15%, as Commercial properties pay a significant amount of the property taxes. We need to plan for this, as this will be a significant portion of the County revenues. This is less to work towards economic development, and more to make sure we don't fall behind. (as for the burden Gallagher has put on business, while I wish I was able to make those changes, the best thing I can do is try to speak to the State Legislators and urge them to get Gallagher fixed or gone)

- Infrastructure. Water, roads, bridges. We need to make sure we can stay out of the way for the water projects that are on the books, as we need water if we're going to thrive in the future. We may have I-25 coming forward, but the County has to make sure that we stay up on our own roads and bridges, as well. Businesses won't come here if we're not maintaining our infrastructure.
- I want to make sure that Jacob Castillo, Economic and Workforce

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Development Director, has the freedom to continue moving forward in the arena of Economic Development. He does a great job working with the other EcoDevo partners in Larimer County, and in light of recent disappointments in economic development, I want to make sure that we have the ability to move forward and to work with those already in EcoDevo

- I would like to make sure that we don't have any unnecessary regulations in place that raise the cost of either starting a business in Larimer County or relocating one here. We are already embracing Metro Districts, but I believe that we can do more. Having spent so much time on LLAC, I know how informed the Committee (as well as the Chamber) is when it comes to economic development, and I will be reaching out to you and your membership for thoughts in the future.

(10) <u>How will you make Larimer County a more Jobs Friendly community? Are you willing to engage with business leaders to discuss these solutions? Please explain how you will stay in touch with business leaders.</u>

- To be Jobs Friendly, we must be Business Friendly. When the County was recently looking at the Transportation Capital Expansion Fees, I was strongly in favor of reducing the fees to Commercial, Industrial, and Office, to keep them in line with other Counties. Residential TCEFs were changed by adding more tiers, and tacking on a larger TCEF fee for the larger homes, and reducing the TCEFs on some of the smaller home living spaces.
- I'd also want to look to the Chamber and our Economic Development partners for ideas for reducing unfriendly business habits at the County.
- As for keeping in touch with business leaders, my door will always be open for anyone who would like to meet to discuss how the County can help them. I have a great relationship with the Fort Collins Chamber, and would want to cultivate the same relationships with all of the other Chambers of Commerce in Larimer County.

(11) <u>What role should Larimer County have in the region? What do you believe are the top issues facing Northern Colorado in the next several years?</u>

- We should be the convener of municipalities in Larimer County, so that we can all work together towards common goals, making growth smarter and more managed.
- Top issues facing Northern Colorado include:
    - Housing – While Larimer County does not delve much into Housing, there may be tools that we can employ to allow developers to more

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easily develop Attainable Housing, including density bonuses to developers who dedicate a portion of the project to housing that fits certain income levels.

- Water – NISP and the Windy Gap Firming Project need to be completed, so that the Northern Colorado water companies are able to hold onto the water that they own and are able to distribute it to their members.
- Infrastructure – Our major bridges in Larimer County will all be structurally sufficient by the end of 2019, which is great, but our roads need to be improved as well. Additionally, we will need to spend some time and money to improve the facilities that need updating, so we can continue to serve our residents.
- Jobs – A stagnant economy does not help Larimer County or her residents. We need to make sure that we are welcoming and inviting to new commerce.
- Broadband – Connectivity is becoming more essential to jobs, schooling, and life in general. While I do not support Larimer County starting their own Broadband Utility, I do support common sense in installing fiber optic cabling to allow private enterprise the opportunity to begin affordable high-speed internet to the more rural areas of the County.

(12) Colorado will continue to grow, including our area. How should Larimer County plan for growth, if at all?

- First and foremost, growth has been here, and will continue to be here. To try to say that it won't, or to try to stop it, is silly. The best thing that Larimer County can do is to be smart in our planning for this future growth.
- Working with our Municipalities, we have the opportunity to all plan together to achieve smart growth in the County. This would allow us to focus on the transportation and other needs at the same time.
- We need to make sure that we do not impede water storage.
- I am a supporter of Metro Districts, which allow for a developer to decide if he/she wants to put the burden for the costs for infrastructure on future residents, as this may impact the salability of the homes or commercial spaces. Additionally, it allows the Buyer to decide if he/she wants to live in a home with a higher property tax burden each year.
- We need to make sure that we do not impede attainable housing.

(13) What are the top two issues facing county government over the next 4 years

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and why do you believe they are the most important?

- Over $300 million of necessary Infrastructure needs. We cannot just piece this together, or else it will end up costing more in the future. I'm not one for "kicking the can down the road," as this does not solve problems, just creates more.
- Housing and Jobs. These are really one issue, as we can't have great employees for new businesses if they can't find housing, and we can't support the growth of housing if we don't have jobs for those who want to move here. While we may now be in an era of extremely low unemployment, that will not always be the case. We need to make sure that we don't get in the way of those who are bringing smart growth to Larimer County.

(14) What economic tools should the County add to their "tool box" of resources to attract key employers?

- Probably the simplest tool is to not get in the way. Reduce unnecessary regulations, reduce redundant, and expensive requirements in order to build, and help commerce to move forward. I will cite "Fugitive Dust" as a prime example of an example of a municipality spending time and resources to implement a new regulation, which will cost developers and builders more money, due to very few complaints.
- We also need to protect our natural environment, and allow folks to use the open space we have.

(15) What are the top three transportation improvements Larimer County should accomplish? What is your position on the Fix North I-25 effort? Why?

- Finish bringing the remaining high-traffic bridges in the County up to a level of Structurally Sufficient, which is due to occur by the end of 2019.
- Maintain our roadways. Plan for future growth (Montava?) We should talk with the municipalities who may have developments coming and see what future-planning we can do so that when development comes, we may be ahead of the game, which could be an incentive.
- Build the necessary Maintenance Sheds. Bear with me for a minute – we have vehicles that cost in the hundreds of thousands of dollars each, yet many must sit outside, because the Maintenance Sheds we do have are not able to house them. These vehicles don't get cleaned often enough, either, which will lead to quicker deterioration of the rigs. We need to take care of our assets, so that they will be start and run when we need them for road

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repairs, plowing, etc.

I absolutely support the Fix North I-25 effort. I applaud the County and Municipalities for all working together to get this road expanded. I will be anxiously awaiting this fall's vote on the two roadway efforts to see if there's any way we could leverage the work we're having done into either more lanes or at least getting the third lane up to Wellington.

(16) Why would a business person support your election to office?

- Simply, two things:
  - I've run my own business, and understand budgeting, income and expenses, and that you need to be responsible with your money. I strongly believe in having a "rainy day fund" for those unexpected needs (see fires and floods)
  - I have the experience and qualifications to do the job. You only hire someone who has the skills to do a job in your business, so you should elect someone who has not only been learning this job from his predecessors for the past 9 years, but has been honing his leadership skills for many years, as well. I can walk into the position and hit the ground running.

(17) If business groups endorse you, is there any significant information that could come out about you during a campaign that could potentially embarrass you (and them) publicly? (ex: bankruptcy, arrest, conviction, etc.)

I had been utilizing a cabin I own in Red Feather for a short-term rental until just over a year ago. As soon as I realized that there is a permit that I'm supposed to apply for and hold in order to legally do short-term rentals, I stopped renting out altogether. (I will say that I do want to make it easier for folks to use their investment properties for short-term rentals, but that's for after I get into office)

_____

Signature, Date

NISP SUPPORT/ENDORSEMENTS 2019

NISP participant communities
Dacono, Eaton, Erie, Evans, Firestone, Fort Lupton, Fort Morgan, Frederick, Lafayette, Severance, Windsor, Central Weld County Water District, Fort Collins-Loveland Water District, Left Hand Water District, Morgan County Quality Water

Ditch & reservoir companies
District 6 Water Users Association
Lake Canal Ditch Company
New Cache la Poudre Irrigating Company
North Poudre Irrigation Company

Water conservancy districts
Central Colorado Water Conservancy District
Lower South Platte Water Conservancy District
Northern Colorado Water Conservancy District
St. Vrain & Left Hand Water Conservancy District
Lower Arkansas Valley Water Conservancy District

Conservation districts
Boulder Valley Conservation District
Longmont Conservation District
West Greeley Conservation District
Big Thompson Conservation District
Fort Collins Conservation District

Editorial support
BizWest
Carbon Valley Independent
Erie Review
Fort Collins Coloradoan
Fort Morgan Times
Greeley Tribune
Lafayette News
Longmont Times-Call
Lost Creek Guide
Louisville Times
Loveland Reporter-Herald
Windsor Beacon

Fire districts
Frederick-Firestone Fire Protection District

West Slope agencies & organizations
Colorado River District
Club 20
Southwestern Water Conservation District
Ute Water Conservancy District

Agricultural organizations
Agfinity, Inc.
Barn Media & the Colorado Agriculture News Network
Boulder-St.Vrain Valley County Farm Bureau
Colorado Association of Wheat Growers
Colorado Cattlemen's Association
Colorado Corn Growers Association
Colorado Dairy Producers
Colorado Egg Producers Association
Colorado Farm Bureau
Colorado Livestock Association
Colorado Pork Producers Council
Colorado State Grange
Colorado Sugarbeet Growers Association
Eaton Local Sugarbeet Growers
GreenCO
Larimer County Farm Bureau
Rocky Mountain Agribusiness Association
Rocky Mountain Farmers Union
Valley Irrigation of Greeley
Weld County Farm Bureau
Western Sugar Cooperative

Business organizations
Accelerate Colorado
Action 22
Associated General Contractors of Colorado
Colorado Association of Commerce & Industry
Colorado Contractors Association
Fort Collins Board of REALTORS ®
Front Range District, Colorado Counties, Inc.
Morgan County Economic Development Corporation
Northern Colorado Home Builders Assoc.
Northern Colorado Legislative Alliance
Poudre Valley REA
Progressive 15
United Power
Upstate Colorado Economic Development
Weld Community Development Group
Weld County Builders Assoc, Inc.
Weld County Council

Chambers of commerce
Berthoud Area Chamber
Carbon Valley Chamber
Erie Chamber
Evans Area Chamber
Fort Collins Chamber
Fort Lupton Chamber
Fort Morgan Chamber
Greeley Chamber
Lafayette Chamber
Longmont Area Chamber
Mead Area Chamber
Windsor Chamber
Town of Pierce

County commissioners
Morgan County Commissioners
Weld County Commissioners

Public/elected officials
U.S. Sen. Cory Gardner
U.S. Rep. Ken Buck

State Sen. John Cooke
State Sen. Don Coram
State Sen. Vicki Marble
State Sen. Kevin Priola
State Sen. Bob Rankin
State Sen. Jerry Sonnenberg
State Rep. Perry Buck
State Rep. Steve Humphrey
State Rep. Hugh McKean
State Rep. Lori Saine
State Rep. Rob Woodward

Former U.S. Sen. Hank Brown
Don Ament, former state agriculture commissioner
Tom Donnelly, Larimer County Commissioner
Steve Johnson, Larimer County Commissioner
Mary Hodge, Adams County Commissioner

Mr. Chandler J. Peter
U.S. Army Corps of Engineers
Denver Regulatory Office
9307 South Wadsworth Blvd.
Littleton, CO 80128-6901

Dear Mr. Peter, 9/12/2008

I'm writing as chair of the Save The Poudre Coalition to offer comments on the Draft Environmental Impact Statement (DEIS) for the Northern Integrated Supply Project (NISP). I respectfully request that you add our comments as provided in this document into the legal record for this action.

The Save the Poudre Coalition is a partnership of twelve local, regional, statewide, and national organizations. Our partners are:

American Rivers
Cache la Poudre River Foundation
Citizen Planners
Clean Water Action
Colorado Environmental Coalition
Defenders of Wildlife
Earthjustice
Environment Colorado
Fort Collins Audubon Society
Friends of the Poudre
Poudre Paddlers
Sierra Club Rocky Mountain Chapter
Western Resource Advocates
Wolverine Farm Publishing/Matter Bookstore

We consulted with over 46 qualified professionals in the preparation of this letter and the attached documents. Fifteen have Ph.D.'s, fourteen have advanced degrees or certificates in their field, the remainder are degreed professionals with credentials and decades of experience in their respective fields, including this partial list:

- McCrystie Adams, J.D., Project Attorney, Earthjustice Legal Defense
- John Bartholow, M.S., Hydrologist retired from the USGS
- Brian Bledsoe, P.E, Ph.D., Dept of Civil and Environmental Engineering, Colorado State University
- Philip Cafaro, Ph.D., Associate Professor, Department of Philosophy, Colorado State University
- Kurt Fausch, Ph.D., Dept of Fish and Wildlife Biology, Colorado State University
- Jim Henriksen, M.S., Hydrologist
- Taryn Hutchins-Cabibi, M.A., Western Resource Advocates
- David Jones, M.S. Forest Ecology

- Nick Komar, Ph.D., Center for Disease Control
- Jason La Belle, Ph.D. Assistant Professor and Director of the Laboratory of Public Archeology, Department of Anthropology, Colorado State University
- Dan Luecke, Ph.D., Hydrologist in private practice
- Bart Miller, J.D., Director, Western Waters Program, Western Resource Advocates
- Drew Peternell, J.D., Colorado Director, Western Water Project, Trout Unlimited
- Robert T. Milhous, Ph.D. Hydrologist retired from the USGS
- William Miller, B.S., Retired Engineer and Ornithologist
- Doug Pflugh, M.S., Research Analyst, Earthjustice Legal Defense
- N. Leroy Poff, Ph.D., Professor of Biology, Colorado State University
- James Rose, Ph.D., Professor Emeritus, Department of Zoology and Physiology, University of Wyoming
- John Sanderson, Ph.D. Ecologist with the Nature Conservancy
- Stacy Tellinghuisen, Western Resource Advocates
- Gary Wockner, Ph.D., Natural Resource Ecology Laboratory, Colorado State University

We endorse the comments submitted by Western Resource Advocates, Trout Unlimited, Dr. Jason La Belle, Dr. James Rose, Dr. N. Leroy Poff, John Bartolow and the City of Fort Collins.

We are attaching a number of documents to this letter and request that you add them to the legal record for this action as well.

After reviewing the document and its accompanying technical reports in detail, we do not believe this DEIS meets the basic requirements of the Federal National Environmental Policy Act or the Federal Clean Water Act. These major deficiencies call for a rewrite of the DEIS that includes a new full Alternatives Analysis that must include:

1. Full analysis of the role water conservation and efficiency improvements play in demand side reduction.
2. An accurate analysis of existing populations and projected future growth that is based on science, land use planning, sound water policy, and the cumulative effects of regional development.
3. Careful examination of agricultural water transfers as a supply source, reviewed in the context of an accurate analysis of the environmental impacts of said transfers.
4. Rotating fallow agreements under current existing, realistic and manageable contract arrangements.
5. Realistic and accurate cost impact scenarios.
6. Cost/benefit analysis and comparison of the alternatives.
7. Full analysis of the potential water yield in the Cache la Poudre River watershed, which includes not just the recent climate record, but the full historic stream gage record and reconstructed historic climate records that take into account the full range of drought and wet year cycles.

The National Environmental Policy Act

The National Environmental Policy Act[1] requires federal agencies to prepare a detailed statement on the environmental impacts of a proposed "major federal action" and all of the reasonable alternatives thereto before authorizing any such action.[2] An agency proposal for major federal action exists for NEPA purposes "at that the stage . . . when an agency subject to [NEPA] has a goal and is actively preparing to make a decision on one or more alternative means of accomplishing that goal and the effects can be meaningfully evaluated."[3] NEPA's purpose is to promote efforts "which will prevent or eliminate damage to the environment",[4] to inform the public of environmental consequences,[5] and to "help public officials . . . take actions that protect, restore, and enhance the environment."[6]

Under NEPA, the NISP Draft EIS must analyze "connected", "cumulative", and "similar" actions and three types of impacts.[7] Connected actions are those which are "closely related," including those that "[c]annot or will not proceed unless other actions are taken", or those that "[a]re interdependent parts of a larger action and depend on the larger action for their justification."[8] Cumulative actions are those that "have cumulatively significant impacts and should therefore be discussed in the same impact statement."[9] Similar actions include those that have "common timing or geography."[10] In order to assess "significance," NEPA requires consideration of "[w]hether the action is related to other actions with individually insignificant but cumulatively significant impacts."[11]

The three types of impacts to be studied in an EIS are those that are "direct," "indirect," and "cumulative."[12] Direct effects are those that "are caused by the action and occur at the same time and place."[13] Indirect effects are those "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."[14] A project's "cumulative impact," is

> the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions . . . . Cumulative impacts can result from individually minor but

[1] 42 U.S.C. §§ 4321-4370f.
[2] *Id.* at § 4332(2)(C).
[3] 40 C.F.R. § 1508.23.
[4] 42 U.S.C. § 4321.
[5] 40 C.F.R. § 1500.1(b).
[6] *Id.* at § 1500.1(c).
[7] *Id.* at §§ 1508.25, 1508.7, 1508.8.
[8] *Id.* at § 1508.25(a)(1).
[9] *Id.* at § 1508.25(a)(2).
[10] *Id.* at § 1508.25(a)(3).
[11] *Id.* at § 1508.27(b)(7).
[12] *Id.* at 1508.25(c); *see also id.* at §§ 1508.7, 1508.8.
[13] *Id.* at § 1508.8(a).
[14] *Id.* at § 1508.8(b).

> collectively significant actions taking place over a period of time.[15]

NEPA's many policies and goals include:

- Encouraging a "productive and enjoyable harmony between man and his environment";[16]
- Promoting "efforts which will prevent or eliminate damage to the environment and biosphere";[17]
- Using "all practicable means and measures . . .to create and maintain conditions under which man and nature can exist in productive harmony";[18]
- Fulfilling "the responsibilities of each generation as trustee of the environment for succeeding generations";[19]
- Assuring "all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings";[20]
- Allowing beneficial use of the environment "without degradation . . . or other undesirable and unintended consequences";[21]
- Preserving "important historic, cultural, and natural aspects of our national heritage";[22]
- Achieving a "balance between population and resource use";[23] and
- Enhancing "the quality of renewable resources" and maximizing recycling of depletable resources.[24]

Mitigating Environmental Impacts

At the most fundamental level, NEPA is intended to help public officials make decisions that are based on an understanding of environmental consequences, and to take actions that protect, restore, and enhance the environment.[25] Federal agencies are required, to the fullest extent possible, use all practicable means consistent with the requirements of NEPA to "restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions upon the quality of the human environment."[26] CEQ regulations further define mitigation as:

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[15] *Id.* at § 1508.7. *See also* Neighbors of Cuddy Mountain v. U.S. Forest Serv., 137 F.3d 1372, 1379 (9th Cir. 1998) (stating that with respect to a cumulative impacts analysis, an agency must provide "some quantified or detailed information" because "[w]ithout such information, neither courts nor the public . . . can be assured that the [agency] provided the hard look that it is required to provide.").
[16] 42 U.S.C. § 4321.
[17] *Id.*
[18] *Id.*
[19] *Id.* at § 4331(b)(1).
[20] *Id.* at § 4331(b)(2).
[21] *Id.* at § 4331(b)(3).
[22] *Id.* at § 4331(b)(4).
[23] *Id.* at § 4331(b)(5).
[24] *Id.* at § 4331(b)(6).
[25] *See* 40 CFR § 1500.1(b).
[26] *Id.* at 1500.2(f).

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.[27]

Effective mitigation therefore starts at the beginning of the NEPA process, not at the end, and must be included as an integral part of the alternatives development and analysis process.

We address these and other issues in the remainder of this letter.

Climate change and NISP projected firm yield

The NISP DEIS projects a firm yield of 40,000 acre-feet (AF) based on the climate record from 1951 to about year 2000. Though this period incorporated moderate drought and major wet periods, it did not capture the most significant droughts recorded for the watershed. A much longer climate and river flow record is available.

We examined the availability of the Grey Mountain right over the entire climate record, using measured data from the historic record (early 1900's through 2007) and reconstructed precipitation records from the tree-ring analysis and found that the NISP project,[28] when examined over this entire period, is unlikely to meet it's firm yield projections.

Using flow data from the 1951-1998 record, we built a linear model that incorporated the current year's total native flow with the previous four years' total native flows, in the following form:

$$y = \beta_0 \cdot f(t) + \beta_1 \cdot f(t-1) + \beta_2 \cdot f(t-2) + \beta_3 \cdot f(t-3) + \beta_4 \cdot f(t-4)$$

where
y is the volume of the Grey Mountain right for the current year, in acre-feet
f(t) is the total volume of native flow in the current year, in acre-feet
f(t-1), etc. is the total volume of native flow in the previous year, in acre feet, and so on.
β_0, β_1, β_2, β_3 and β_4 are regression parameters

[27] 40 C.F.R. § 1508.20.
[28] Connie A. Woodhouse and Jeffrey J. Lukas. 2006. Multi-Century Tree-Ring Reconstructions of Colorado Streamflow for Water Resource Planning. Climatic Change 78(2-4), 293-315. http://www.springerlink.com/content/c925656512300527/, viewed on 5/12/2008.

The basis for this model is the year-to-year availability of a junior right on the Poudre River like the Grey Mountain right. Junior rights are typically available based on current year's reservoir volumes as well as the current year's flows, and the current year's reservoir volumes are based on flows from previous years. Using this model, we were able to reconstruct the Grey Mountain right over the reconstructed and historic precipitation record, going back to 1618. All terms in the regression were statistically significant, and the model R^2 was 0.89. Total yearly system losses from the Glade Reservoir were conservatively estimated at 2,300 AF/year, though they could be much higher.

Our analysis indicates the following:

1. The NISP project firm yield is likely to be only 35,000 to 36,000 AF per year on average (12.5 - 15% lower than the projected 40,000 AF).
2. It would fail to deliver its projected yield one year out of every five.
3. Over the historic climate record from 1618 to 2007, there were five deep, extended droughts lasting two to three decades long during which the project would fail to deliver its projected yield in four out of five years.

The NISP DEIS requests operational flexibility allowing the Glade reservoir's managers to fill the reservoir with rented water in dry years. During extended droughts like those present in the historic and reconstructed climate record, it does not appear that sufficient rental water would be available to meet the needs of the project participants.

For these reasons, we do not believe that the NISP project will meet its projected firm yield projections. The firm yield and the project operations plan must be re-evaluated in the context of the entire climate record, incorporating major as well as minor droughts. Additionally, the operations plan and firm yield projections analysis must evaluate the project's operation using currently available climate change scenarios in order to assess the effects of future climate variability and shifts in precipitation patterns on the project's ability to meet its firm yield projections.

There are many other simple linear or nonlinear models that could be used in order to predict the Grey Mountain right and other aspects of the river's hydrology based on historic data and therefore provide insight into the effects of drought and whether the project could fulfill its projected purpose and need.[29,30] A useful analysis should not be limited to the example provided above.

NISP impacts on Agricultural Wetlands

On page ES-7 of the NISP DEIS we find the following statement:

> "The removal of irrigation from up to 69,200 acres of agricultural lands would result in a loss of about 1,384 acres of wetlands, which is substantially greater than any of the other alternatives."

[29] A.C. Davidson. 2003. Statistical Models. Cambridge University Press.
[30] G.A.F Seber and C.J. Wild. 1989. Nonlinear Regression. New York: John Wiley and Sons.

This estimate appears in nineteen other locations in the document. It is based on a transparently faulty analysis of the quantity of irrigation-associated wetlands in the region. The analysis was based on a visual estimate of just two farm fields, from which the authors of the analysis surmised that 2% of all land in the entire region served by Poudre River irrigation water consisted of wetlands providing wildlife habitat.

We consulted with seven independent Ph.D.- and M.S.-level experts in land use analysis, wetlands ecology, and vegetation surveys in Colorado. We surveyed them on the method and the findings of this analysis. The overwhelming consensus was that the survey method and analysis was completely inadequate. It would be very unlikely to pass peer review in any scientific or technical journal dealing with wetlands analysis, vegetation classification, or a related field. The findings are inconsistent with the Fish and Wildlife Service (FWS) wetlands inventory data for the region.[31] It grossly overstates the habitat values of irrigation-associated wetlands. It grossly overestimates irrigation-associated wetlands acreages by a factor of five to ten times.

As a proof of concept, in early August we drove a transect across agricultural lands irrigated with Poudre River water, in the region around Ault, Eaton, and Greeley, surveying from county roads South and West of those towns across the Poudre River. In our brief survey of twenty farm fields receiving irrigation water we estimated that areas with developed wetland vegetation constituted less than 0.2% (one-fifth of one percent) of the area. This is one-tenth of the area percentage used as the basis for the environmental analysis of the no-action alternative.

In short, the survey used as the basis for the environmental analysis in the NISP DEIS must be thrown out and be completely redone from scratch using accepted, rational, and accurate survey techniques that adequately rank and report the habitat quality of the wetlands. The survey must take into account the following factors:

1. Analyze vegetation composition and structure on any wetlands found in the survey to assess habitat quality.
2. Consider underlying soils and the timing of water applications to assess drainage and the longevity of surface water presence.
3. Randomly select survey sites from throughout the geographic region based on factors that influence the depth and size of irrigation-associated wetlands.
4. Consider the effects of slope and aspect on the formation and seasonal longevity irrigation-associated wetlands.
5. Consider the effects of irrigation methods (e.g. flood, furrow, pivot, other sprinkler types, drip, etc.) on the formation and seasonal longevity of irrigation-associated wetlands.
6. Consider the effects of the source of irrigation water (gravity fed, pumped from a well, pumped from a ditch).
7. Parcel size

[31] U.S. Fish and Wildife Service. National Wetlands Inventory. http://www.fws.gov/nwi/, viewed on 9/8/2008.

8. Survey replication among the above sources of variation.

Taking these various factors into account will likely mean the wetlands survey will have to examine at least forty-five (45) randomly-selected fields from the affected area in order to take into account the many sources of potential variation in the survey and include at least two sets of replicates.

Screening threshold of 30% used in the NISP DEIS Alternatives Analysis

Section 2.1.2.1 on page 2-5 of the NISP DEIS states the following regarding threshold cutoff values for the DEIS Alternatives Analysis:

> "**Firm Yield.** The firm yield screening criterion requires that viable water supply sources must be capable of providing a firm annual water yield. This screening criterion was only applied to concepts because concepts are defined as a source of potential water supplies able to meet a portion of the NISP Participants' request. To pass this criterion, concepts must be able to provide at least 30 percent of the total requested firm annual yield of 40,000 AF, which is 12,000 AF. Limiting the provisional percentages reduces the number of water supply sources to a maximum of four, which is logistically reasonable for a regional water supply project of this magnitude."

The DEIS and supporting documents claim to have cast a wide net, examining a variety of alternatives to meet the stated purpose and need of the NISP participants. It is unfortunate, however, that the Corps of Engineers consultants who considered the array of potential alternatives used the same method as the project proponents (the Northern Colorado Water Conservancy District), who had made their own examination of alternatives in prior documents. At the very least, this does not appear to fit the role of the Corps as independent arbiters of the proposed project.

The document provides no basis or justification for this cutoff value, or for limiting the sources of supply to a maximum of four. There are no surveys of other projects, or scenarios upon which they base the justification. In short, the DEIS offers no basis or justification for any screening threshold – it merely sets a screening threshold and applies it.

The 30% screening threshold cuts off one of the largest alternative sources of water (rotating fallow agreements). Rotating fallow agreements are in our view the most viable of the alternative water sources available. They present the greatest opportunity to partner with agricultural water users while meeting the needs of the NISP participants. Had the alternatives analysis used a smaller threshold value (even just one percent smaller) and evaluated rotating fallow agreements with the same contractual arrangements as is being used in other places in Colorado and the West, rather than the cumbersome, burdensome, and unlikely contractual arrangement proposed in the DEIS, they would have passed scrutiny and been incorporated into NISP at a much reduced cost compared with the construction of NISP. And, they would have likely made the existing NISP scenario unworkable.

The Northern District's initial analysis, and the subsequent COE analysis, applied an arbitrary screening threshold mandating that any alternative chosen must supply at least 30% of the stated water demand. Such an arbitrary threshold guaranteed that the applicant's "preferred" alternative would be a large, "regional" project under the presumption that overall costs would be lower and the affected environment would be better protected -- a project so large, in fact, that it must be constructed and operated by an organization such as the Northern District. However, such an arbitrary 30% threshold also guaranteed that a combination of small, flexible, less expensive, and incremental water supply projects would never be seriously considered. Being blind to small scale, appropriate development is a recipe for unsustainable water projects and, as our analysis shows, failed to identify a suitable alternative that would preserve what is left of the Cache la Poudre River.

In summary, we conclude that the NISP Alternatives Analysis must be redone with the screening threshold and limitation to just four water sources removed to allow for greater flexibility, a wider range of options, a less costly project, and less environmental impact.

Timeliness screen applied in the Alternatives Analysis

Page 2-5 of the DEIS describes a Timeline Screen applied in the alternatives analysis, eliminating any option that could not be completed within five years, 2005-2010. Obviously at this point no water would be provided from this project before 2010. If this screen was truly need driven in that the water must have been supplied before 2010, then the action alternatives no longer pass the timeliness screen. At this point the Corps must drop this timeliness screen and consider all available options for supply.

Purchasers ability to purchase and sell units in the project

Page 2-31, section 2.4.1.2 of the DEIS states the following:

> The NISP Participants would have the ability to sell their contract rights in NISP to other entities within the District boundaries or buy additional contract rights in NISP as they become available. The ability to purchase and sell contracts in NISP would not alter the size or operation of NISP. Once NISP becomes operational, it is anticipated that there would be a market for NISP contracts similar to the market that currently exists for C-BT units.

We see two major issues associated this clause. First, it casts significant doubt as to whether the project is necessary. If the participants' need projections are solid and the need is as firm, then why would they want to sell shares in the project? This casts serious doubt as to their actual need for the water. For that matter, it restricts the purchase and sale of project water to the boundaries of the Northern Colorado Water Conservancy District, which violates the free market. We are no fans of trans-basin water diversions, however developing a major publicly-funded project like NISP and then restricting the purchase and sale of the resources for the project to the boundaries of the NCWCD bureaucracy casts serious doubt as to the actual need for the project and whether it supports legal provisions that allow for the purchase and sale of water within Colorado.

Using other sources of water to fill the Glade Reservoir

On page 2-31, section 2.4.1.3, the proponents request the right to initially fill the reservoir with other sources of water. This would lead to the temporary dry up of tens of

thousands of acres irrigated agricultural lands, which were not accounted for in the impacts analysis.

If other water is available, then where is the actual need?

References to the EPA 303d list must be updated

Page 3-25, section 3.5.1 references the 303d list for 2006. The 2008 list was approved by EPA in May of 2008. It adds pH and Cu for the Monroe Canal to Shields Street reach (COSPCP10) below the North Fork and an aquatic life use impairment for Horsetooth Reservoir (COSPCP14).

TCE Plume modeling

Page 4-38, section 4.7.2 discusses the impacts of the Glade Reservoir on the TCE plume. The modeling work on the pollution plume predicted its future course based on current conditions. No modeling was apparently done to consider the role that reservoir leakage would have on the TCE plume direction or rate of travel via alteration of the subsurface hydrologic gradient. This is a very serious problem considering the great public health risk posed by the TCE plume. The impact of the proposed reservoir on the TCE plume direction and rate of travel must be modeled directly.

Biological Assessment used – is it the final or the draft?

The Biological Assessment is labeled in the footer throughout as "Predecisional Draft." There is no clear indication that the Corps used the final version of the Biological Assessment in its analysis.

Wetlands Screen Threshold

On pages 2-5 and 2-6, section 2.1.2.2, the DEIS describes a rationale for the 60 acre wetlands screen threshold. This threshold is based on a level "where the wetland area differential diminishes as screening tool," i.e., where the screen eliminates a certain number of projects, rather than be based on an acceptable level of wetland loss as determined through sound science. This screen is entirely arbitrary – there is no scientific justification provided related to the relationship between wetland size and biological function, water quality improvement, habitat value, recreational contributions, or direct relationship to the project. It must be removed entirely as a screen.

Outdated Topographic Maps

At 2-6, the waterways screen was based on stream classifications taken from USGS topo maps rather than on-the-ground inspections. This review was presumably conducted with USGS 7.5-minute series maps which are generally less than current. For example, the 7.5-minute map Laporte, which covers the Glade Reservoir site and the river as far east as Laporte, was most recently published in 1979 as a non-field checked photorevision of a 1962 map. The photos used for the revision were taken in 1975, and the revisions in the vicinity of the project appear to be limited to cultural features and mining operations. The original mapping, which appears to be the source of the hydrological data, was based on 1958 photos field checked in 1962. All of which is to say that the stream classifications used for this screen threshold were based on 45-year old data.

Similar data issues apply to all environmental analyses which were conducted from USGS topographic maps without additional field-checking; we call all of these inappropriate uses of the old data into question.

Hazardous Land Uses and Contaminants

On pages 2-6 through 2-7, there is discussion of eliminating from consideration all sites with "hazardous land uses...and various contaminants..." How then is the proposed site for the Glade Reservoir with its underlying TCE plume not excluded?

C-BT Transfers Eliminated from the Alternatives Analysis

On page 2-10, 2.1.3.1, the alternatives analysis eliminates C-BT transfers because one could only get 37,000 AF using a 0.5 AF per unit quota, the minimum quota ever allotted through C-BT. In the Healthy Rivers Alternative we discuss the reasons why the historic average of 0.7 AF per unit should be applied. If a factor of 0.7 AF per unit was applied, the amount of water available would go well above 40,000 AF.

Air Quality Issues

On page 3-127, section 3-25, the DEIS admits that the reservoirs sites are within a Federally-designated ozone non-attainment area but claim that "air quality is currently not an issue in these areas." This is entirely wrong. The State of Colorado is putting great efforts into developing and implementing ozone reduction actions to comply with Federal Standards. According to the State:[32]

> Colorado is in the midst of an effort to reduce ozone air pollution. High levels of ozone present health concerns both for healthy adults and for sensitive people, particularly the elderly, young children and those with asthma or other respiratory ailments. Symptoms include stinging eyes and throats, chest pains, coughing and breathing difficulty.
>
> Denver and North Front Range Area Violates Ozone Standard
>
> The Denver-metropolitan and North Front Range areas became "nonattainment" areas for the federal ozone standard on November 20, 2007, when a deferral by the U.S. Environmental Protection Agency expired.
>
> The nonattainment designation is a result of a violation of the federal 8-hour ozone standard. The standard is based on a three-year average of monitoring data. Air quality monitoring data for the 2005-2007 averaging period confirms a violation of the eight-hour health-based standard.
>
> A detailed plan to reduce ozone is being developed by the Colorado Air Pollution Control Division, along with the Regional Air Quality Council and the North Front Range Metropolitan Planning Organization. The

[32] http://www.cdphe.state.co.us/ap/ozone.html, viewed on 9/11/2008.

> resulting attainment plan will be submitted by the Regional Air Quality Council to the Colorado Air Quality Control Commission for approval by the end of 2008, with legislative review expected after that. Once all state approval processes have been completed, the plan ultimately will be submitted by the governor to the EPA.
>
> The plan will require further reductions in ozone levels beyond what was required through an earlier Ozone Early Action Compact. The Ozone Early Action Compact allowed EPA to defer classifying the Denver metropolitan area under the 8-hour ozone standard. That deferral expired on November 20, 2007.

This one paragraph dismissal of serious health concerns and absolutely no discussion of how the project might impact these ozone levels is a clear failure to meet both the letter and intent of NEPA. Potential impacts to ozone from the project include, but are not limited to: vehicle emissions from construction, emissions changes from the highway re-alignment, and changes to release of ozone precursors from changes in land use practices.

Recreation potential at the proposed Glade Reservoir

The NISP DEIS proposes that the Glade Reservoir will provide over $17 million in yearly economic benefits to Northern Colorado. This dramatic overstatement of the likely benefits of the project is based on a transparently faulty analysis. It ignores key factors that, if considered in the analysis, would greatly change the outcome:

1. The analysis largely ignores or grossly understates the impacts the project would have on downstream economic benefits, not just in Fort Collins but in Bellevue, Laporte, Timnath, Windsor, Greeley, and rural Larimer and Weld Counties.
2. The analysis assumes that use levels will immediately reach levels experienced at Horsetooth Reservoir and will remain constant every year.
3. It does not factor in the likelihood that the reservoir may take years to fill, possibly a decade or more.
4. It does not factor in fluctuating water levels as a factor that influences visitation. Our own analysis of Glade reservoir water use levels using the historic and reconstructed climate record indicates that about a third of the time the reservoir will be nearly empty, fluctuating between dead pool and very low water levels.
5. It assumes that fish concentrations and angling potential will remain constant over this time, ignoring the role that water quality, turbidity, fluctuating oxygen concentrations, and siltation have on sport fish biology and reproduction. Our own analysis indicates that, should Glade be built, fishing will be poor at least one third of the time, and water sports will not be viable due to safety concerns due to turbid water, underwater obstacles, and shallow water.

An accurate and viable economic benefit analysis would take into account the above factors and the following:

1. Survey the boating public and assess use levels based on the fraction of the public who utilize motorized recreation and who would travel to Glade for recreation, if the reservoir were built.
2. Take into account the impact of rising fuel prices on motorized recreation and visitor use at the reservoir if it were built.
3. Accurately assess how highly fluctuating reservoir levels and frequent dead pool conditions would influence visitation, using data from other reservoirs with similar conditions.

Geographic Scope of the Impacts Analysis

Since this project would severely restrict river flows on the entire lower Poudre River below the canyon mouth, and would significantly impact flows on the South Platte River, the entire stretch of the Cache la Poudre River to the confluence with the South Platte, and then the South Platte from the Poudre River downstream must be considered in the impacts analyses done for the DEIS.

Proposed Flow Mitigation in the Filter Plant Run

One of the mitigation options proposed in the DEIS is to increase flows by about 40 cfs during the month of August through the "Filter Plant Run" on the Poudre River, and make structural changes that would allow linking the "Filter Plant Run" and the "Bridges Run". The DEIS estimated that increasing flows through August would extend the rafting season through the month of August with whitewater sports use levels at the same levels as in May, June, and July. This highly speculative argument led to doubtful claims that it would increase the economic value to the rafting companies by about $186,000.

We surveyed whitewater sports companies operating on the river to investigate the economic value of this claim. The survey is being sent to the Corps of Engineers by Josh Metten under separate cover. We found the following:

1) The increase of ~40 cfs is very unlikely to extend the rafting season to any degree, except in the wettest of years, perhaps once per decade.

2) The major limiting factors for the rafting season in August are very low river flows and the start of the school year.[33, 34] The great majority of responses we received indicated that ~40 cfs would do very little to nothing to extend the rafting season on the filter plant run. The customer base during the week is largely gone as students go back to school and vacationing families return home. The flows are so low that exposed rocks and gravel bars make rafting and kayaking impractical.

Most companies end their season by the first of second season in August for the reasons cited in (2) above. Most do not use the filter plant run after the month of June. Therefore we do not believe that the estimate of an $186,000 economic gain is credible. It is grossly overstated, speculative, and must be revised downward. Based on the survey results, we believe it is overstated by a factor of at least ten.

[33] USGS stream gage data. http://waterdata.usgs.gov/co/nwis/rt, viewed on 9/11/2008.
[34] Poudre River Rock Report. http://www.poudrerockreport.com/, viewed on 9/11/2008.

Adaptive Management

In section 4.4.3 and in later sections, the NISP EIS proposes to use Adaptive Management as its primary means of mitigation for the project. The DEIS devotes relatively few pages in total to the entire concept, but places a great deal of its impact mitigation strategy on the concept.

The concept of Adaptive Management was first proposed as a means to assess the environmental impacts of construction projects when important environmental impacts are unknown or difficult to assess.[35, 36] For the NISP project, the likely impacts are well understood and straightforward to assess, due to the decades of environmental research.

We have a number of grave concerns about applying adaptive management to NISP, as follows:

1. Though the DEIS proposes a number of possible survey mechanisms and assessment techniques, it offers no basis or justification for utilizing adaptive management to deal with the expected impacts of the NISP project when the likely impacts are well understood and straightforward to model and assess. Using adaptive management must be justified using at least the following criteria:
    a. The similarities between the proposed NISP project and other projects employing adaptive management.
    b. Specific reasons why adaptive management should be chosen, when the expected impacts of the project are straightforward to predict and well understood.
    c. The merits of adaptive management must be presented, alongside the disadvantages.
    d. The desired outcomes of adaptive management, and why they could not be achieved with a formal mitigation plan.
2. No adaptive management plan was developed for the project, from which the merits of the adaptive management proposal could be assessed. The DEIS simply proposes that a plan be submitted to the Corps of Engineers at least 2.5 years prior to initiating diversions, with provisions for reviewing the plan every five years afterward. How can the decision makers and the affected public assess the adequacy of adaptive management in mitigating the impact of the project if no plan is presented until after the project is permitted and construction begins? We believe an adaptive management plan must be prepared as part of the DEIS for this project so that decision makers and the affected public may judge the merits of this proposal.
3. We could find no proposed budget for developing, implementing, and modifying adaptive management plans and techniques. There does not appear to be a budget in the project for mitigation measures after diversions begin.
4. No mechanisms are proposed for analyzing the results of data collection and making decisions regarding proposed mitigation measures other than submitting plans to the

[35] Holling, C.S., ed. 1978. Adaptive environmental assessment and management. New York: John Wiley and Sons, Inc. 377 p.
[36] Walters, C.J. 1986. Adaptive management of renewable resources. New York: McGraw Hill. 374 p.

Corps of Engineers and re-evaluating those plans every five years. There are no stakeholder groups or expert panels proposed. No decision-makers are identified as to who decides what mitigation measures would be necessary and how those decisions would be made.

5. Standards and goals for mitigation measures are not proposed in the DEIS. In order to judge the efficacy of the proposal and the seriousness of the project proponents, we must know what the very specific mitigation goals are that they seek to achieve, involving water quality, sustaining riparian forests, sustaining wetlands, the aquatic environment, and economic impacts.

Adaptive Management is wholly unsuited for this project, and we believe the concept must be dismissed.

Impacts on Riparian Vegetation

The final conclusion that ERO reached in its evaluation of the four alternative plans (associated with NISP) for the Cache La Poudre R was that "the reductions in streamflows on the Cache La Poudre (CLP) and South Plattte River associated with the action alternatives are not anticipated to cause a change in riparian and/or wetland vegetation." This conclusion is not supported by data or an objective framework for assessing possible changes in vegetation in response to the alternatives. This conclusion is based upon expected change in monthly average flows from "baseline condition". "Baseline condition" is mentioned for the first time in the conclusions on p. 56 of the report and is never defined. This is important because if "baseline condition" during a dry year is based upon an average low flow, plants are likely to be more sensitive to smaller changes than deviation from higher baseline condition. In other words, a reduction in stage by 0.5 feet at low flow should have a greater effect than the same reduction in flow at a higher flow.

Overall, the technical report is weak, does not use data relating flow to riparian vegetation to reach its conclusions, and fails to directly address the potential and likely effects of reductions in high flows on riparian vegetation. Changes in high flow are the basis of the proposed alternatives and high flows are a key component of the range of flows that riparian vegetation is responsive to and dependent upon. Although the main hydrologic impacts of the NISP proposal are to reduce the magnitude and frequency of high flows, the ecological effects of these reductions are de-emphasized and/or ignored in the conclusions. The report was difficult to technically evaluate because there is very little substantive content to the report, no data, no linkages of hydrology to vegetation, and unsubstantiated conclusions.

Several important points and considerations concerning the conclusions of this report follow:

1. The ERO report does not present any data relating riparian vegetation to streamflow. The conclusions of the report are strongly stated but not backed by evidence or findings from ERO or other studies (which are based upon a singe species at a single study site – Scott et al. studies).

2. All of the conclusions were made based upon "reviews of aerial photography and site visits" and some assumptions linking a few studies to the reaches of interest.
3. Site selection was based upon ERO's consideration of the "areas where the greatest changes in streamflow and potential for effects to riparian vegetation might occur". These "sensitive reaches" were restricted to natural areas, yet there are potential negative effects of altered flow regime along the entire river course. Although the channel through the city is heavily impacted and in a degraded state, streamflow still performs important ecological functions through the entire reach.
4. "assessment of potential effects to riparian and wetland vegetation … was based primarily on average monthly flows and stream stage associated with each alternative" (p. 35). Riparian vegetation responds to extreme flows (highs and lows) that are not well-represented by monthly averages, particularly in hydrologically variable months like April, May, and June.
5. Stage-discharge relationships vary along the course of the CLP. ERO's conclusions are based upon how stage will be affected at the gage locations with are likely more and less at different points along the river depending on cross sectional dimensions (channel geometry).
6. The role of peak flows in maintaining recruitment patterns, age-class structure, and sustainable riparian communities is mentioned in the report but when the proposed reductions in peak flows are evaluated a series of circular illogical steps are taken to diminish the importance of these reductions. For example, p. 56 "The NISP action alternatives would reduce the frequency of flows of 3,400 cfs from 17 to 5 days and flows of 1,600 cfs from 19 to 9 days for the 50 years of hydrologic record (Anderson 2008). Neither of these flows currently occurs at a frequency sufficient to provide hydrologic support for riparian vegetation. It is likely that most of the supportive hydrology comes from the lower more frequently occurring streamflows and supplemental sources such as the ditch and nearby ponds." Riparian plant species respond to a range of flows over a range of timescales. Large infrequent high flows are key to the maintenance of these systems as they are the flows that connect the river to the floodplain, create sites for regeneration of a range of riparian plant species, stimulate microbial activity and decomposition of organic material on the floodplain, nutrient release, flushing of floodplain soils, recharge of alluvial aquifers, and a range of other important ecological functions (I can provide citations). The absence of such flows will most certainly cause changes in the physical integrity of the floodplain and shifts in riparian plant population structure and community composition over time. Who is to say that because the effects may be expressed over a long period of time that they are not worth considering in evaluating the costs and benefits of NISP? Short and long term effects should be evaluated.
7. "Riparian vegetation on stream reaches with ground water elevations that are independent of streamflows are unlikely to be affected by changes in streamflow (p. 38)." Fails to recognize the importance of high flows in maintaining riparian vegetation. Typically reaches are gaining and losing at different times during the season. This statement is unsubstantiated.
8. "Although supportive hydrologic conditions are essential for the maintenance of wetlands, simple cause-and-effect relationships are difficult to establish (Mitsch and Gosselink 1993)" (p. 40). Difficulty in establishing such linkages does not justify

ignoring them. There seems to be confusion about the fact that riparian areas may contain jurisdictional wetlands, riparian areas also include a mosaic of other fluvially influenced areas that may not be "wetland" in the strict legal sense, but are uniquely riparian.

9. "Scouring and overbank flows can reduce vegetation encroachment and possibly help regenerate some types of riparian vegetation by scouring the floodplain and creating soil conditions favorable for regeneration (Stromberg et al. 1993)." (p. 42). This is a statement with widespread scientific support. Loss of such flows or reduction in the frequency of them would occur under alternatives 2, 3, and 4 of NISP. Why then are these facts not linked together in an evaluation of the possible effects of NISP. This seems to contradict the ERO conclusions for most of the reaches evaluated.
10. "Many of the riparian areas along the Cache la Poudre and South Platte rivers appear to be supported by water sources other than the rivers (e.g., ditches, return flows, and ponds)." (p. 46). This may be true, but does not diminish the fact that NISP is not likely to affect the low flows that these other water sources become important during. High flows would be affected by NISP and would not likley be replaced by other water sources. Again, ERO seems to confuse the role of high and low flows in providing different functions (high flows: floodplain connectivity, groundwater recharge, creation of habitat for recruitment and establishment; low flows: maintenance of established vegetation and preventing water stress and associated ills).
11. ERO seems to be confusing Army Corps of Engineers jurisdictional wetland criteria with vegetation associated with riparian areas. Whereas some areas associated, adjacent to, and influenced by rivers (riparian areas) may fall under jurisdictional wetland status, far more does not yet is still dependent upon and responsive to flow regime.
12. ERO considers 0.5 ft of stage change to be a conservative estimate of a stage change that herbaceous vegetation would respond to (p. 48). Assuming that this is a number that is meaningful to plants, over what time interval might one expect vegetation change to occur in response to altered flow? If plants might become water stressed after one day, five day or even ten days of a stage decline exceeding 0.5 ft, monthly averages would not enable one to determine if NISP flows might cause change in the herbaceous vegetation. The amount of variability in stage over the course of a month is not addressed. An average flow that varies by 0.5 ft might average to 0.5 ft while experiencing a range of flows from well outside (e.g., 0, 1.5, 3 ft or more) of this "conservative" value, which would likely result in altered herbaceous vegetation. A daily timestep would be more appropriate to examine possible effects of altered flows on vegetation.
13. "Nonwetland herbaceous vegetation likely would not be affected by changes in stream stage" (p. 48). One of the functions of flow in riparian areas is to support riparian communities but it is also to prevent "terrestrialization" or the encroachment of channels and riparian communities by upland vegetation. Riparian areas typically experience an "ebb and flow" of upland species into and out of riparian areas over the course of time. This ebb and flow is largely dictated by the frequency and duration of high flow events that exclude or disfavour upland species near the river. This is what distinguishes riparian areas from surrounding uplands and non-fluvial wetlands.

When high flows are removed, terrestrialization occurs and riparian areas narrow, become less distinctive, heterogeneous, species rich, and less "riparian".

14. "…woody vegetation , such as willow shrubs and cottonwood trees, likely would be unaffected by changes in stream stage of about 1.5 feet or less, because woody vegetation is more deeply rooted, and physiologically adapted to following the water table downward."(p. 48?) Whereas Populus and Salix seedlings can extend roots to track a falling water table, there is no literature suggesting that established plants (juveniles and adults) can respond to falling water tables through root extension. This is misconception that I have seen before in studies trying to justify lowering of water tables. Salix and Populus have very different root morphologies and maximum rooting depths so should not be considered together.
15. "Where water table declines are greater than 1.5 feet, it is possible that existing woody vegetation could be affected, but research shows that declines of up to 3 feet may not cause death of woody riparian vegetation. Establishment of woody vegetation would likely be more affected by changes in overbank and scouring flows (i.e., 25-year flows)…" (p. 48-49). This being stated, very little consideration of the influences of reduced peaks on vegetation is given in the conclusions. "Simply stated, high flows on the Poudre River below the canyon mouth would become a rarer event with NISP." (p. 53). Linking these two statements and then concluding that "The reductions in streamflows on the Poudre and South Platte rivers associated with the action alternatives are not anticipated to cause a loss of riparian and/or wetland vegetation" (p. 75) is contradictory.
16. ERO states that mean monthly stage would be reduced no more that 0.1 ft under each of the three alternatives (2, 3, and 4). No statement of the variability within a month is provided (p. 49). If this varies substantially, the conclusions made are irrelevant. Again, if the larges mean monthly changes in stage could be as high as 0.36 to 0.61 ft during June, what is the variability around this monthly mean? ERO fails to take any variability into account, yet earlier in the report cite Scott et al. 2000 as having concluded that "sustained declines of the water table of greater than 3.1 feet resulted in 88 percent mortality of plains cottonwood" at their study site. Although it is unlikely that reductions of stage of even 0.61 ft during high flows would not negatively affect maintenance of adult Populus over the short term (e.g., cause water stress), ERO seems to mix flows necessary for regeneration and maintenance, and fails to examine differential effects of different flow alterations on each.
17. There is no basis for the statement that stage reductions of "0.18 feet below baseline conditions in May and June … during dry years are small, and are unlikely to affect riparian and wetland vegetation." (p. 50) or "Based on ERO's analysis of stream stage at the Canyon gage, it is unlikely that stream stage would affect riparian and wetland vegetation in the vicinity of the Canyon gage." (p. 50).
18. "The high flows that would be most affected by NISP do not appear to be providing supportive hydrology for riparian and wetland vegetation in the McMurry Natural Area. Flows above about 2,000 cfs that exceed the stream banks may help with the habitat renewal process and the reductions in these overbank flows may reduce the opportunities to create new habitat for riparian vegetation establishment." (p. 55). This being said, the conclusion ERO makes is that NISP would not negatively affect

vegetation (?).

19. Martinez Natural Area reach: "It is likely that most of the supportive hydrology comes from the lower more frequently occurring streamflows and supplemental sources such as the ditch and nearby ponds."(p. 56) It is unclear what is meant by "supportive hydrology". It is assumed that this is low flow hydrology and how it might affect maintenance of riparian vegetation. No mention is made of the effects of altered high flow on vegetation through this reach. High flows are those most influenced by the alternatives in NISP.
20. Any conclusions that could have been made by logically linking many of the statements about the possible effects of reduced high flows are seemingly discounted in the final conclusions: "Without this disturbance and a substantial reduction in the frequency of this occurrence of overbank flows, it is likely that the woody riparian vegetation will become increasingly decadent. This would be a slow process that would be difficult to separate from current trends in riparian vegetation along the Poudre River." (p. 75).
21. General comment on non-riparian vegetation cover types section of the report: no clear criteria for assessing condition of vegetation cover types is provided, yet in most cases cover types are considered to be of low to moderate quality. Without clear assessment criteria, it is unclear if the rating of quality is simply the opinion of the observer (which is open to bias) or based on something more scientifically defensible.

22. Overall ERO has failed to: 1) link riparian vegetation to streamflow, 2) adequately distinguish between flows necessary to maintain channel integrity and facilitate regeneration of riparian vegetation and flows that maintain established plants, 3) consistently evaluate the role of high flows in maintaining vegetation, 4) to reach conclusions based upon any objective scientific criteria. NISP proposes to have an effect largely upon high flows, so the focus on low flow hydrology and alluvial water tables is a distraction from the real issue. Reductions in high flows will influence regeneration of many riparian species (facilitating encroachment of terrestrial species into riparian areas and suppressing processes necessary for regeneration and establishment of many riparian species - particularly fluvial disturbance adapted species). This will result in changes in population structure of many species over various periods of time ranging from years to decades. Change in population structure of many species results in changes in plant community composition. These factors are not evaluated by ERO, yet they are the crux of the issue. Because peak flows occur over a timescale of less than a month, monthly time steps in considering the effects of reduced peak flows on vegetation are inadequate. There is no stated reason for not taking advantage of daily average flows and examining the extreme flows that vegetation responds to rather than some monthly mean (which riparian plants are less responsive to).

General Concerns Regarding Language Use and Presentation Bias

We have discussed the NISP DEIS with dozens of individuals who have had a chance to read portions of or the entire document and who have professional experience with NEPA documents in general. Nearly all expressed serious reservations about the

persistent bias throughout the document for the action alternatives and against the no action alternative.

For example, there were two technical analyses done to evaluate the likely impacts of the no action alternative on irrigated agricultural lands. The first analysis concluded that up to 69,200 acres of farmland would be impacted. We analyzed the method used to derive this figure and found it faulty and spurious, and apparently the Corps of Engineers agreed because it ordered a separate analysis be done to correct the errors in the first analysis. The second analysis revised the first estimate to 33,637 acres, and clearly documented the errors in the first analysis. Yet, the document refers to this corrected figure only twice that we could find– once in section 4.2.2.1, and once as a footnote to Table 4-8 on page 4-47.

The faulty estimate of 69,200 appears thirty-four times elsewhere in the DEIS. It becomes the foundational figure for fundamental analyses and interpretation related to the economics of the project, environmental impacts, and socio-economic impacts. This faulty analysis weighs heavily in considering which alternative is the least environmentally damaging, skewing the analysis heavily (and wrongly) in favor of the action alternatives.

This situation gives the appearance that a transparently faulty analysis was widely used throughout the NISP DEIS in order to bolster support for the action alternatives.

There are numerous other examples where we find similar issues:

1. The economic analyses hold up speculative benefits of the proposed Glade Reservoir but downplay the economic impacts to river users downstream of the diversions.
2. The environmental impacts analysis excludes major portions of the affected riparian and aquatic corridor downstream of the diversion points, limiting the impact analyses only to the developed reservoir, infrastructure, and pipeline footprints.
3. Conclusions concerning environmental impacts in the DEIS frequently conflict with the supporting technical studies, particularly in the assessment of water quality and riparian forest impacts. Where the technical reports conclude significant impacts, the DEIS consistently overrules them and reports “minor impacts” or “no significant impact”, and in several cases concludes significant environmental benefits.
4. The water use analysis excluded major industrial water uses and excluded the highest water use years from the calculations, resulting in a per capita water use estimate approximately 13% lower than it actually was, and then attempted to compare this water use figure with other utility providers for whom industrial water uses were not removed.
5. Likely detrimental impacts are persistently couched using modifiers such as “…may cause…”, “…might effect…”, “…may occur…”.
6. Economic estimates that bolster the proposed alternative are described using terms like “There ***would be*** (emphasis added) an estimated gain of…”, when economic factors that bolster the no action alternative are described using language such as “…and a loss ranging from ***$0 to $700,000*** (emphasis added) annually…” when there

is no basis described for the lower bound of zero. For examples of this, see Table 4-1 on page 4-4.

7. From page D-4 of the DEIS: "The ***small flow decreases*** (emphasis added) predicted to occur in May and June are not expected to affect stream water quality." The flow decreases they describe during this period are in the hundreds of cubic feet per second (cfs), compared with the approximate increase of 40 cfs the DEIS proposes to provide in August as mitigation, which is described as "significant". As we saw in many places in the DEIS, no basis was provided for the judgement that it would not affect stream water quality, and it contradicts directly with the findings of the supporting water quality technical reports that predicted water quality would decrease directly with streamflow reductions.
8. On page 2-7 there is discussion of the need for storage elements to regional in nature to be considered. This suggests that even if an analysis found that it would be cheapest and least impactful for each participant to independently develop their own supplies, that smaller, localized options could not be considered. This undermines the objectivity and the scope of the alternatives analysis – along with other limitations placed on the alternatives analysis, it virtually assures that a large reservoir project be selected through the screening process.

There are dozens of examples of this throughout the document, and we would be happy to work with the Corps of Engineers to identify the places in the DEIS where it undermines the credibility of the analysis.

If you have any questions or need clarification on the issues presented in this letter, please contact me at the addresses and phone number below. Thank you for the opportunity to contribute to the analysis of the NISP DEIS.

On behalf of the Save The Poudre Coalition, respectfully yours,

/s/
Mark Easter, M.S. Botany, B.S.E.E.
Chair, Save The Poudre Coalition
Conservation Chair, Sierra Club Poudre Canyon Group
PO Box 20
Fort Collins, CO 80522

Personal address and contact info:
2820 Cherry Lane
Fort Collins, CO 80521
970-224-9214
measter@frii.com

Attachments:

Healthy Rivers, Healthy Communities: A balanced proposal for the Cache la Poudre River in Colorado. File name is STP_Healthy_Rivers_Alternative.pdf

Healthy Rivers, Healthy Communities: A restoration proposal for the Cache la Poudre River in Colorado. File name is STP_Restoration_Proposal.pdf

A Review of the Likely Agricultural Impacts from the Northern Integrated Supply Project. File name is STP_Ag_Impacts_Analysis.pdf

Comments on NISP DEIS Treatment of Preble's Meadow Jumping Mouse. File name is STP_Prebles_comments.pdf

Comments on NISP DEIS Treatment of Fish. File name is STP_fish_comments.pdf

Comments on NISP DEIS Treatment of Birds. File name is STP_NISP_bird_comments.pdf

Form for Nomination of the Cache la Poudre Urban River River as an Important Bird Area. File name is STP_IBA_nomination_form.pdf

IBA Nomination for the Cache la Poudre Urban River Corridor Important Bird Area. File name is STP_IBA_nominination_text.pdf

Fort Collins Audubon Society Poudre River Bird Survey from 2001-2002. File name is STP_FCAS_Poudre_River_Bird_Survey_2001-2002.pdf

Fort Collins Audubon Society Poudre River Bird Survey from 2006. File name is STP_FCAS_Poudre_River_Bird_Survey2006.pdf

City of Fort Collins ad hoc Science Review: File name is STP_ad_hoc_report.pdf

Save the Poudre: Poudre Waterkeeper Comments on the Supplemental Draft Environmental Impact Statement for the Northern Integrated Supply Project, June 2015

September 3, 2015

Save the Poudre: Poudre Waterkeeper (STP) has prepared these comments and supporting materials for the US Army Corps of Engineers (Corps) in review of the Supplemental Draft Environmental Impact Statement (SDEIS) for the Northern Integrated Supply Project (NISP) released June 2015.

In general, STP finds that the SDEIS fails to meet the requirements of the National Environmental Policy Act (NEPA), the Clean Water Act (CWA) and the Endangered Species Act (ESA), under which the SDEIS was required.

STP presents these comments without reference to relevant materials that were requested through the Freedom of Information Act (FOIA) on July 19, 2015, but which were not provided by the Corps in a timely fashion. *See* "Freedom of Information Act Request," attached here in Appendix A (A04). STP requested an extension of the comment period to accommodate this request but that extension was not granted. *See* "Request to extend the deadline for the public comment period for the NISP SDEIS," attached here in Appendix A (A03). As this FOIA request was needed to trigger the disclosure of information that the Corps failed to properly disclose in the SDEIS, STP expects the Corps to give full consideration to any comments based on that material that supplement or revise these comments submitted in a timely fashion even if submitted after the close of the official comment period.

I. The SDEIS Fails to Meet the Requirements of NEPA and CWA

A. The SDEIS neither Considers a Full Range of Alternative nor Adequately Analyzes the Environmental Impacts of NISP

1. The SDEIS Fails to Objectively Consider the Benefits of Conservation for Reducing Projected Demand

The Corps appropriately retained an independent expert to review the project proponent's demand projection. SDEIS at 1-14. This expert took exception with the proponent's projections, stating "we are

concerned about the HE projections' implied increases in overall water requirements per capita for NISP participants, particularly in the 2030 through 2050 period." "Review of 2010-2011 'NISP Demand Projections from Harvey Economics and Recommendations for NISP Supplemental EIS'" (Demand Projection Review), attached here in Appendix E (E30), at 9. The expert subsequently proposes, and the Corps accepts in the SDEIS, two alternate demand curves, one of which is based on fixed rate "best guess" conservation scenario. Demand Projection Review at 9 ("The extent of future declines in water requirements per capita is very difficult to predict and somewhat speculative in nature").

The conservation scenario is, however, never given any weight in the analysis of the project's need and purpose. It is merely offered as a straw man argument that regardless of any efforts the demand for water more than justifies NSIP—the Corps assumes that because the projected water demands over the entire study period are still greater than the 40,000 acre-feet requested by the project proponent, there is still need for NISP. SDEIS at 1-15 ("Under any of the three demand scenarios, both NISP and additional supplies would be required to meet the NISP Participants' future water supply needs").

Further, the SDEIS asserts, without support, that "the timing of the future water supply needs can be delayed (but not avoided) through water conservation." SDEIS at 4-5. Such a statement is only true if the Corps assumes that the participants will continue infinitely increasing their water demands. The SDEIS clearly illustrates that the projected demand is <u>reduced, not just delayed</u> by the conservation scenario through the study period of this review. SDEIS at Figure 1-4. The Corps must not speculate about water demands beyond the range of their analysis. Within the time frame under consideration, the conservation scenario does reduce demand.

In fact, the SDEIS clearly demonstrates that even the limited conservation proposed under the conservation scenario reduces the projected long-term demand of the NISP participants by approximately 40,000 acre-feet – the desired firm yield from NISP. SDEIS at Figure 1-4. The projected increase in demand over 2010 is approximately 50,000 acre-feet, roughly equivalent to the unmet demand after NISP water is applied to the original demand projection. The Corps fails to objectively consider that reduced demand from the conservation scenario (or other conservation-based alternatives) may be meet by the project participants through the means with which they anticipate meeting their surplus water needs after NISP is implemented.

STP rejects the SDEIS's demand projections as deeply flawed and unrepresentative of the demand likely to be experienced by the participants, as well as the assumption that these demands must be met, but if

it continues to use these projections in its review of NISP it must do so in an objective and consistent manner. The Corps must reconsider its analysis of need by specifically addressing the ability of the participants to meet the reduced needs projected under the conservation scenario and any other practicable conservation-based approaches that are identified in the SDEIS review through the means with which they intend to meet their water demands that will be unmet by NISP under the original projections. The Corps must not rely on assumptions of demand beyond its designated study period. If the Corps determines that the participants cannot meet the full projected need under a conservation approach, the Corps must consider and disclose the ability of the participants to partially meet the need and how NISP alternatives could be re-configured to meet the lesser need. The Corps must fully refute the practicability of any approach as described here that could be a LEDPA to NISP before permitting NISP.

2. The SDEIS Incorporates an Assumption that Water Supply Demands must be Met that Unreasonably Constrains the Range of Alternatives

The SDEIS is entirely premised on the assertion that increased water supplies are <u>needed</u>.

> The project's purpose and need is stated as "*[t]o provide the Project Participants with approximately 40,000 acre-feet of new reliable municipal water supply annually through a regional project coordinated by the District, which will meet a portion of the Participants' current and reasonably projected future additional water supply needs*."

SDEIS at 1-3.

This "need" is based on estimates of water demand forecasts.

> HE was originally commissioned by the Northern District in June 2004 to evaluate and prepare water demand forecasts for each of the NISP Participants (Participants), along with a discussion of conservation practices employed by these Participants. Separately, the Northern District staff prepared an evaluation of water supplies for each Participant. These two work elements were then combined to assess potential future water shortages relevant to a determination of purpose and need for NISP. This study was provided to the U.S. Army Corps of Engineers for its use in considering NISP purpose and need and in preparing Chapter One of the NISP Environmental Impact Statement (EIS).

"Water Supplies and Demands for Participants in the Northern Integrated Supply Project" (Demand Projection), attached here in Appendix E (E53), at 1.

The Corps' fails, however, to establish that the "water demand forecasts" reflect an actual need. The SDEIS includes no discussion of the implications for the participants of not obtaining sufficient water supplies to meet the demand forecasts. On the contrary, the Corps considers such a scenario unconceivable and offers a purported "No Action Alternative" that undertakes the exact same action as the proposed action alternatives—development of 40,000 acre-feet of new water supply. SDEIS at 2-16.

By assuming that the water demand forecasts will be met one way or another and failing to consider and disclose the impacts of this not happening, the Corps fails to establish a level playing field for review of the action alternatives as required by NEPA and the Clean Water Act. The review in the SDEIS fails to consider and disclose any possible actions that might be undertaken by the participants to meet that shortfall. The Corps has inappropriately constrained the range of alternatives.

The Corps must reconsider its evaluation of the project's purpose and need and must specifically consider and disclose its analysis of the actual need for the participants to meet the estimated water demands forecasts. Such an analysis must independently assess the participants' potential responses to an unmet water demand shortfall and the likelihood that water scarcity, behavioral changes, and market forces would alleviate such a shortfall regardless of the participants' actions.

Unless the Corps can affirmatively establish the compelling need for additional water supplies, the Corps must further consider and disclose a range of alternatives that the participants could undertake in response to water supply shortfalls. Such alternatives might include, but must not be limited to, development regulations and infrastructure improvements, conservation, water use efficiency improvements, traditional agricultural transfers, alternative agricultural transfers, and water reuse.

3. The SDEIS "Regional Project" Screen for Alternative Selection is Arbitrary and Capricious and Improperly Restricts the Range of Alternatives

In the SDEIS, the Corps' continues its use of a "Regional Project" screen to determine the feasibility of alternatives. SDEIS at 2-3. The use of this screen is used to justify the elimination of any alternative that does not comprise a singular effort that meets the demanded firm yield in an integrated fashion. "Evaluation of the 'Healthy Rivers Alternative' Proposed by STP Using the NISP Alternatives Screening

Criteria" (HRA Tech Report), attached here in Appendix E (E31), at 5 ("To advance, alternatives must be able to meet the Participant's water supply need with a regional project, eliminating the need for Participants to pursue separate solutions to meet their individual needs"). The Corps fails to define in clear and unambiguous language what this screening criterion is. *See*, *in general*, SDEIS at Section 1.2.3. The "regional project" criterion is also used by the Corps to justify a "cutoff threshold" screen that eliminates alternatives that fail to provide "30 percent of the firm yield request for concepts and 15 percent of required storage capacity for elements"). HRA Tech Report at 4("Concepts and elements that fall below the cutoff thresholds […] are not considered because, below these levels, the regional nature of the project would be lost and would effectively operate as individual local water supplies"). STP objected to these 30%/15% thresholds in its comments on the DEIS (attached here in Appendix B (B13)) and incorporates those comments by reference, asserting that the thresholds are arbitrary and capricious as the Corps fails to provide meaningful support for their values or applications.

The Corps justifies the "regional project" screen by stating that "[t]he District is a regional water supply entity with responsibilities for water supply planning and management for the region and what it is proposing is a regional water supply project to meet the water supply needs of 15 Participants providing water to an area of about 945 square miles." SDEIS at 2-3. STP does not dispute this characterization of the facts—the applicant is clearly Northern Colorado Water Conservancy District and the project participants are interchangeable components that have, and likely will continue to, change over time. SDEIS at S-1 ("The Town of Berthoud withdrew as a Participant in NISP in April 2008 as the DEIS was being released to the public. Frederick requested the project yield previously allocated to Berthoud"). STP does, however, dispute the conclusion that the Corps draws from this factual situation—that only a singular, large reservoir-based project can fulfill the proponent's need. This assertion is arbitrary and capricious, contrary to fact, and the Corps' must be seen as having improperly restricted the range of alterative available for consideration in the SDEIS.

The Corps can give great weight to the project proponent's request, but the Corps must still exercise independent judgement when crafting the statement of purpose after considering both the proponent's stated need and the public's perspective. The Corps cannot simply adopt the project proponent's purposes and it cannot construct the purpose so narrowly so as to unreasonably limit the range of alternatives available for consideration. Additionally, the Corps cannot assume that common needs require a common solution and must address the merits of differing approaches in the impact analysis rather than preemptively through the alternatives screening. *Colorado Environmental Coalition v.*

Dombeck, 185 F.3d 1162 (10th Cir. 1999), *Simmons v. Corps of Engineers*¸ 120 F.3d 664 (7th Cir. 1997) (the Corps has a "duty under NEPA to exercise a degree of skepticism in dealing with self-serving statements from a prime beneficiary of the project").

The Corps, in deferring to the project proponent's desires, fails to demonstrate why multiple small projects operated or coordinated by the project proponent and serving the participants in a regionally coordinated fashion does not constitute a "regional project." Although a singular project may be simpler for the proponent, that is not a sufficient reason for the Corps to rule out a more diversified approach. The Corps fails to determine if the public good would best be served by the proponent's preferred concept of by a distributed source approach to providing the demanded firm yield. The Corps also fails to provide any support for the particular "cutoff threshold" values (30 percent for concepts and 15 percent for elements) that are used in the screening analysis and fails to disclose how those values were determined.

The Corps must re-consider its alternative screening process by re-applying the "regional project" and cutoff threshold criterion after:

1. Clearly and unambiguously defining its "regional project" criterion;
2. Disclosing the analysis and supporting material for the development of this definition specifically addressing how the individual participants can be served by a variety of approaches;
3. Disclosing how the number and location of participants affects the possible configurations of a "regional project" and how changes in the participant makeup may change those possible configurations prior to, during, and after project implementation; and
4. Disclosing the analysis and supporting material for the development of any threshold values that derive from the "regional project" criterion.

4. The SDEIS 40,000 Acre-foot Screen for Alternative Selection is Arbitrary and Capricious and Improperly Restricts the Range of Alternatives

The SDEIS states that the purpose and need of the proposed project is "[t]o provide the Project Participants with approximately 40,000 acre-feet of new reliable municipal water supply annually[.]" SDEIS at 1-3. The Corps asserts that this "need" is justified by projected population growth in the

participants' service areas. SDEIS at 1-8. The Corps also asserts that "[t]he NISP Participants' water supply needs during the planning period (through 2060) is at least 40,000 acre-feet." SDEIS at 1-15.

The Corps uses these assertions of need to establish a threshold of 40,000 acre-feet under its "Purpose and Need Screening Category" for alternative screening and eliminates potential alternatives that do not provide this amount of firm yield. SDEIS at 2-3. The Corps' only support for this threshold is the statement that it "reviewed these 2011 demand projections in connection with the validity of the need (BBC 2011) and found that 40,000 acre-feet of firm annual yield is still valid for NISP." SDEIS at 2-3.

The Corps utterly fails to support these assertions that 40,000 acre-feet is a valid statement of need for this project. STP disputes the demand analysis that the Corps incorporates into the SDEIS for a number of reasons and asserts that the SDEIS dramatically overstates the need for additional firm yield within the participants' service areas. However, if the Corps insists on using this deeply flawed demand analysis, it must accurately and consistently apply the results.

The Corps' analyses project the "need" that the proponent and participants seek to meet with NISP as 84,000 acre-feet. SDEIS at 1-17. The Corps fails to provide any support for its use of the lesser 40,000 acre-feet figure other than that was the amount that the application requested. SDEIS at Table 1-1. The participants' desire for 40,000 acre-feet is alternately stated as their "firm yield goal" (SDEIS at Table 1-1), a "request" (SDEIS at 1-5), and "a portion of their projected demand" (SDEIS at 1-5).

The Corps can give great weight to the project proponent's request, but the Corps must still exercise independent judgement when crafting the statement of purpose after considering both the proponent's stated need and the public's perspective. The Corps cannot simply adopt the project proponent's purposes and it cannot give construct the purpose so narrowly so as to unreasonably limit the range of alternatives available for consideration. *Colorado Environmental Coalition v. Dombeck*, 185 F.3d 1162 (10th Cir. 1999); *see also Simmons v. Corps of Engineers*¸ 120 F.3d 664 (7th Cir. 1997).

The Corps failed its duties by applying the 40,000 acre-feet figure, a value that was chosen arbitrarily and capriciously from a range of possible values that would have been equally valid in partially meeting what the SDEIS purports to document as the need of the participants. The Corps assertion that "[t]he NISP Participants' water supply needs during the planning period (through 2060) is at least 40,000 AF" (SDEIS at 1-15), could have as easily read "at least 5,000 AF" or "at least 60,000 AF." A review of the analysis in "Review of 2010-2011 NISP Demand Projections from Harvey Economics and

Recommendations for NISP Supplemental EIS" (referenced in the SDEIS as "BBC 2011" and attached here in Appendix E (E30)) as cited at SDEIS 2-3, could have equally found that "20,000 AF of firm annual yield is still valid for NISP" or "1,000 AF of firm yield is still valid for NISP." While, the proponent is free to propose whatever yield they desire, there is absolutely no defensible reason for 40,000 acre-feet to have been considered the appropriate threshold value for the Corps analysis.

If the Corps chooses to adopt a purpose and need that only partially meets its projections of actual need, the Corps must independently and objectively balance the proponent's desires with the public interest. By arbitrarily applying the 40,000 acre-foot figure to the alterative screening process, the Corps has unreasonably eliminated alternatives that may have contributed to meeting the participants' needs in a meaningful fashion. *Natural Resources Defense Council v. Callaway*, 524 F.2d 79, 93 (2d Cir. 1975) ("The EIS must nevertheless consider such alternatives to the proposed action as may partially or completely meet the proposal's goal and it must evaluate their comparative merits"). The Corps developed and applies a "cutoff threshold" screen that eliminates alternatives that fail to provide "30 percent of the firm yield request for concepts and 15 percent of required storage capacity for elements" based on this arbitrary 40,000 acre-foot figure. HRA Tech Report at 4("Concepts and elements that fall below the cutoff thresholds […] are not considered because, below these levels, the regional nature of the project would be lost and would effectively operate as individual local water supplies"). STP disputes these thresholds in principle (*see* Appendix B (B13)) as well as in their application. By using these "cutoffs," the Corps has eliminated alternatives that failed to meet an arbitrary percentage of an arbitrary value.

As the NISP process currently stands, the Corps has failed to provide a meaningful and defensible purpose and need for the proposed project. Until this defect is remedied, the Corps cannot develop a competent range of alternatives for consideration under NEPA or the Clean Water Act.

The Corps must re-consider its development of the project purpose and need statement and the screening analysis that defines the range of alternatives. This reconsideration must:

1. Either consider and disclose a range of firm yields that meet the demand projections developed and endorsed by the Corps or reconsider the demand projections;
2. Disclose the analysis and supporting material for the development of any value or range of values for firm yield that is adopted as the project's purpose and need;

3. Demonstrate that the firm yield value or range of values that the Corps adopts considers the public's perspective and potential benefits and impacts; and,
4. Disclose the analysis and supporting material for the development of any threshold values that are applied under the purpose and need screening category.

If the Corps proceeds with its use of 40,000 acre-feet against these claims, the Corps must quantitatively define what "approximately 40,000 AF" includes. SDEIS at 1-3. The Merriam-Webster Dictionary defines approximately as "nearly correct or exact", and defines "approximate" as "to be very nearly to but not exactly like (something)". It provides no quantitative definition of "approximately". The Corps must provide clear guidance about what it considers as "approximately 40,000 AF" before it applies this as a screening threshold.

5. The SDEIS Improperly Applies Historical Water Use Rates in the Demand Projections

The demand projections developed for the SDEIS, and used to support the project purpose and need, reflect an unsupported assumption that past water use is a valid indication of future use. With two exceptions, the demand projections describe future water use rates based on a fixed rate derived from historical rates. Demand Projection at A-5, B-6, D-6, E-7, F-6, G-6, H-5, I-6, J-6, K-6, L-5, M-7, N-6. In one instance, this is explicitly stated as "[w]ater usage is expected to track population growth." Demand Projection at J-6. One of the exceptions does not clearly state the method by which future water rates were determined. *See* Demand Projection at Appendix C. The other exception uses a split system, one figure based on historical use, the other not, but both are static moving forward. Demand Projection at O-8.

The Corps fails to provide any support for the assumption that average historical rates are appropriate indicators of future use. Rather, the demand projection analysis itself supports an entirely different case by documenting that water use rates change over time and in many of the participants' service areas are generally trending downward. Demand Projection at Exhibit A-3, Exhibit B-4, Exhibit C-3, Exhibit L-3, Exhibit N-3, Exhibit O-4. The six providers reflecting this consistently downward trend represent 15,300 acre-feet (38%) of the "new permitted firm yield from NISP sought by participants." Demand Projection at Table I-1. Another four providers, representing 12,200 acre-feet (30%) of the requested firm yield, have demand curves that peaked earlier in the 2000s and have subsequently declined. For all of these

10 providers, use of historic average water use rate overstates demand for Year 0 of the projection; i.e., the projection fails to accurately capture the starting point of a future demand curve.

The trends of water use change through time and a general decline in water consumption through the 2000s is also demonstrated by the average water use rates for the combined NISP participants. Demand Projection at Table III-1.

Overall, the data documented in the demand projection do not support the use of an historical average rate as a good predictor of future water use rates. The Corps fails to incorporate the principle of decoupling of population growth and water demand that is being witnessed throughout the western United States. *See* "Decoupling water use from growth: the New Mexico example," attached here in Appendix E (E13).The Corps instead dismisses declines in water use as the low-hanging fruit of conservation efforts and assumes, without an analysis or meaningful supporting documentation, that future declines will be more difficult. The extent of the SDEIS discussion of this issue is:

> "[reductions to date] also suggests that additional savings will be more difficult and costly to achieve as described below.
>
> Typically, water providers and their customers are motivated to take the first steps in conservation programs that achieve the largest savings at the least incremental cost. The Participants have reduced use by implementing relatively inexpensive water-saving measures such as public education, watering restrictions, low-flow fixture requirements, and landscaping regulation for new construction (HE 2011)."

SDEIS at 1-11.

The Corps must re-consider its water demand projections and must utilize a demand projection model that incorporates trends and reasonable assumptions about future use. The token conservation scenario, which incorporates a fixed rate decline as a straw man for discussion, does not accurately capture such a demand projection.

6. The SDEIS Fails to Incorporate Current Water Supply Availability into Water Supply Need Projections

The SDEIS projects future water supplies by comparing projected demand with "current" supply. The SDEIS relies on estimates of the participants' water supply holdings in 2010. Demand Projection at 31 ("Additional water needs of the Participants are determined by the difference between their projected future water demands and their firm annual water supplies or yields that were owned or controlled by the Participants in 2010").

By relying on a 2010 water supply accounting, the Corps fails to accurately reflect the current situation in the SDEIS released in 2015. This is dramatically illustrated by the change in water supply held by the participants from 2005 to 2010:

> "The supply evaluation in the [Demand Projection] indicates that NISP participants currently have supplies totaling about 59,400 acre-feet in terms of firm yield. This figure suggests that participants have continued to add to their portfolios of water supplies since the 2005 report, when their collective firm yield was estimated at about 48,000 acre-feet."

Demand Projection Review at 6.

A similar growth in holdings from 2010 to the present would offset the projected "need" for NISP by over 10,000 acre-feet, reducing the "requested firm yield" by at least 25%. Importantly, it would negate the Corps dismissal of the Healthy Rivers Alternative on the grounds that it fell 5,000 acre-feet short of the Corps' arbitrary 40,000 acre-foot screening threshold. SDEIS at 2-9. The Corps fails to properly consider the full range of alternatives due to its use of outdated data for water supply holdings.

The Corps must re-consider its water supply demand projections using the most current data available for the current water supply holdings of participants. The Corps must disclose its rationale for using data more than one year old. The Corps must also re-consider all analyses that were conducted in a manner that was dependent on the results of the water supply need projections, and must disclose and provide for meaningful public review of all revisions of the projections and dependent analyses.

7. The SDEIS Fails to Fully Consider Alternatives Incorporating Traditional Transfer Methods

Colorado has a long and successful history of providing water to growing municipalities by transferring water from farms to cities. This "Traditional Transfer Method" (TTM) is often pejoratively called "buy and dry" as towns and cities buy water from farmers to meet municipal needs. In fact, over the last

decade, water from approximately 400,000 acres of farms has been transferred from farms to cities in Colorado (*see* "Why Colorado's producers must adapt to a more tenuous water supply and how they're making it work," attached here in Appendix E (E58)) – TTMs is often the easiest, fastest, and most practicable method for municipalities to get more water. In northern Colorado over the last 25 years, water from approximately 420,000 acres of farm has been transferred to cities via TTMs. Unpublished public testimony, Weld County Commissioner Sean Conway at Fort Collins City Council meeting, September 1, 2015. Further, the Colorado Water Plan indicates that Colorado farmers will transfer water from 500,000 – 700,000 acres of farms by the year 2050. "Colorado's Water Plan, Second Draft" (July 2015) available at: https://www.colorado.gov/pacific/sites/default/files/FINAL-2ndDraftClean-Appendices-2015%20Revised.pdf and last viewed September 3, 2015, at 208. Moreover, the SDEIS states that communities within the NISP project area are using and will likely continue to use TTMs to get water to meet their needs in the future. SDEIS at 2-11, SDEIS at 5-13.

TTM transfers have occurred over the history of Colorado involving hundreds of thousands of acre feet of water with little or no federal or state environmental-regulatory action required (including under the Clean Water Act) because little or no environmental damage occurs. Moreover, these TTMs occur between a willing buyer and a willing seller, and often the sellers (farmers) reap substantial profits from the business transaction.

If none of the proposed action alternatives are approved in the Record of Decision, then the NISP participants and farmers in northern Colorado are likely to undertake a variety of TTMs to meet all of the NISP participants' water needs including the 40,000 acre feet described in the Purpose and Need in the SDEIS. Such a no action alternative could move forward in multiple ways:

- The NISP participants may work together to develop a "regional project" somewhat like the one described in the SDEIS. The NISP participants cooperatively facilitate business interactions with farmers to buy water and have it transferred into a regional reservoir. STP believes that such a regional project would be most practicable if the water was diverted at the same head gates from which it is diverted now, and that the water must be piped or pumped to the regional reservoir, thus avoiding new environmental damage to the Cache la Poudre River. A regional project using TTMs without changes of diversion points would allow the participants to meet their water supply objectives in a less environmentally damaging fashion than any of the action

alternatives. The Corps' must not permit any of the action alternatives when this approach represents a Least Environmentally Damaging Practicable Alternative (LEDPA) for NISP.

- The NISP participants may also undertake a series of separate projects like those described in the No Action Alternative in the NISP Draft Environmental Impact Statement whereby NISP participants do not engage in a regional project, but rather go it alone or join together with fewer neighboring NISP participants. If this were to occur in a manner similar to that described in the 2008 DEIS "No Action Alternative," STP believes that that water coming from the Cache la Poudre River must be diverted at the same headgate from which it is diverted now, and that water must be piped or pumped to the separate municipalities' (or groups of municipalities') reservoir (or reservoirs), thus avoiding new environmental damage to the Cache la Poudre River. The Corps' must not permit any of the action alternatives when this approach represents a Least Environmentally Damaging Practicable Alternative (LEDPA) for NISP.

8. The SDEIS Fails to Incorporate the Firm Yield from the Windy Gap Firming Project into the Water Supply Need Projections

The SDEIS discloses that five NISP participants are also participants in the Windy Gap Project. SDEIS at 1-16, Table 1-7, 1-18. Firm yield from the Windy Gap project is currently considered to be zero. This is the primary rationale for pursuing the Windy Gap Firming Project, an action that is currently in the permitting process. *See* "Record of Decision Windy Gap Firming Project Final Environmental Impact Statement" (2014), available http://www.usbr.gov/gp/ecao/wgfp_feis/wgfp_rod.pdf and last viewed September 3, 2015, at 6. Although the SDEIS does not explicitly state that the Windy Gap units held by the five NISP participants contribute no water to the estimates of the water supply holdings of these participants, this is a reasonable assumption.

The SDEIS calculates the water supply need projections by comparing the demand projections with current water supply estimates. SDEIS at 1-17. As the water supply estimates are held constant at 2010 levels during modeling, the Corps fails to incorporate the reasonable foreseeable gains in firm yield from the Windy Gap Firming Project into the projections of the water supply need.

STP opposes the Windy Gap Firming Project. That opposition, however, does not excuse the Corps from properly incorporating the impacts of the implementation of Windy Gap Firming Project into its analyses of NISP.

This failure to incorporate water supply gains from the Windy Gap Firming Project into the water supply need projections is inconsistent with how the SDEIS treats the project in its hydrologic modeling. SDEIS at 5-6 ("The CTP modeling of Future Conditions hydrology assumes that the Windy Gap Firming Project (WGFP) is successfully completed, and the projected WGFP yield is factored into the inputs developed for the Greeley System Model for Future Conditions model runs").

The Corps must re-consider its water supply need projections using the anticipated firm yield from the Windy Gap Firming Project, a project that the SDEIS otherwise assumes will be completed. The Corps must disclose its rationale for using any projected firm yields that differ from those disclosed in the "Record of Decision Windy Gap Firming Project Final Environmental Impact Statement" (2014). The Corps must also re-consider all analyses that were conducted dependent on the results of the water supply need projections and disclose and provide for meaningful public of all revisions of the projections and dependent analyses.

9. The SDEIS Fails to Consider Water Pricing in the Demand Analysis

The SDEIS describes water pricing projections based on the estimated costs of each alternative. *See*, *e.g.*, SDEIS at 4-384 – 4-385 (Alternative 1), SDEIS at 4-387 – 4-388 (Alternative 2). These analyses appear to have been conducted after and independently of the demand analyses that inform the proposed project's purpose and need. The SDEIS only discuss water price increases as a function of environmental impacts from the alternatives. *See*, SDEIS at 3-219 – 3-220, *in general*, SDEIS at Section 4.20.

One of the Corps' consultants dismisses—entirely without support—the potential impact of water price increases on water use. Demand Projection at 35 ("Since almost all water costs along the Front Range of Colorado are increasing, it is unlikely that growth or water use will be affected significantly by increases in the cost of water for the Participants"). The SDEIS merely accepts the demand projections generated based on population growth projections and assumed water use. Demand Projection Review at 1 ("HE gathered or developed projections of future demographic growth for each participant, then combined projected growth in population (or accounts) with assumptions regarding water use per resident (or per account) specific to each participant"). The unspecified "Conservation Scenario," presented as a token nod to unconstrained demand, does not quantitatively address water rate structures as tools for reducing demand and there is no documentation that the assumed prices would adequately capture the potential demand reductions from appropriate water rate structures. SDEIS at 1-14. The conservation scenario contemplates "future rate increases" but neither the Corps nor its expert attempt any

quantitative analysis of what those might be. Demand Projection Review at 9. On the contrary, the SDEIS discloses the opposite, demonstrating that water prices are expected to drop below pre-NISP levels by the end of the project. SDEIS at 4-388 ("the average cost of household water service would increase only slightly by 2020, to about $560 per year (4% higher than in 2010) before declining to levels below 2010 in 2030 and 2040").

This failure to consider water rate structures as a demand management tool is contrary to the well-established principle in water planning that municipal water prices directly affect water use. *See*, *e.g.*, "Pricing Structure" Appendix E (E32). The Corps failed to implement this basic principle into its demand forecast models, despite the recommendation of its other consultant, who takes a more informed view of the role of water prices on demand. Demand Projection Review at 9 ("We also believe the EIS should consider the possibility that water requirements per capita among the NISP participants will continue to decline to at least some degree due to […], the likelihood of future rate increases to pay for new water supplies from the proposed NISP project and/or other sources").

The disclosure that the alternatives would result in water price increases coupled with the failure to consider what impact those increases, in addition to other rate structures imposed with the intent of curtailing demand, is a fatal flaw in the Corps' analysis. The Corps must reconsider its demand analysis and incorporate specific, quantitative review of the effects of various pricing structures on projected demand.

10. The SDEIS Confirms the Intention of the Project Proponent to Allow Participants to Sell Their Shares in NISP

In our comment letter on the DEIS (submitted September 12, 2008, and attached here in Appendix B (B13)), STP expressed concerns that the project was structured to allow participants to sell their shares in NISP to other parties. As the SDEIS does not respond to those concerns, we hereby incorporate them into these comments by reference.

11. The SDEIS Inappropriately Constrains the Range of Alternatives by Dropping the Healthy Rivers Alternative from Consideration

STP rejects the Corps' use of a 40,000 acre-foot screening threshold. *See* "The SDEIS 40,000 Acre-foot Screen for Alternative Selection is Arbitrary and Capricious and Improperly Restricts the Range of

Alternatives." STP also rejects the Corps' use of unspecified water sources under the concept of operational flexibility in Alternative 2 to buttress the yield of that alternative when climatic conditions constrain the specified water sources. *See* "The SDEIS Fails to Analyze Any of the Environmental Impacts of the Requested Operational Flexibility." If the Corps' persists in using this threshold and applying unspecified supplemental water sources, it must do so in consistent fashion across all of the alternatives, including the No Action Alternative. Where options exist to approximately meet the desired firm yield (as Alternative 2 does with operational flexibility), the Corps must consider those options with an equivalent flexibility.

The SDEIS acknowledges that Alternative 2 would not meet its firm yield requirements during dry periods, during which project participants would be required to acquire additional water rights to be stored in the proposed Glade reservoir. SDEIS at 2-47. In its comments on the NISP DEIS, STP submitted comments on the historic flow regime and analyzed a reconstructed flow regime based on tree ring records from the Cache la Poudre watershed, and we are providing those comments again here. *See* Appendix B (B13). The tree ring record analysis reveals that it is likely, due to the junior priority of the Grey Mountain right, that there would be multiple several-year periods in the near future during which NISP would fall short of its firm yield water delivery requirements by at least 18,000 acre feet. The project would only be able to deliver less than 25,000 acre feet per year during those dry periods, assuming the senior water rights exchanged in the Galeton water trade would still remain in priority during such extended droughts. A 22,000 acre foot firm yield delivery is definitely not "approximately 40,000 acre feet" of firm yield.

Although the Healthy River Alternative was rejected by the Corps for failing to provide a full 40,000 acre-feet of firm yield (SDEIS at 2-9), the various water supply methods described in the Healthy Rivers Alternative could be flexibly augmented by 5,000 acre feet or more in a relatively straightforward way, including the following:

1) Traditional purchases of water rights stored in existing reservoirs. Where storage may be an issue, numerous alternative storage options have emerged, including groundwater storage and utilizing gravel pits, as described in the STP comments on the NISP DEIS. *See* Appendix B (B13).
2) Purchases of water rights from the Colorado-Big Thompson Project.
3) Increasing the firm yield portion of water yield through alternative agricultural transfers, such as rotational fallowing agreements, interruptible supply agreements, agricultural-municipal water

sharing agreements, water cooperatives, water banks, and Flex markets. These methods are described in the Colorado Water Plan, which cites a need to develop more than 50,000 acre-feet of supply through these methods. *See* "Colorado's Water Plan, Second Draft."

4) Pursuing conservation and water use efficiency more aggressively.
5) Utilizing reverse osmosis like the city of Aurora, CO is doing (as well as many other communities) to augment existing water supplies. Water secured through the South Platte Water Conservation Program or other downstream water rights could be treated through reverse osmosis to augment supplies within the region, as long as the brine waste is disposed of safely and securely. In cases where it can be demonstrated that water reuse will not affect return flows, a water reuse program may be utilized as supply for a reverse osmosis system.

The Corps inappropriately constrained the range of options by dropping the Healthy River Alternatives from further consideration while retaining Alternative 2 (as well as the other action alternatives). There is no support for the assertion that the Healthy Rivers Alternative fails the screening criteria while the others do not.

12. The SDEIS Fails to Consider the Full Range of Water Available for Transfer to Municipal Needs

The municipal and industrial water use policy cap, a policy on water use from the Colorado-Big Thompson system set by the Northern Colorado Water Conservancy District, is capricious and arbitrary and should not have been applied by the Corps to consideration of the Healthy Rivers Alternative. HRA Tech Report at 50-51. The cap is a limit on existing water supplies and storage infrastructure in the Colorado-Big Thompson system that could be utilized to meet current and future water needs. Such a policy unnecessarily limits water supplies that could be legally purchased and dedicated for municipal and industrial water uses like those desired by the NISP subscribers.

13. The SDEIS Fails to Consider a Meaningful Range of Alternatives, Again

The Corps has fundamentally failed its duty to provide the reviewer with a meaningful range of alternatives for consideration. All of the alternatives under consideration, including the No Action Alternative, are comprised of large reservoirs. If the Corps was correct in constructing the purpose and need, which it is assuredly not, the legal standard for "range of alternatives" requires contemplation of something other than minor variations of the preferred alternative. STP objects to this violation of the

intent of NEPA (40 C.F.R. 1500) and outlines specific issues with the Corps process that lead to this outcome throughout this document.

14. The SDEIS Fails to Establish the Reasonableness and Feasibility of the No Action Alternative

NEPA requires a No Action Alternative, a status quo scenario indicating what would happen if the permit was denied that functions as an environmental baseline facilitating a meaningful evaluation of project impacts. *Half Moon Bay Fisherman's Marketing Association v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988). The No Action Alternative must incorporate actions if they are "predictable" results of the permit denial. "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," Question 3, 46 Fed. Reg. 18,026, 18,027 (March 23, 1981). The development of a No Action Alternative should be a straightforward process that requires an understanding of current conditions.

The SDEIS and supporting documents disclose that the Corps undertook an elaborate process, driven by the project participants, to identify a No Action Alternative for NISP. SDEIS at 2-16, 2-19; "Northern Integrated Supply Project No Action Alternative Evaluation" (NAA Evaluation) attached here as Appendix E (E52) *generally*. The Corps sought to determine what the participants would do in lieu of NISP; unfortunately, they instead determined what the participants would like to do. The Corps utterly fails to establish that the No Action Alternative has described represent either a reasonable or feasible outcome of the denial of the NISP application, relying on speculative planning rather than an analysis of predictable actions..

The Corps contracted a process to develop the No Action Alternative that was similar to that undertaken during action alternative development. The result is similarly indistinguishable from an action item and only differs from the NISP by its purported lack of need for a Corps permit. The Cactus Hill Reservoir is a component of both the No Action Alternative and the no-Glade Reservoir action alternatives (Alternatives 3 and 4). SDEIS at Table 2-3. The Corps failed to independently develop the No Action Alternative and instead accepted what the participants proposed. SDEIS at 2-19. Consequently, the design of the project and the underlying assumptions reflect the participants' preferences and assertions rather than a rigorous review.

Key among these assumptions is the belief that the 15 participants would undertake a "regional project" meeting all of their needs concurrently. SDEIS at 2-16. Although the SDEIS provides justification for this

choice of approach, the Corps and its consultant fail to provide any indication of its reasonableness. NAA Evaluation at 7 – 9. That is, although the "regional project" approach might be desirable (it is clear that the participants have "expressed interest" in such a project and might even take the first steps "pursue" one), there is no support for the concept that the assertion that might actually be possible. The consultant report states that the region has "a history of successfully developing regional projects" but of the seven examples that it cites, five are Northern Colorado Water Conservancy District projects (including NISP which has yet to be *See*n as successfully developed) and the other two, both filter plants, are operated by two and three entities respectively—exactly the small scale project that this No Action Alternative proposes to avoid. NAA Evaluation at 7. There is no evidence of a project on anywhere the scale and complexity of this one being undertaken without a central managing entity.

A basic tenant of NEPA is that an alternative must be non-speculative if it is to be considered reasonable. *Utahns for Better Transportation v. U.S. Department of Transportation*, 305 F.3d 1152, 1172 (10th Cir. 2002). Despite the elaborate alternative development process, the SDEIS discloses that the Corps actually has no idea what the participants might do in lieu of NISP.

> "In the absence of NISP, the independent Participants must meet their future water demands and it is not possible to predict with certainty the actual future response of the Participants."

SDEIS at 2-19.

Further, the SDEIS discloses that there is little certainty that the No Action Alternative could be implemented if the action items are all denied.

> "It is not known with certainty if the Participants could acquire adequate agricultural water rights to meet a firm yield of future demands.

SDEIS at 2-19.

The SDEIS fails to document any ditch share acquisitions within even two orders of magnitude of that required to execute the No Action Alternative.

> "It should be noted that the cost information presented in this discussion is primarily for transactions of small amounts of water. The highest transaction amount found was for slightly more than 200 acre-feet of water."

NAA Evaluation at C2.

The SDEIS states that even if water were available to the participants, they would still face challenging and lengthy water court proceedings to acquire the change of diversions that are critical for the No Action Alternative as proposed. SDEIS at 3-26.

The SDEIS discloses that the proposed No Action Alternative would impact extensive wetlands. SDEIS at 4-217. Under the Corps regulations, the No Action Alternative occurs when the permit is denied and does not include activity which would require a Corps permit. The Corps fails to establish that the wetlands impacted by this alternative are non-jurisdictional.

The SDEIS fails to disclose that Cactus Hill Reservoir, an integral component of the No Action Alternative as well as Alternatives 3 and 4, is adjacent and down-gradient of a proposed uranium mine, the Centennial Uranium Project. *See* "Centennial Uranium Project," attached here in Appendix E (E07). Although progress on the mine has been limited over the last few years, the mine's proponents indicate that they intend on pursuing the project. Appendix E (E07) ("The Company has engaged an independent mining consultant to prepare development scenarios for the Centennial Uranium Project in order to maximize the value that can be extracted from this project").

Much of the complexity and environmental impact associated with the proposed No Action Alternative is associated with the desired approach of making the alternative a "regional project" that provides the same firm yield that is desired from the action alternatives. The Corps has improperly incorporated these assumptions as guiding principles in its acceptance of the proposed alternative. NEPA does not require that the No Action Alternative meet the stated purpose and need of the project and the Corps must reject these criteria as they reflect a desired outcome of the project participants rather than an objective assessment of the likely outcome of permit denial. *See* 40 C.F.R. 1502.14(d) (requiring a no action alternative but not indicating that it must meet the project's purpose and need). It is natural that the participants would want to get what they sought in the permit application but there is no assumed right that they will do so granted merely by proposing a large project.

The Corps fails to establish with any certainty that the No Action Alternative, if it were indeed pursued by the participants, could be implemented successfully. By proposing such a likely infeasible scenario as the No Action Alternative, the Corps has failed to meet the intent of NEPA to establish a meaningful

baseline for comparison with the action alternatives. It appears to be at best a "straw man" worse-case scenario set up to make the action alternatives look better when analyzed in the SDEIS.

The Corps must re-consider its development of the No Action Alternative. The Corps must undertake an independent process that objectively identifies what is likely to actually happen rather than what the participants would desire to happen. To do so, the Corps must consider existing practice and trends in water acquisition, and develop a scenario that is both likely and feasible. If the Corps retains the current No Action Alternative, it must refine the alternative by eliminating the proposed changes of diversion points. SDEIS at 2-21. The proposed diversion changes contribute significantly to the environmental impact and infeasibility of the alternative but are not essential to its function (the water could be piped from its current diversion points to the regional facilities). The Corps must establish that any wetlands potentially impacted by the alternative are either not jurisdictional or are otherwise exempt from a Corps permit; failing this, the Corps must reconsider the project to eliminate destruction of the identified wetlands. The Corps must also consider the potential impacts on the Cactus Hill reservoir and its stored water and operations from the proposed Centennial Uranium Project, as well as the impacts of the reservoir on the mine. The Corps must also consider No Action Alternative options that do not take the "regional project" approach and do not provide the desired firm yield but still partially meet the needs of the participants.

Critically, the project proponent itself has called into question the practicability of the Cactus Hill Reservoir that is the critical component of this alternative, allowing it to function as a "regional project." SDEIS at Table 2-3, 2-19.

> "While Cactus Hill was proposed as an alternative, additional studies through the EIS process have lead Northern Water to have serious concerns about the practicability of a Cactus Hill alternative[.]"

"Northern Water Response to City of Fort Collins Staff Comments," attached here in Appendix E (E20).

The SDEIS fails to disclose these concerns and offers the reservoir as a viable option. If Cactus Hill is not a practicable action, the Corps must withdraw it from consideration and reconsider the No Action Alternative as wells as Alternatives 3 and 4. If Alternative 2, the preferred alternative, is the only "practicable" alternative considered under the SDEIS, the Corps has failed at even the most basic duties under NEPA and the CWA.

15. The SDEIS Alternative 2 is Speculative as it Fails to Meet the Stated 40,000 Acre-foot Firm Yield Threshold

The SDEIS acknowledges that the water rights associated with NISP are insufficient to fill Glade and Galeton Reservoirs and to keep them operational under all foreseeable conditions:

> "Modeling indicates that there can be several years in a row of divertible flow followed by **as many as 8 years with no flow available**. Therefore, it is possible that divertible flows from the Poudre River may not be available under the Grey Mountain water right to fill Glade Reservoir at the start of NISP."

SDEIS at 2-47, emphasis added.

> "**The alternatives are not sized to meet full firm yield requirements during more severe droughts**, such as the recent drought of the early- through mid-2000s. For example, the most recent drought (2000–2005) was more severe than those experienced earlier in the modeled period. Based on model results, in severe droughts such as that of the early 2000s, it is anticipated that the NISP Participants—either as a group or individually—may pursue water supplies through any available options declared legal by the state."

SDEIS at 2-48, emphasis added.

The draft operations plan is equally explicit:

> "The project is not sized, however, to meet full firm yield requirements during more severe droughts such as the recent drought of the early- through mid-2000s. **The Grey Mountain water rights on the Poudre River would have very rarely been in priority during the early- to mid-2000s**. Moreover, the historically more frequent SPWCP water rights on the South Platte River would have been in priority much less than typical during the recent drought period (IY 2000-2005) and would therefore have yielded much less water during the drought compared to the long-term average (IY 1950-2005)."

"Final Draft Report, Northern Integrated Supply Project Supplemental Draft Environmental Impact Statement Operations Plan Report" (Operations Plan Report), attached here in Appendix E (E56) at 7-2.

> "In [drought events such as those experienced in the 2000s which are likely to become more common with climate change] it is expected that NISP Participants would still require water supplies, even while curtailing their demands through aggressive drought-response measures. Additionally, because of the conservative nature of municipal water supply planning, it is unlikely that Participants would be willing to fully draw down their supply in Glade Reservoir or Cactus Hill Reservoir on the hope that supplies would be available the following year. This type of response to drought would be similar to actual operations of other major municipal water supply systems along the Front Range during the early 2000s drought"

Operations Plan Report at 7-3.

The SDEIS makes it clear that the proponent and the Corps have failed to successfully identify the necessary water sources to successfully implement NISP. Consequently, the SDEIS asks for "operational flexibility" for the initial fill and for anytime during droughts to operate NISP. That SDEIS states that operational flexibility is needed to allow the participants:

> "The ability to use sources of water other than the Grey Mountain water right—such as the Participants' own C-BT water—for the initial fill of the Glade Reservoir.
>
> - The ability to use out-of-priority storage to fill Galeton Reservoir when situations allow.
> - The ability to enter into dry-year leasing or interruptible supply contracts with agricultural irrigation users to meet project water needs during droughts similar to that which occurred in the early 2000s.
> - In addition to these three operational scenarios, which are discussed in the following sections, NISP Participants would have the ability to buy and sell their portion of NISP yield by contract."

SDEIS at 2-46 – 2-48.

Although the SDEIS for NISP proposes to use participants' already diverted Colorado-Big Thompson water and other sources for the initial fill and for anytime during droughts when operational flexibility is needed to store or deliver water for NISP, the Corps provides no explanation of how this would occur. Given the reasonable assumption that the participants are already using this Colorado-Big Thompson water—if they have surplus water then there is no need for NISP—this C-BT water is not actually

available. Further, in a drought, we would assume that there is no or little surplus C-BT water available from other sources to be purchased for NISP.

Operational flexibility is also invoked to allow the participants to acquire all water sources they can, even those that were previously eliminated from consideration as alternatives to meet the needs that NISP is designed to salve:

> "Dry-year leasing and water banking were previously evaluated as water supply concepts for NISP (HDR 2007, Appendix R and Appendix S), but the concepts were both eliminated because they did not meet the firm yield screening criterion defined for the EIS alternatives evaluation. However, in severe droughts such as that of the early 2000s, it is anticipated that the NISP Participants—either as a group or individually—may pursue water supplies through any available options declared legal by the state."

Operations Plan Report at 7-3.

The SDEIS fails to explain how Alternative 2, which by the Corps' own analysis will be unable to achieve full operations with its designated water sources, fulfills the alternative screening threshold that requires each alternative to provide 40,000 acre-feet of annual firm yield. STP disputes the validity of this threshold, but if the Corps insists on applying it, the Corps must do so consistently and competently. The SDEIS also fails to explain why other alternatives that failed the firm yield threshold, such as the Healthy Rivers Alternative, were not modified to invoke operational flexibility in terms of speculative additional water acquisition to pass the screen. Finally, the SDEIS fails to establish that the participants have any surplus Colorado-Big Thompson water or other sources of available water to use for "operational flexibility."

The SDEIS, in the mitigation plan, discloses that there is a risk that oil and gas development at the Galeton Reservoir site could lead to contamination of reservoir water. SDEIS Appendix F at 56 ("Develop protocols that would be followed in the event that a leaking oil and gas well is discovered after reservoir filling"). Such contamination potential is also addressed in STP's comments on the Galeton Reservoir site oil and gas wells. The SDEIS fails to consider how such contamination would impact the overall project's ability, as implemented through Alternative 2, to provide the designated firm yield. The SDEIS also fails to consider how the costs associated with the removal of oil and gas wells and acquisition of mineral

rights impacts the feasibility of the development of Galeton Reservoir. *See "*The SDEIS Fails to Adequately Consider the Impacts of Oil and Gas Wells at Galeton Reservoir Site."

The Corps also fails to consider and disclose how the inability of the project proponent to successfully execute the proposed water exchanges required for the SPWCP could impact the ability of all of the action alternatives, including Alternative 2, to provide the desired 40,000 acre-feet of firm yield. The loss of the water to be obtained through the SPWCP would undermine the feasibility of all of the action alternatives. The Corps must independently establish and disclose the likelihood of the success of these water exchanges before it can consider the ability of the action alternatives to meet the 40,000 acre-foot threshold.

The Corps must disclose the specific water sources that will be used by the project proponent under the concept of "operational flexibility," including for initial infill and ongoing operations, and must independently consider and disclose all environmental impacts associated with use of those water sources, including but not limited to any sources from Colorado's west slope such as tributaries to the Colorado River. The Corps must specifically address the feasibility of the acquisition of water from each source, considering cost, logistics, impacts, and legal availability. The Corps must also specifically consider the time frame for acquisition and implementation of those water sources, including, but not limited to, the burden of seeking approval for water right changes through water court. STP has previously submitted comments on this subject and attaches and incorporates those comments here as "Analysis needed in the SDEIS, the WGFP FEIS, and the Moffat Collection System Project FEIS of impacts of the Northern Integrated Supply Project on the Upper Colorado River, including cumulative impacts" (letter from Gary Wockner to Chandler Peter, April 10, 2011), attached here in Appendix E (E33).

16. The SDEIS Alternative 2 is Speculative as There is No Reliably Available Undiverted Water in the Cache la Poudre

In an over-appropriated system like the Poudre (SDEIS at 3-28, average annual diversions are 101% of the flow measured at the canyon mouth), the possession of a water right is less important than the presence of physical water – the paper right is only meaningful if the water is actually there. Agricultural water rights along the Poudre are very senior while the conditional Grey Mountain right is very junior. "Water Administration in the Cache la Poudre River Basin Technical Memorandum" (SDEIS technical report) at 6. As described above, the SDEIS demonstrates that the junior priority of the conditional Grey Mountain right coupled with the small amounts of actually available "new water" in the Cache la Poudre

leave the project participants at significant risk of falling short of their alleged water supply needs. Similarly, the proposed No Action Alternative (Alternative 1) is described as including a new junior right that would yield 750 acre-feet—but only in the two wettest year in the historical record. SDEIS at 2-22. Presumably, the project participants would utilize new diversions to the full extent possible and we can only assume, as the SDEIS provides no proof to the opposite, that this poor yield represents the state of available water in the Poudre.

It is clear from the SDEIS' own analysis that new diversions from the Poudre, conducted under junior water rights, are incapable of supplying a meaningful amount of firm yield to address the proponent's stated needs. In order for a water provider to generate true firm yield, the provider must seek out water sources that can deliver reliable water under all climatic conditions. In an over-appropriated basin like the Cache la Poudre basin, water providers should be focusing on established senior rights, not conditional junior.

The SDEIS fails to address this reality or to adequately weight the consistency of water sources when evaluating each alternatives "firm yield." STP rejects the Corps use of a 40,000 acre-feet threshold for alterative selection, but if the Corps is going to apply such a screen, the Corps must revisit its process and eliminate components of alternatives, such as those of the action alternatives, that rely on new diversions from the Poudre and consequently do not contribute a significant portion of this firm yield threshold.

17. The SDEIS Alternative 2 Is Speculative As It Relies on Water Exchanges That May Not Be Feasible

All of the action alternatives, including Alternative 2, rely on the South Platte Water Conservation Project (SPWCP) for a significant portion of their water supply through exchanges with irrigation companies that require substitution of newly diverted South Platte water for the companies' existing Cache la Poudre diversions. SDEIS at 2-31. The SDEIS states that the South Platte diversions would provide an average of 28,400 acre-feet and a maximum of 63,500 acre-feet annually to NISP, while the Poudre River diversions under Alternative 2, for example, are stated as an average of 35,100 acre-feet and a maximum of 92,300 acre-feet annually. SDEIS at 2-31, Operations Plan Report at Table 3.1.

Unfortunately, the SDEIS fails to establish that these water exchanges are practicable. Although the Corps asserts that the water sources have been acquired (SDEIS at 2-48, "The District owns the water

rights with the necessary points of diversion and storage for Alternative 2") this assertion fails to recognize that the proposed actions are not fully under the control of the project proponent and that the South Platte water controlled under those rights will not be directly conveyed to the participants:

> "**The District is presently negotiating** with the Larimer-Weld and New Cache Canal companies regarding the compensatory measures that the ditch companies may require for allowing NISP to exchange on irrigation water delivered by the ditch companies. **These measures would address concerns expressed in discussions with the ditch companies related to the requested change in their historical ditch operations and their perceived receipt of lesser quality water**. **The specific measures** to be provided under agreements reached by Northern Water and the ditch companies **may include a range of options**, such as monetary compensation and/or the District providing the ditch companies water and storage from NISP or another facility. The **Corps will analyze effects associated with these measures and determine whether additional NEPA evaluation is needed**."

SDEIS at 2-36, emphasis added.

Although the Corps discloses that an agreement with the irrigation companies is still pending, it fails to provide any details on those negotiations or acknowledge or consider the implications to the action alternatives if these negotiations were to fail and the exchange water for SPWCP were to not be available. The irrigation companies clearly have concerns about the quality of the water that would be available to them and consequently that water may not be acceptable regardless of the conditions proposed. SDEIS at 4-150 ("Elevated salinity and selenium concentrations in Galeton Reservoir releases to the canals are expected to result in a decrease in crop yields where the water is used for irrigation"). As the Corps has failed to fully disclose the risks of oil and gas contamination to Galeton Reservoir water (*see* "The SDEIS Fails to Adequately Consider the Impacts of Oil and Gas Wells at Galeton Reservoir Site"), the irrigation companies may not have a full understanding of consequences they may face from the exchange. Further, if the companies are the willing to accept the water, they may require conditions, monetary or otherwise, that either undermine the functionality of NISP or pose too great of a burden on the project proponent. As the Corps fails to disclose more than superficial information regarding the negotiations, however, the public is unable to provide meaningful review of the likelihood of the exchanges or the dependent alternatives.

NEPA requires that alternatives be feasible and not be speculative. *Utahns for Better Transportation v. U.S. Departent of Transportation*, 305 F.3d 1152, 1172 (10th Cir. 2002). Without the SPWCP water, none of the action alternatives, including Alternative 2, can acquire more than half of its intended water and cannot be seen as feasible. The Corps must independently establish and disclose, rather than accept on faith, the likelihood of the project proponent's success in establishing and maintaining the needed water exchanges. The Corps must ensure that the irrigation companies are fully informed of the risks Galeton Reservoir water from potential oil and gas contamination. If the exchanges cannot be reasonably assured, the Corps must reject further consideration of these alternatives. The Corps must also consider the likelihood of, and independently review the environmental impacts of, the refusal of the irrigation companies to accept the water exchange and the subsequent possibility that the project proponent would outright purchase the water.

Further, the Corps must not pass off review of the environmental impacts of the "range of options" that may be imposed by the irrigation companies to an unspecified future date and review process while continuing with the review of the action alternatives. These conditions may have significant impact on the environment and the feasibility of the alternative. If the Corps does not have sufficient information to competently evaluate these alternatives, it must halt the review process pending availability of that information.

The SDEIS acknowledges that there is a risk to the ongoing implementation of the water exchanges from the anticipated conversion of agricultural water rights to municipal use. SDEIS at 2-38 ("The District assessed the risk of the purchase of shares in the two ditch companies by others and the subsequent conversion of agricultural water to municipal use"). The Corps fails, however, to disclose the extent of that risk. The SDEIS cites a document ("Brouwer, C. 2013[,] Risk Associated with the South Platte Water Conservation Project Exchange[,] Submitted to U.S. Army Corps of Engineers[,] January 10") as a source for that risk assessment but that document does not appear to have been made available with the SDEIS. The Corps instead states that "[a] variety of techniques are available to ensure long-term reliability of exchange operations[.]" SDEIS at 2-38. This list appears to outline potential mitigation concepts rather than describe specific implementation techniques and fails to disclose which, if any, of these are to be incorporated into the action items and what the outcome of such incorporation would be.

The Corps must analyze and disclose the risks to the proposed water exchanges posed by sales of shares of the irrigation companies to non-agricultural uses. Such an analysis must include both the likelihood and the magnitude of the impacts of such sales, and must independently establish the likelihood of the long-term success of the exchanges. If the "variety of techniques" identified above are to be incorporated into the action alternatives, the Corps must describe them in adequate detail for the public to provide meaningful review and must consider and disclose their impacts on the feasibility of the action alternatives.

18. The SDEIS Alternative 2 is Speculative as It Relies on Galeton Reservoir Which May Not Be Filled Legally

All of the action alternatives, including Alternative 2, rely on the SPWCP for a significant portion of their water supply through exchanges with irrigation companies that require substitution of newly diverted South Platte water for the companies' existing Cache la Poudre diversions. SDEIS at 2-31. The South Platte water required for these exchanges would be stored in the proposed Galeton Reservoir. SDEIS at 2-31, 2-34.

The SDEIS states that it is likely that Galeton Reservoir will violate state water quality standards as soon as it is filled. SDEIS at 101, 102 ("Galeton Reservoir may need to be listed on the State's 303(d) List and/or the Monitoring and Evaluation List for some of the constituents listed above (*e.g.*, nutrients, chlorophyll a, and pH), due to anticipated high concentrations"). The SDEIS attributes this poor water quality to the composition of the source water from the South Platte River and the reservoir itself. SDEIS at 4-101. The Conceptual Mitigation Plan fails to present any concrete mechanism to avoid these exceedances. *See*, *in general*, SDEIS Appendix F.

The Corps' guidelines prohibit a discharge that causes or contributes to violations of any state water quality standards. *See* 40 C.F.R. 230.10(b)(1). The Corps cannot permit the construction and operation of Galeton Reservoir unless specific measures to avoid these exceedances are identified and mandated. The Corps must independently consider and disclose the feasibility of such measures and, if the exceedances cannot be successfully avoided, the Corps must strike the implementation of Galeton Reservoir from the action alternatives including Alternative 2.

19. The SDEIS Fails to Analyze Any of the Environmental Impacts of the Requested Operational Flexibility

The SDEIS acknowledges that the designated water sources are likely insufficient to meet the desired firm yield and invokes the concept of "operational flexibility" to disclose that the participants intend on using any water they can get their hands on to operate NISP. Unlike the DEIS, the SDEIS no longer explicitly proposes to use new Windy Gap, Laramie River, or Grand River Ditch water for the initial fill of Glade or Galeton, or for operational flexibility. However:

- Colorado-Big Thompson water is Colorado River water.
- The additional agricultural water that the SDEIS proposes to use for the initial fill or during drought could be from any source including Colorado River water that already is diverted through the C-BT, Windy Gap, Laramie River, or Grand River Ditch system.

The SDEIS for NISP proposes to use participants' "surplus water" or to buy or lease water from farmers for the initial fill and for anytime during droughts when operation flexibility is needed to store or deliver water for NISP.

In its discussion of operational flexibility, the SDEIS explicitly acknowledges that, "[t]his type of temporary alternate source of water supply is not captured in the modeling for the SDEIS but would be operated in compliance with all state regulations in order to prevent injury to other water users." Operations Plan Report at 7-4.

The SDEIS fails to analyze the impact on participants' existing water supplies of using this Colorado-Big Thompson water or how any Colorado-Big Thompson water would be available for the initial fill or ongoing operation flexibility of NISP especially during droughts.

The SDEIS fails to analyze the environmental and socio-economic impacts to farms of buying and leasing water for the initial fill or for ongoing operational flexibility for NISP, which could be in the tens-of-thousands of acre feet per year during the initial fill, during droughts, or at any other time NISP needed water. The SDEIS fails to analyze the environmental or socio-economic on farms of using "out of priority" storage to fill Galeton Reservoir. The SDEIS also fails to analyze the environmental impacts to the South Platte River of using "out of priority" storage to fill Galeton Reservoir.

The SDEIS fails to offer or discuss the source of this water, the diversion point, or amount, and thus fails to analyze the environmental or economic impacts of diverting this water from any river, including the Cache la Poudre River when, for example, the diversion point or amount is upstream of a current diversion point, which would likely be necessary to fill or operate Glade Reservoir.

In summary, the SDEIS discloses that NISP may utilize entirely different water sources than are described in the alternatives discussion in the document but utterly fails to analyze any of the impacts associated with the use of those sources. It is difficult to conceive of a more naked disregard of the requirements of NEPA or of the Corps' duty to the public in the environmental process review.

The Corps must re-consider and disclose its environmental impact analysis of Alternative 2 including the impacts associated with differing water sources that may be incorporated under the concept of operational flexibility as described here. The Corps must specifically include analysis of wetlands dry up that may result from diversion of water sources. If water sources under consideration are located or impact resources outside of the NISP study area, the Corps must revise the study area to fully cover the associated impacts.

20. The SDEIS Improperly Considers the Proposed Augmentation Flows under Alternative 2

The SDEIS describes winter "augmentation flows" as a component of Alternative 2. SDEIS at 2-42. The SDEIS also presents these augmentation flows as a key part of the Conceptual Mitigation Plan. SDEIS Appendix F at 37-42. This duplication allows the Corps to in effect double count the benefits of the augmentation flows. The SDEIS cites several occasions where these augmentation flows have a direct effect on the impact analysis. *See*, *e.g.*, SDEIS at 4-55 ("With the proposed flow augmentation program in place under Alternative 2, flows would improve to greater than 10 cfs about 93% of the time"). As the SDEIS is written, the Corps has failed in its duty to clearly describe the impacts and potential mitigation of the project. The Corps must determine if the augmentation flows are a component of Alternative 2 or mitigation for Alternative 2 and correct its documentation to reflect this decision.

While the concept of increasing flows during the winter is admirable, Alternative 2 proposes to accomplish this with water diverted during the peak flow periods. STP maintains that the peak flows are critical to river health. STP would like to see flow improvements in the winter months but not at the cost of the peak flows.

These voluntary releases from Glade Reservoir do not contribute to meeting the project's purpose and need. The flows are intended "to improve Poudre River streamflows, primarily during winter months when flows are low and NISP would generally not be diverting, in Alternative 2." SDEIS at 2-42. The purpose and need of NISP is to provide "new reliable municipal water supply" to the project participants. If the Corps determines that the augmentation flows are a component of Alternative 2, the Corps must disclose the rationale for including the augmentation flows into Alterative 2 and how they are relevant to the project's purpose and need.

The augmentation flows do not appear to avoid, minimize, rectify, or reduce the impacts of Alternative 2. 40 C.F.R. 1508.20. On the contrary, it is reasonable to assume that the augmentation flows will increase the impacts of the project by increasing the amount of water diverted during peak flow periods. The SDEIS indicates that the 3,600 acre-feet pool to be designated in Glade Reservoir for these flows were not incorporated in the demand modeling (Draft Operations Plan at 1-1) but the Corps does not indicate if the diversions to fill this pool were considered in the impact analysis in any form. Although the project proponent proposes that these augmentation flows would be "recaptured and reused," the Corps fails to disclose if that reuse, and an effective double counting of the available water, was incorporated into the impact analysis. Draft Operations Plan at 1-1. Further, reuse of the augmentation flow water is not supported in the SDEIS as a necessarily feasible action. *See*, *e.g.*, SDIES at 4-17 ("The exact method to return the water to Glade Reservoir will be determined between the SDEIS and the FEIS, but possible options include water exchanges").

The SDEIS states that the augmentation flows will not be maintained under all climatic conditions. SDEIS at 2-44, 4-17 ("Curtailment of streamflow augmentation releases may be required under extreme drought conditions when reservoir levels are low"). The SDEIS fails to disclose if that restriction is based on a lack of any active water storage within Glade Reservoir, the inability of Glade Reservoir storage to provide firm yield for project participants, or some other criteria. The Corps also fails to explain why the augmentation flow releases would have a lower priority than water supply provision, if that is the case, given that these flows are intended as mitigation for ongoing impacts. *See* SDEIS at 2-44. The Corps must quantitatively define the conditions (*e.g.* "extreme drought") under which mitigation requirements could not be met.

If the Corps determines that the augmentation flows are mitigation, the Corps must consider and disclose how the augmentation flows provide mitigation under NEPA and/or CWA. This analysis must

specify which impacts will be mitigated and the extent to which these flows will effectively mitigate those impacts. The analysis must also disclose the effect of the proposed mitigation if the augmentation flows are reduced or eliminated in unfavorable climatic conditions, and what the criteria for such reductions and/or eliminations would be. If the Corps determines that the augmentation flows are compensatory mitigation, the Corps must prepare and disclose an analysis documenting how the benefit of the augmentation flows outweigh the impacts that they cause.

The Corps must conduct an independent analysis of the project proponent's claims as to the legality and feasibility of the augmentation flows raised by the City of Fort Collins.

21. The SDEIS Fails to Adequately Consider the Difficulty of Arranging the Needed Water Exchanges

The viability of transferring 20kaf+ from Weld County up to a diversion point at the canyon remains in question, considering the extremely complicated legal process and the cost. In order to make this trade, the diversion point for more than 20,000 acre feet of water currently diverted at the Larimer Weld and New Cache canals would have be moved upstream to the Glade Reservoir diversion point at the canyon mouth. Such large water diversion point changes are rare, and they can take more than a decade to work through water court, if ever. It is unusual for trades like this to be executed without executing additional water exchanges with other water providers. STP questions whether this water trade can be executed efficiently or cost-effectively.

No public records appear to be available indicating that the project applicant has secured agreements with the affected ditch companies to support the proposed water transfers.

22. The SDEIS Fails to Establish the Feasibility of Siting Glade Reservoir upon Karst Formations

In a December 7, 2012, letter to the Corps, STP called the presence of Karst formations at the Glade Reservoir site to the attention of the Corps and requested that the Corps assess the hazards associated with the karst and the potential impacts of this situation on the cost of implementing Alternative 2. "Potential soil subsidence hazard at or near the proposed NISP Glade Reservoir dam site" (letter from John Bartholow and Gary Wockner to Chandler Peter, November 7, 2012), attached here in Appenidx E

(E34). The Corps failed to adequately address this issue in the SDEIS, merely noting the presence of the karst soils and deferring analysis of the implications to a later date.

> "The potential for karst features (solution cavities) in the Lower Ingleside Formation, which has been mapped in the lower right abutment area of the proposed Glade Reservoir Dam, **would be evaluated by future geotechnical studies** for the reservoir. Mitigation of solution cavities would be addressed in the final design, including a grouting program and other foundation treatment precautions."

SDEIS at 4-189, emphasis added.

The Corps must complete its analysis of the situation, including the implications for reservoir design and operations and project cost, before it can determine the feasibility of Glade Reservoir and Alternative 2. The Corps must disclose this information to the public in a manner that will allow for meaningful public review.

23. The SDEIS Fails to Consider the Impacts of the Pipeline Serving Eaton, Severance, and Windsor

The SDEIS states that water provided to Eaton, Severance, and Windsor "would be [delivered] by direct pipeline connection from Glade Reservoir to the Soldier Canyon Filter Plant" under Alternative 2. SDEIS at 2-42. The Corps, however, fails to provide any information on that pipeline, including alignment, size, cost, and environmental impacts. *See*, *e.g.*, SDEIS at Table 2-4 (listing zero miles of pipeline for conveying treated or untreated water to participants under Alternative 2). The Corps must describe the pipeline and independently consider and disclose the environmental impacts of its construction and operation if Alternative 2 is to be considered for permitting.

24. The SDEIS Fails to Take a "Hard Look" at the Impacts of Meeting the Project Participants' Full Needs

STP disputes the project purpose and need as identified in the SDEIS. However, if the Corps adopts their erroneous calculations of need, the Corps must incorporate that information into its review of the environmental impact of NISP. Specifically, the Corps must fully consider the projected needs in its cumulative impact analysis.

The Corps considers as Reasonably Foreseeable Future Actions those that would occur by 2050 and:

- The action would occur within the same geographic area where effects from the NISP alternatives are expected to occur (the cumulative effects study area is shown in Figure 5-1, and includes the District boundaries, outside of which, impacts from NISP are not expected to occur).
- The action would affect the same environmental resources as the NISP alternatives, and measurably contribute to the total resource impact.
- There is reasonable certainty as to the likelihood of the future action occurring; the future action is not speculative.
- There is sufficient information available to define the future action and conduct a meaningful analysis.

SDEIS at 5-2 – 5-3.

Clearly, future water supply development will meet the first two criteria. If the Corps is confident enough in its erroneous demand calculations to use them to inform the project's purpose and need, then the Corps must have "reasonable certainty" that the participants will undertake means to get their desired water. And, although it is difficult to know the exact source of water that will be used, the SDEIS establishes that there is no water available for new diversions from the Cache la Poudre.

The SDEIS documents demand curves showing that NISP will not curtail future demand. Compare Figure 1-3 and Figure 1-4 (Figure 1-4 illustrates NISP water online but not altering the demand curve); SDEIS 2-46 ("even conservation, which significantly reduces the demand curve should only be seen as delaying not avoiding demand"). The SDEIS is clear that the project proponent and participants will pursue all water legally available when they perceive a need. SDEIS at 2-48 ("in severe droughts such as that of the early 2000s, it is anticipated that the NISP Participants—either as a group or individually—may pursue water supplies through any available options declared legal by the state"). The SDEIS also explicitly states that participants continue and may continue to acquire agricultural water independent of NISP. SDEIS at 2-10, 2-11.

Consequently, the Corps must acknowledge that even if NISP is built participants will meet their water supply desires by acquiring agricultural water rights. The Corps must, for all action alternatives and the

No Action Alterative, give full consideration to the cumulative environmental impacts of the transfer agricultural water rights equivalent to the "surplus demand" identified.

25. The SDEIS Fails to Adequately Consider the Contribution of Peak Flows to the Health of the Cache la Poudre

The SDEIS completely fails to acknowledge the critical importance of peak flows in the Cache la Poudre River. These flows are of critical importance to the maintenance of a healthy ecosystem and water quality in virtually all Colorado Front Range rivers. *See* Appendix E (E35, E02, E26, E36, E29, E37, E04), Wohl 2001, Wohl 2014, Wohl 2004, Rosgen 1996. The body of peer-reviewed, scientific literature establishing this fundamental principal is vast and irrefutable. It extends far beyond the citations provided with these comments.

The NISP DEIS made the same critical, fundamental errors. The SDEIS does not appear to have been informed in any way by the public's comments on the NISP DEIS with regards to the importance of peak flows within the native hydrograph of the Cache la Poudre River.

The deficiencies of this analysis apply to nearly the entire SDEIS. The incidents where it appears are simply too numerous to mention. The SDEIS and its supporting technical reports consistently and routinely fails to address the role of peak flows in critical areas, or argues against their importance using arguments that are specious, illogical, and contrary to known principals of ecology, biology, physics and water chemistry as they apply to aquatic systems.

For these reasons, the SDEIS' complete failure to acknowledge the impact of these flows is a fatal flaw in the document, and violates the National Environmental Policy Act's requirements for accurate and full disclosure of a proposed project's impacts. The analysis is scientifically incompetent and it must be revised completely in a supplemental draft environmental impact statement.

STP discusses these deficiencies in the SDEIS in the appendix to this letter titled "NISP SDEIS Wetland and Riparian Review," attached here in Appendix D (D04). The City of Fort Collins identifies these deficiencies in their analysis of the SDEIS, and we endorse those comments. John Bartholow addresses this issue in his comments on the SDEIS provided to the Corps on August 26, 2015 (untitled, attached here in Appendix E (E03)), and we endorse those comments. Dr. Leroy Poff and multiple other commenters address these issues in their comments to the Corps on the NISP DEIS.

Bartholow's paper on minimum restoration flows for the Cache la Poudre River ("Constructing an Interdisciplinary Flow Regime Recommendation," attached here in Appendix E (E04)) was submitted to the Corps as a comment on the NISP DEIS on May 8, 2011. No reference to that paper or his comments appears to have been made in the SDEIS, and so we are providing that letter again for the public record along with the subject citation ("Recommended flow regime for the Cache la Poudre River and NISP permit," attached here in Appendix E (E38)).

In addition to these issues, the SDEIS failed to disclose and address the economic and environmental impacts of the project on the users of water rights junior to the Grey Mountain right in the South Platte watershed. At a minimum, the Corps must address the economic and environmental impact of the loss of these flows within the watershed. STP addressed those issues in their submittal of comments on the NISP DEIS to the Corps on March 16, 2011 (at E39). STP provides that letter again for the public record along with the subject citation (at E05).

Section 2.5.6, page2-44 of the SDEIS states the following: "Curtailment of streamflow augmentation releases may be required under extreme drought conditions when reservoir levels are low." What quantitative measure is proposed for what defines "extreme drought conditions"? Specifically, what reservoir volume would trigger a curtailment of augmentation flows for winter flow mitigation or mitigating water quality issues at water treatment plant outflows? Without such a proposed quantitative measure, the public cannot verify the veracity and practicability of proposed mitigation measures.

The Corps must develop and adopt a mitigation plan that incorporates the absolutely critical, fundamental, and inviolate importance of peak flows, as cited in this document, and which protects those flows. STP endorses the flow regime standards developed by Bartholow (2010) (at E38, E04) as the absolutely bare minimum flows required to keep the Cache la Poudre River healthy and functioning.

26. The SDEIS Fails to Establish the Validity of the Evaporation and Loss Rates Incorporated into Hydrologic Modeling

The SDEIS incorporates a very low evaporation for Glade Reservoir of 2.2-2.3%. SDEIS at Table 2-8 and Table 4-11, Draft Operations Plan at 3-30. The SDEIS uses a general loss rate of 5% for all alternatives. SDEIS at 2-52, 5-18. The SDEIS appears to incorporate higher rates for Alternatives 3 and 4 but fails to quantify what these rates might be. SDEIS at 4-77 ("Alternatives 3 and 4 would have greater net

diversions from both the Poudre River and the South Platte River compared to Alternative 2. This is due to the need to accommodate increased transit and storage losses (i.e., *See*page and evaporation) associated with Cactus Hill Reservoir, while still delivering full project firm yield to the Participants"). The SDEIS discloses that long-term average diversions for Alternative 2 are projected to be 43,300 acre-feet. This represents an 8.25% "surplus" for transit and storage losses over the 40,000 acre-feet firm yield demanded by the project.

The SDEIS fails to provide clear, quantitative support, based on local condition and proposed project design, for the loss rates incorporated into the analysis. The Corps must document its determination of rates incorporated into the modeling, must explain why they deviate from common practice if they do, and must disclose this information to the public in a manner that will allow for meaningful public review.

27. The SDEIS Fails to Present a Complete Water Quality Analysis

The SDEIS, at D-28, states the following (emphasis added):

> "Alternative 2 is the Proposed Action and the District's Preferred Alternative. This alternative meets the overall project purpose, existing technology, and logistics criteria and, therefore, is practicable. However, until the Phase II water quality modeling has been completed it cannot be determined whether this alternative would result in greater impacts to the aquatic environment than the other alternatives analyzed in the SDEIS. Whether this alternative is the LEDPA as defined by the Guidelines is unknown at this time."

The Corps reports in the SDEIS, at S-13 that it plans to complete a Phase II water quality and water temperature analysis.

Failing to prepare numerical water quality and temperature models does not allow for complete public comment during the SDEIS. It is critical for the public to evaluate the methods and assumptions made in creating a numeric water quality model. The environmental impact of the proposed reservoirs cannot be fully understood without a complete analysis. The SDEIS is incomplete due to this oversight.

The Corps must complete the Phase II water quality and water temperature analysis and provide for meaningful public comment before issuing a Record of Decision on NISP through another supplemental draft environmental impact statement.

STP endorses the Fort Collins comments on the SDEIS referring to water quality modeling as they come to similar findings.

The Phase II water quality and water temperature analysis must address the following issues:

- The SDEIS indicates that the proposed Galeton reservoir, when initially filled, would immediately qualify for the state's 303(d) list for exceeding water quality standards. No mitigation or other measures are proposed to address this public health risk.
- All of the action alternatives will reduce flows significantly. This means less dilution, so pollution problems will be exacerbated at water treatment plant discharge points along the river. Diverting water doesn't immediately change pollutant concentrations. However, downstream of diversions, an existing pollutant input will cause the concentration to increase more dramatically, since there will be less water to dilute it. This will be a problem for all of the State of Colorado 303 list pollutants for the Poudre River. The proposed diversions will ultimately cause standard exceedances, which means the project should not be completed according to the 404(b)(1) Guidelines at 40 C.F.R. 230.10(b).
- The 404(b)(1) Guidelines at 40 C.F.R. 230.10(b) specify that no discharge of dredged or fill material may be permitted if it will cause or contribute to violations of any applicable State water quality standard.
- The WQCC also has designated a narrative temperature standard (CDPHE 2013): Temperature shall maintain a normal pattern of diel and seasonal fluctuations and spatial diversity with no abrupt changes and shall have no increase in temperature of a magnitude, rate, and duration deleterious to the resident aquatic life.
- Section 4.12.3.3.1 states that "There could be a minor to moderate increase in summer temperatures that, if unmitigated, could have an adverse impact on trout."
- Excerpts from the SDEIS confirm that current diversions create an "abrupt change" in water temperature. A new diversion will violate the narrative temperature standard. Section 3.3.2.5 states the following: "Overall, these inflows and outflows result in fluctuating river temperatures, with inflows providing both cooler and warmer water and outflows allowing greater warming of the river with reduced water depth." Later in the section it says this: "Downstream of the fossil Creek diversion, temperatures increase sharply due to reduced flow rates."

- Of the action alternatives, the SDEIS indicates that alternative 4 has the least overall impact on dissolved oxygen and water temperatures, and alternative 1 is likely to have the least overall impact on overall water quality. In the technical report titled "Stream Temperature and Dissolved Oxygen Analysis for NISP Supplemental Draft EIS" (Hydros) concluded the following "Of all the alternatives evaluated, Alternative 1 is predicted to have the least effect to the water quality of the Poudre River." Unfortunately, the SDEIS treatment of water quality issues frequently uses double-negatives combined with obtuse and confusing language that has the appearance, at least, of attempting to conceal potential impacts of the project on water quality. Here is just one example of many, from section 4.3.9.2: "Generally, the anticipated adverse effects on stream temperature for Alternative 2 are expected to be less than those for Alternative 3 and greater than those for Alternative 4." This says that alternative 4 would have less of an impact on water temperature than alternative 2. As a result, the analysis of least environmentally damaging alternatives (LEDPA) must acknowledge these realities clearly and directly.

28. The SDEIS Fails to Adequately Consider the Impacts of the Alternatives on Wetlands and Riparian Vegetation

Like its various analyses of the importance of peak flows, the SDEIS analysis of wetlands and riparian vegetation is fatally flawed. Much of the reason for deficiencies is related to the failure of the document to acknowledge the importance of peak flows, however there are multiple contributing factors that lead STP to overall reject the findings of the SDEIS analysis of wetlands and riparian vegetation, sections 3.9, 4.9, and 5.9, and the associated technical reports on the topic.

STP completed its own analysis of the impacts of potential water development in the Cache la Poudre Basin on wetlands and riparian vegetation. STP provided this analysis to the Corps on December 17, 2012 ("NISP's impacts on riparian areas including wetlands along the Cache la Poudre River," attached here in Appendix E (E24)). STP is inserting these documents into the public record again as we see no acknowledgement of that work in the body of the SDEIS or the supporting technical reports ("Wetlands Impacts caused by the Northern Integrated Supply Project," attached here in Appendix E (E41)).

In section 3.9.5.1 the SDEIS explains they rejected the National Wetlands Inventory (NWI) maps (*see* "National Wetlands Inventory," available at http://www.fws.gov/wetlands/ and last viewed on August 30, 2015) for the Cache la Poudre Watershed because it uses the Cowardin Classification system,

whereas the Corps uses a different classification system. The Cowardin classification system is the most current classification system available and is accepted by the U.S. Fish and Wildlife Service in the National Wetlands Inventory. The Corps wetlands classification system has not been updated since 1987. There is an abundant number of suitable and well-documented cross-walk algorithms published to allow translating between the Cowardin and USACE Classification Systems (see, *e.g.*, "Supplemental Guidance for the Classification of Wetlands for the Update of the National Wetland Inventory for Minnesota," attached here in Appendix E (E42)). Instead, the SDEIS uses the Colorado Division of Wildlife (CDOW) (sic) riparian vegetation maps. The CDOW riparian vegetation maps are outdated and have a resolution of ½ acre, whereas the NWI imagery has a resolution of 1 meter, more than 2,000 times better resolution. The CDOW maps were developed from imagery collected well before the year 2000, whereas the NWI Inventory utilized the most current photograph imagery available in 2011. The NWI maps are more current, the resolution is better, accepted wetlands classification transfer functions are readily available. The NWI imagery indicates that the majority of wetland and riparian vegetation features have a resolution smaller than ½ acre. The decision to utilize the CDOW maps led to an analysis bias that incorrectly concluded a radically smaller impact on riparian vegetation than would have been concluded from using a more current classification method applied with more current, accurate, finely-scaled maps. The decision to utilize the CDOW riparian vegetation maps was capricious and arbitrary.

STP addresses the wetlands and riparian vegetation analysis in detail in reports titled "NISP SDEIS Wetland and Riparian Review" and "Supplemental Notes on the NISP DEIS and SDEIS analysis of Wetlands and Riparian Vegetation" (attached here in Appendix D (D04, D06)). The City of Fort Collins addresses wetland and riparian vegetation issues their comments on the SDEIS, which we endorse.

Before we summarize the details, we wish to address a larger issue indicating a clear bias by the Corps towards permitting large, damaging water projects and ignoring the cumulative impacts of those projects. This bias is perhaps most clear in the how the SDEIS analyzes wetlands and riparian vegetation. The SDEIS accepts a downward decline of these fundamental native ecosystems as inevitable and unstoppable in the face of past history and the long list of additional water diversions proposed for the Cache la Poudre Watershed. The background premise that there is no question that all of these projects will be permitted and their impacts will be felt throughout the watershed is fundamental to the structure of the SDEIS and its supporting technical reports. The documents systematically ignore the ecosystem services provided by wetlands and riparian vegetation and the long-term effects these systems have on water quality. Moreover, it seems to indicate that the Corps, as head agency charged

with managing and protecting our nation's waterways, is prepared to effectively abdicate its legally-defined role as impartial judge and simply accept the premise that any and all water project applications will be approved. That bias is in direct contradiction with the spirit and the intent of our nation's landmark environmental protection laws, including but not limited to the National Environmental Policy Act of 1969, the Federal Water Pollution Control Act Amendments of 1972, the Clean Water Act of 1977, the Water Quality Act of 1987, and the Endangered Species Act of 1973. These are the laws that the Corps is entrusted (and legally obligated) to uphold. It effectively kicks the can down the road into the legal system and shifts the burden of proof of environmental damage off of the backs of the project applicants, and onto the backs of the public. The Corps must instead shift the burden onto the project applicants, as the law clearly requires, to reveal the actual environmental damage attributable to projects, if built, and to and to demonstrate that the applicants have done everything that can reasonably be expected of them to minimize the consequences of a project if built. To date, the Corps has failed to do so.

Following is a summary of the details from our supporting technical review:

The SDEIS defines the resource trajectory of cottonwood forests as inevitably downward, effectively in a death spiral to a permanently degraded condition. This is contrary to evidence provided in our report on this issue and evidence provided by the city of Fort Collins. Evidence supporting the effectiveness of restorative and regenerative flows is abundantly clear (attached here in Appendix E (E02, E36, E26, E29)). In their analysis, the City of Fort Collins arrived at the same conclusion as us, and in a letter to the City of Fort Collins by the project applicant dated August 28, 2015, the Northern Colorado Water Conservancy District (Appendix E (E20)) indicated they agreed with this assessment.

The SDEIS and supporting technical reports dismiss the importance of native vegetation regeneration following 2013 floods, despite clear and unequivocal evidence to the contrary. Riparian cottonwood forests are the most common and most valuable riparian vegetation type in the Cache la Poudre watershed and it must be protected. Additionally, the SDEIS makes claims completely unsupported by the literature that pond shores are effectively replacement habitat for riparian cottonwood forests.

The SDEIS omits any discussion on restoration potential with environmental flows. Improved wetland and riparian habitat on similar rivers shows that degraded conditions can be reversed with flow management.

The SDEIS attempts to claim that wetland functions are achieved equally through open water (man-made ponds) compared with riverine wetland functions. With regards to water quality and habitat functions, open water is simply no replacement for riverine wetlands.

The document does not address the synergistic effects of climate change combined with the project's impacts on potential long-term environmental degradation in the watershed associated with loss of peak flows.

The SDEIS analysis depends upon return flows and agricultural nutrient mitigation to partially limit the negative effects of alternative 2. This is irresponsible, considering that the project applicant has no influence over the availability, timing, placement, and amount of return flows in mitigating project impacts.

Changing the hydrology of the floodplain could endanger nutrient cycling that mitigates non-point source pollution.

STP requested information on the irrigation-associated wetlands affected by the No Action Alternative. Appendix A (A04). STP did not receive that locational information before the close of the comment period, and therefore reserves the right to comment on the SDEIS regarding the location and extent of action wetlands losses associated with the No Action Alternative.

In addition to STP's analysis of the wetlands and riparian vegetation analyses, we reviewed the technical report treatment of the data on groundwater and surface water support for riverine vegetation in the watershed. The technical reports for the SDEIS rely on six groundwater monitoring transects, one transect located in each section of the river. From this analysis the SDEIS concluded that the Cache la Poudre River is a "gaining" river throughout its entire reach, and that nearly all riverine wetlands within the watershed are supported almost solely by irrigation return flows, with little or no support from peak flows from the Cache la Poudre River. The well locations and transects used to derive these findings are not a representative sample of the groundwater conditions within the watershed. STP conducted a stratified random sample of points in the riverbed center at one mile intervals from the canyon mouth to the confluence with the South Platte River. STP measured the proximity from river center at each of the 53 points to a nearby water impoundment, irrigation ditch or irrigated farm field or pasture. Five of the six transects sampled for the technical reports run directly towards and terminate adjacent to a water impoundment, or they run directly through a wetlands complex with a high water table. The

conditions at these limited, unrepresentative samples lead to the incorrect, unbalanced and statistically indefensible conclusion about the role return flows play in supporting wetlands and riparian vegetation in the watershed. According to our stratified sample analysis, the likelihood that the transects sampled for the NISP SDIES represents the groundwater conditions in the watershed are less than 10%. In all likelihood, the Cache la Poudre River is a "gaining river" and a "losing river" at intervals throughout its reach, and to use the findings from the groundwater transects to claim that peak flows have little or no role in maintaining wetlands and riparian vegetation violates scientific convention and is wholly indefensible.

The technical reports on wetlands and riparian areas indicate that wetland loss resulting from Alternative 2 would be 10 acres. Frankly, this is in irrationally low number, considering that STP's analysis indicates that at least 1,700 acres of riparian habitat, including 700 acres of wetlands would be negatively affected, and considering the consistent bias present in the analysis towards valuing the habitat value and fragility of irrigation-associated wetlands compared with riverine wetlands. Be that as it may, we were surprised to see that the SDEIS reported the loss as 9 acres of riverine wetlands, not the 10 acres reported in the technical reports. There does not appear to be any evidence of a rounding error. It leads us to wonder if this change is simply an error, or is another artifact of analysis bias, somehow related to the fact that the SDEIS threshold between classifying an affect as being minor and major is set at 10 acres.

The screening criterion for impacts on wetlands was set at 60 acres. As with the DEIS, no basis for this threshold was provided, and no explanation was provided in response to comments questioning this threshold value in the NISP DEIS. What is the basis for this threshold? It is capricious and arbitrary.

The DEIS and SDEIS have ignored a significant component of the terrestrial and aquatic biota, viz. bryophytes (mosses, liverworts and hornworts), fungi and lichenized fungi (lichens).

There is no assessment of the effects on the ecology of the vegetation and wetlands that will be affected. Effects are couched solely in terms of degree of effect (major, moderate, etc.) and area affected permanently or temporarily. Thus there is no connection made between the loss of grassland habitat and the effects this might have on fauna.

The Technical Report Supplement downplays the potential loss of thousands of acres of grasslands as 'negligible' in regional terms, yet the incremental loss of habitat is clearly of concern to the Corps (as demonstrated by the withdrawal of NWP 26 in 2000).

'Temporary effects' are treated in the DEIS and SDEIS as if they are always short-term effects that are expected to be ameliorated within approximately 5 years, when in fact they may occur over decades.

The DEIS and SDEIS are silent on the practicality of complete restoration of disturbed vegetation and wetlands, and say nothing about how restoration is to monitored and its success assessed.

Because the definition of wetlands has a regulatory purpose, some habitats that may be defined at wetlands in an ecological sense (*e.g.* using the FWS guidelines) may not be included in the delineation of wetlands.

Baseline data is referred to the existing naturalized condition, rather than potential or desirable condition. This precludes the consideration of opportunities to rehabilitate degraded habitats and reverse historical declines. It has also led to a chain of 'could do' statements in the SDEIS about what might be possible in terms of mitigation strategies after the completion of the project, instead of a consideration of mitigation and adaptive management as a fundamental part of the project proposal.

Edge effects and cumulative (i.e. knock-on) effects of habitat loss and degradation are not taken into account. Instead, the effect on a vegetation community or wetland is considered to be localized to that community or wetland and assumes that there will be no further effect on any other community of wetland.

The Corps must re-consider its wetlands and riparian vegetation analysis in compliance with these comments. The new analysis must be disclosed in a manner that provides for meaningful public review before the Corps makes any decisions on this project.

29. The SDEIS Fails to Adequately Consider Farmland Loss under the Alternatives

The SDEIS projects that 64,200 acres of irrigated farmland would no longer be irrigated under Alternative 1. The analysis begins in SDEIS section 2.4.2 and there are at least 46 references to this figure of 64,200 acres that follow. There is relatively little in the SDEIS analysis of this issue of farmland loss that has substantively changed from that in the DEIS, and we believe the analysis done for the DEIS

still applies ("A Review of the Likely Agricultural Impacts from the Northern Integrated Supply Project," attached here in Appendix B (B03)). A subsequent document, also previously provided to the Corps, ("The Farm Facts about NISP," attached here in Appendix C (C25)) applies as well, with the following additions to these documents:

1. The SDEIS projects that under operational flexibility for alternative 2 during dry years and for the initial fill of Glade Reservoir, an unspecified amount of additional agricultural water rights would be acquired by purchase or lease, and would be used to meet the project's firm yield delivery requirements. Yet, no projections are provided in the SDEIS of the irrigated farmland losses associated with either this initial fill or agricultural water transfers to NISP during the dry periods when the project could not meet its firm yield requirements. It does not appear to be clearly stated that the planned "operational flexibility" would extend to all of the project alternatives except for the "No Action Alternative", however we assume that it would considering the same weather-related streamflow limitations would apply to the Alternatives 2-4, and therefore it would be necessary to analyze the irrigated farmland loss projections to Alternatives 2-4.
2. The SDEIS analysis of the impacts of applying saline water to salt-affected soils in the Poudre and South Platte watersheds continues to be qualitative, as was the similar analysis in the DEIS analysis. No substantive quantitative analysis was done. This is a flaw in the SDEIS that must be corrected. The SDEIS fails to inform the public adequately about the actual impacts of the project on crop production and cropland soils.
3. The SDEIS ruled out rotational fallowing as a substantive alternative to permanent "buy and dry" and farmland loss. The SDEIS states that it is not a "proven technology" or method, despite the fact that hundreds of thousands of acre feet annually are being shared between municipal water users in Southern California and several California irrigation districts through this method. Rotational fallowing programs are being developed in at least two locations in Colorado – one in the Arkansas Valley, and another in the Cache la Poudre Basin. Rotational fallowing programs are a reasonably foreseeable future action in the Cache la Poudre River basin, have been proposed and discussed in lengthy detail in "Colorado's Water Plan (Draft 2, July 2015)," and will likely become one of the major sources of water for growing communities in Colorado. The SDEIS' failure to consider

rotational fallowing programs is a serious flaw that must be corrected in order to comply with NEPA and the CWA.

The Corps must address these concerns in a re-consideration of its analysis of farmland loss. The new analysis must be provided for meaningful public review prior to any decision making on this project.

30. The SDEIS Fails to Adequately Consider the Impacts on Air Quality from the Alternatives

The SDEIS noise impact analysis fails to address the cumulative impacts to those living to the east of the Hogback ridge, where Highway 287 would be moved if the project were permitted and built. The ridge provides a natural noise barrier for those who reside on the east side of the Hogback ridge. Without this barrier, these residents will be exposed not only to construction noise during the initial phase of the project, but also to non-dampened highway noise after the project is completed. With no major topographic features between the new Highway 287 and Interstate 25, this area will be flanked by two major highways, and the residents left to live with the noise and air pollution that accompanies them.

The EPA mobile emissions model for both on-road and non-road sources was officially changed during 2014 to now be MOVES2014 from MOVES2010. The work done in the SDEIS is both out of date and does not apparently use the official EPA mobile emissions model used in air quality modeling for both NEPA conformity and attainment planning. It is important that the project comprehensively estimate all direct and indirect mobile emissions associated with the life of the project using this new tool, and not rely upon: "Emission load factors were developed based on Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling, EPA-420-P-04-005 and AP-42 (EPA 2004)." The combined direct (on-site) and indirect (off-site but directly caused by the project including the highway and road re-locations) emissions will be much larger than presented in the SDEIS.

On August 27, 2015, the EPA published a proposed rule in the Federal Register: "Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Several Areas Classified as Marginal for the 2008 Ozone National Ambient Air Quality Standards" (available at: http://www.gpo.gov/fdsys/pkg/FR-2015-08-27/html/2015-21196.htm and last viewed September 3, 2015). The current Denver/Northern Front Range ozone nonattainment area will be "bumped up" to Moderate nonattainment status, requiring a new nonattainment plan and adding additional control requirements. This plan must demonstrate attainment or reasonable further progress toward attaining

the 2008 Ozone standard of 75 ppb by 2017. Any additional NOx emissions in 2017 or later will contribute to forming additional ozone and the potential for continuing nonattainment, and must be addressed in the SDEIS. The project must not contribute to continuing nonattainment, or prevent attainment by the statutory deadline.

In December of 2014 EPA proposed a revision to the current Ozone standard, to lower the level to somewhere in the range of 65 to 70 ppb. By federal court order, the EPA must decide to keep the standard at 75 or change it to a lower number in the 65 to 70 ppb range by October 1, 2015. This means that in the autumn of 2017, the area around the proposed Glade and Galeton reservoirs will continue to be nonattainment or may have to achieve a more stringent standard. The NISP project will be required to produce a plan to achieve nonattainment status for their activities, due in late 2020 or early 2021. Any additional NOx emissions in 2017 or later will contribute to forming additional ozone and the potential for continuing nonattainment. The project must not contribute to continuing nonattainment, or prevent attainment of the "2015 Ozone standard" by the statutory deadline.

The Corps must re-consider its air quality analysis and disclose its results in a manner that provides for meaningful public review prior to any decision making on NISP.

31. The SDEIS Fails to Adequately Consider the Impacts on Recreation from the Alternatives

In sections 3.16.7.2, 4.20.3.3.1 and 5.20.2.3, the SDEIS claims annual value of recreation at Glade Reservoir, at full development, to be approximately $13.2 million dollars. There are numerous fatal flaws associated with this estimate, which are detailed in the attached report titled "Review and Analysis of Effects on Recreation-related Economy: NISP SDEIS," attached here in Appendix D (D05). These issues are summarized as follows:

Using visitor data from lakes in surrounding States, a linear regression model with one dependent variable (surface area of reservoir) was used to estimate annual visitor days for Glade Reservoir, thus not accounting for substitute sites, travel time, or other significant variables. No statistical analysis was offered to verify the utility of the model, and none of the raw data from the study sites used to drive the model were made available. The model could be completely wrong, or it could have no statistical significance, and the public would have no way of knowing if that was the case and therefore could not verify whether the analysis was sound.

Furthermore, the SDEIS made fundamentally incorrect theoretical assumptions that led to inaccurate results.

The SDEIS assumes that changes in the flow levels of the Poudre River resulting in changes to aesthetic quality will have negligible or minor impacts on the recreational value of natural areas and SWAs along the Poudre River. Aesthetic quality is a determinant of demand for recreation, having a positive relationship with demand. Therefore, assuming that a change in aesthetic quality does not affect recreational quality results in understated negative impacts of Alternative 2. No existing studies, communications, new data or new analyses were offered to back up the assumption that changing flow levels would have minor impacts on the recreational value of these areas.

The SDEIS fails to account for the loss in recreation benefits caused by Alternative 2 with respect to the potential whitewater park. Although the SDEIS estimates that Alternative 2 would negatively impact boating on the Poudre River and decrease economic benefits $241,000 annually, it fails to update the economic value to 2011 dollars, and it fails to estimate the additional decrease in economic benefits associated with the potential whitewater park, ranging from a loss of $615,000 to $1,438,000 annually.

Finally this – the economic analysis projects the economic benefits would begin accruing at maximum value ($13.2 million) once the reservoir is filled and park resources are developed, however it provides no benefit-cost analysis to calculate the net present value of that economic activity, and it does not take into account the economic costs to the citizens of Larimer County involved with developing, maintaining and operating the park infrastructure.

In the end, the projected economic benefit of $13.2 million cannot be verified by the public, it fails to account for critical factors (such as cost and net present value) that any astute business person or economic development professional conducting a due diligence analysis would demand, and it is based on highly questionable assumptions that recreation at the reservoir, once complete, would operate at capacity immediately after construction is complete, when no basis for that assumption is provided.

The Corps must re-consider its recreation economics analysis and disclose the results in a manner that provides for meaningful public review prior to any decision making on NISP.

32. The SDEIS Fails to Adequately Consider the Impacts on Threatened & Endangered Species from the Alternatives

Economic growth and development, when un-tempered by adequate conservation measures, is a leading cause of the decline and extinction of threatened and endangered species. Baur and Irvin 2010. Fortunately, Congress enacted the Endangered Species Act in 1973 to conserve and protect such imperiled plants and animals. By law, an environmental impact statement (EIS) must thoroughly and honestly consider any potential impacts to federally-listed threatened and endangered species. 40 C.F.R. 1508.8, 40 C.F.R. 1508.25. The NISP DEIS and SDEIS fail to do this regarding the Preble's meadow jumping mouse (PMJM), a federally-listed threatened species. Thus the DEIS and SDEIS fail to meet the minimum legal requirements for an adequate EIS.

The NISP DEIS and SDEIS fail to provide adequate disclosure regarding mitigation measures for the PMJM, should any of the four alternatives analyzed in detail be pursued. They thus fail to provide necessary information for an informed judgment about whether pursuing NISP (or the other alternatives discussed) would violate the Endangered Species Act in this particular.

The DEIS and SDEIS also fail to properly consider viable alternative water supply proposals that not only would not adversely affect this small rodent, but that could actually benefit it by creating new mouse habitat and enhancing degraded habitat: specifically, the "Healthy Rivers Alternative" developed by Save the Poudre (2008) and "A Better Future for the Poudre River" developed by Western Resource Advocates (2012). Because the DEIS and SDEIS systematically ignore viable alternatives to an unnecessary "taking" of this threatened species, the building of NISP (or pursuit of the other three alternatives analyzed) would, in our opinion, constitute a clear violation of the Endangered Species Act.

Previous comments from Save the Poudre (Appendix B (B02)) on the DEIS's inadequate treatment of the PMJM were written by Robert Schorr, a scientific expert on the mouse. Those comments were based on a thorough review of the scientific literature and addressed critical problems with the proposed mitigation in the DEIS. None of our earlier concerns have been addressed in this SDEIS. Hence we reiterate our previous comments (Appendix B (B02)) in their entirety, including the "Addendum: further comments based on the 'Revised Proposed Rule to Amend the Listing for the Preble's Meadow Jumping Mouse.'" STP reinserts those comments into the record here (*see* attached) and provide additional comments in the document titled "STP Comments on NISP SDEIS Treatment of the Threatened Preble's Meadow Jumping Mouse" (attached here in Appendix D (D02)).

The proponent admits (SDEIS at S-1) that the project, if built, will also harm four threatened and endangered species of Central Nebraska: the whooping crane (*Grus americana*), the least tern (*Sterna*

antillarum athalassos), the piping plover (*Charadrius melodus*) and the pallid sturgeon (*Scaphirhynchus albus*) (hereafter "the Nebraska target species"). In their "Biological Opinion" on NISP, received by the U.S. Army Corps of Engineers October 5, 2007, the U.S. Fish and Wildlife Service concurs, stating that the water depletions associated with NISP are likely to reduce flows on the Platte River through Nebraska and that therefore NISP will adversely affect the Nebraska target species. DEIS page 21.

According to USFWS, the continued existence and recovery of these four threatened and endangered species depends on protecting and restoring water flows to the central and lower Platte River ecosystems. The survival of these species cannot be ensured without significant changes made to improve current environmental conditions. Committee on Endangered and Threatened Species in the Platte River Basin 2004; USFWS 2006a at 11). If built, NISP will instead degrade current environmental conditions, causing water depletions and decreasing peak flows along the Platte River in central Nebraska. For this reason, the U.S. Army Corps of Engineers must deny a permit for NISP under the Clean Water Act.

By law, an environmental impact statement (EIS) must thoroughly consider proposed projects' potential impacts on federally-listed threatened and endangered species. 40 C.F.R. 1505.8, 40 C.F.R. 1508.25. The DEIS and SDEIS fail to do so regarding the Nebraska target species, as documented below and in the Save the Poudre Coalition's earlier (2008a) comments. Thus the DEIS and SDEIS fail to meet the minimum legal requirements for an adequate EIS under NEPA.

By law, an EIS also must consider reasonable alternatives to projects that have the potential to harm threatened and endangered species. Despite the development of two such alternatives to NISP—the "Healthy Rivers Alternative" developed by the Save the Poudre Coalition (attached here in Appendix B (B07)) and "A Better Future for the Poudre River" developed by Western Resource Advocates (attached here at E51)—both the DEIS and SDEIS fail to seriously consider these and other alternative supply possibilities that could meet the water needs of affected communities while securing increased flows for the Nebraska target species, or at least not further harming them. In this way, too, the DEIS and SDEIS fail to meet the minimum legal requirements for an adequate EIS under NEPA.

These comments are explained in more detail in an attachment titled "STP Comments on NISP SDEIS Treatment of Threatened and Endangered Species in Nebraska" (attached here in Appendix D (D03)).

33. The SDEIS Fails to Adequately Consider the Impacts on Greenhouse Gas Emissions and Climate Change from Project Operations and

The SDEIS acknowledges that its analysis of greenhouse gas emissions is incomplete. The SDEIS analyzes the emissions from pumping water for the project, however it fails to address the direct emissions from reservoir construction, including fuels burned in construction equipment, emissions from the mining, manufacture, and transport of the cement, rock and aggregate materials used in reservoir construction. It does not take into account emissions from decaying vegetation and the decomposition of carbon in wetlands soils affected by the altered flow regime resulting from the project.

To address this deficiency, the Corps must prepare a supplemental draft environmental impact statement with a public comment period adequate for public review.

The total yearly emissions for NISP as proposed in the project's Draft Environmental Impact Statement would be at least 43,751 – 84,236 metric tons CO2-equivalent per year, depending on the action alternative chosen. These include energy required to pump water as well as CO2 emissions from soils and decaying vegetation associated with degraded wetlands and riparian vegetation. This estimate is highly conservative, as it does not include methane, carbon dioxide and nitrous oxide emissions directly from the reservoir surface and footprint, spillway or outlet, all of which have been shown to be significant source of emissions from reservoir operations worldwide.

In addition to these yearly emissions, the total emissions produced during the construction of the project would be at least 218,000 metric tons CO2-equivalents. These legacy emissions or "embodied emissions" for the project would represent at least 5 metric tons CO2-equivalents per acre-foot of water proposed to be delivered under the project, with at least 1 metric ton CO2-equivalents per acre foot of water proposed to be delivered each year. These are major greenhouse gas emissions at a time when we should be doing absolutely everything we can do to reduce greenhouse gas emissions in every aspect of our lives. STP provides a detailed analysis of the likely Greenhouse Gas Emissions from alternative 2 of the NISP project as "NISP SDEIS Comments on Greenhouse Gas Emissions from Project Operations and Construction" (attached here in Appendix D (D01)).

34. The SDEIS Fails to Adequately Consider the Impacts of Oil and Gas Wells at Galeton Reservoir Site

STP presented relevant information to the Corps in letters dated March 8, 2011 ("Oil and gas development under and near the proposed Northern Integrated Supply Project's Galeton Reservoir and required analysis under NEPA", attached here in Appendix E (E43)) and November 18, 2012 (*untitled*, attached here in Appendix E (E44)). All information included and requested analyses noted in those letters are hereby incorporated into these comments.

In an improvement to the DEIS, the SDEIS acknowledges the presence of current and historic oil and gas wells at the Galeton Reservoir site (*See*, *e.g.*, sections 2.5.8, 3.6.2.2, and 3.21.2.2). This information is primarily attributed to the document "Oil and Gas Development at the Proposed Galeton Reservoir Site Technical Memorandum" (January 2012). SDEIS at 3-4, 4-9. This analysis was apparently supplemented by a review of Colorado Oil and Gas Conservation Commission (COGCC) records in 2013 and 2014. SDEIS at 2-46, 3-226.

The SDEIS cites various and conflicting figures for the number of wells impacted by the proposed Galeton Reservoir that were apparently derived from inventories at different dates and for different geographic scopes. SDEIS at 2-46 ("Sixteen wells are within the reservoir footprint and three wells are within 500 feet of the footprint"), SDEIS at 3-91 ("39 producing wells and an additional 33 proposed wells on and within 0.5 mile of the proposed Galeton Reservoir site"), SDEIS at 3-226 ("31 producing oil and gas wells, 8 shut-in wells, and 11 plugged and abandoned wells are in the proposed Galeton Reservoir study area"). Note that STP was unable to find any competent definition of the "Galeton Reservoir study area" in either the DEIS or SDEIS.

The SDEIS states that the past and current wells have had satisfactory and unsatisfactory inspections, including multiple crude oil spills on the ground that have been cleaned up to COGCC standards. SDEIS at 3-226. The SDEIS discusses the wells from the perspective of potential hazardous materials resulting from drilling and operation-related spills, and concludes from a review of COGCC records—but no on-the-ground survey—that no risk exists. SDEIS at 3-226, 3-227. No other discussion of the impact of the presence of these wells is presented except the unsupported statement that "[t]he District anticipates that all of the wells would be abandoned by the operator before Galeton Reservoir was built. The District would relocate any well that would interfere with reservoir operations." SDEIS at 2-46.

The Conceptual Mitigation Plan also gives scant notice to the oil and gas wells, relying on a discussion of "a plan" and "protocols" to be developed to deal with potential issues with mechanical integrity of well bores, excavation, leaks and groundwater levels but committing to no mitigation activities. SDEIS Appendix F at 55-57. Rather than providing any transparency concerning the actual properties of and risks from the wells, the Corp makes the unsupported statement that "Northern Water has cooperated with and reviewed plans by the well operators to ensure that the operator's oil and gas development plans are consistent with the construction of Galeton Reservoir. Northern Water will remain in contact and coordinate with the operator as these activities progress." SDEIS Appendix F at 55.

The SDEIS explicitly identifies the analysis of oil and gas development at the Galeton site as one of the incomplete elements of the document that must be updated before the FEIS is issued. SDEIS at S-12, S-13 ("Before FEIS issuance, the Corps anticipates the District will complete the following activities", "Update the description and potential effect of oil and gas well drilling activities at the Galeton Reservoir site", "Perform additional hydrological assessments at the proposed Galeton Reservoir site to determine if fluctuating reservoir levels at Galeton Reservoir have the potential to mobilize any future contaminant plumes from oil and gas development in the area"), SDEIS at 3-91 ("Information on oil and gas well drilling activities at Galeton will be updated for the FEIS"). The SDEIS must therefore be seen as failing to take a "hard look" at the impacts of oil and gas wells at the Galeton Reservoir site.

The Corps must present a complete analysis with adequate public comment opportunity prior to completing the Final EIS. Although the comments here are directed at Alternative 2 and the proposed Galeton Reservoir, a similar analysis must also be conducted for the proposed Cactus Hill Reservoir.

A complete analysis of oil and gas development activity at the Galeton Reservoir site will include, but not be limited to:

Current Inventory of Existing Wells and Historic Well Sites

As discussed above, the SDEIS fails to provide a consistent inventory of the number of existing oil and gas wells and historic well sites that would be impacted by the proposed Galeton Reservoir. Current, geographically-attributed data is updated daily and readily available from COGCC. *See* http://cogcc.state.co.us/data2.html#/downloads. Any future analysis by the Corps must utilize the most current data available at the time of the analysis and must explicitly cite the download date for the data.

The Corps must also clearly define the geographic scope of its analysis. Accurate source data date and geographic scope are essential for the public to competently review the analysis.

On August 4, 2015, STP completed an inventory of oil and gas well permits within the vicinity of the proposed Galeton Reservoir. This inventory identified extensive changes from the inventory presented in the Technical Memorandum and illustrates the fluidity of the oil and gas development situation and the importance of current data: all of the wells listed as "planned" in the Technical Memorandum except for one have been abandoned; six producing, one shut-in, and eight planned wells were identified that were not included in the Technical Memorandum.

Importantly, the STP inventory also identified 11 producing and planned wells that appear to be located either within or immediately adjacent to the dam footprint as indicated in Figure 2-6 of the SDEIS. These well sites could pose additional difficulties for safe abandonment and/or dam maintenance. The Corps must explicitly identify all well located either within or immediately adjacent to the dam footprint in any future inventories.

The STP inventory also revealed that the majority of the wells in the Galeton Reservoir vicinity are developed on spilt estate lands, i.e., lands where the mineral ownership is held separately from the surface ownership. Split estate lands pose additional difficulties for acquisition activities. The Corps must explicitly identify all wells that occur on split estate lands in any future inventories.

Expanded Hazardous Materials Analysis

The Corps must complete a thorough review of the both the surface and sub-surface risk of hazardous material contamination associated with abandoned, current, and planned well at the proposed Galeton Reservoir site rather than relying on a review of COGCC records of surface spills.

The Corps' analysis of potential hazardous material contamination must be updated to reflect the current understanding of oil and gas development contamination risk as presented in the studies "A Public Health Review of High Volume Hydraulic Fracturing for Shale Gas Development," attached here in Appendix E (E45), and "Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources—External Review Draft," attached here in Appendix E (E46). Both of these studies indicate that hazardous material contamination occurs, and may be more likely to occur, than is indicated by the SDEIS analysis due to fluid migration in areas surrounding oil and gas wells.

The Corps must consider that a high potential for well casing failure may exist, even after abandonment, especially with the added pressure from the water in the proposed Galeton reservoir. If well bore integrity were to fail, hydraulic fracturing chemicals as well as oil and gas, brine, and naturally occurring radioactive materials (NORM) from the shale formation could leak into the reservoir. A 2014 study (Darrah et. al, 2014, attached here in Appendix E (E12)) documented contamination in drinking water wells near oil and gas wells. They determined the contamination was a result of well failures from poor cementation, improper, faulty, and failing production casings and one documented underground well failure. This shows that even if the wells are properly abandoned, the initial well construction may have issues that result in well failure and contamination of the well. A 2003 study (Brufatto, et. al, 2003, viewed at http://www.slb.com/~/media/Files/resources/oilfield_review/ors03/aut03/p62_76.ashx on 8/1/2015) showed that the majority of wells fail by maturity (60% of wells failed in 30 years in their study). The wells in this study were located in the Gulf of Mexico, so they were subjected to higher water pressures, as will the wells under the proposed Galeton reservoir.

Although the oil and gas industry prefers to cite studies that have shown that well casing failures are rare, the wells surveyed for these studies were all located on dry land and are not representative of the Galeton Reservoir situation. Wells within the proposed Galeton Reservoir footprint will be under water and therefore subjected to elevated pressure, as a result of the water on top of them. The Corps must consider the post-impoundment geologic impacts resulting from large and fluctuating weight of the proposed reservoir. The Corps must do so by consulting with a qualified expert who can provide expert advice on the post-impoundment landscape.

The Corps must consult with qualified experts and fully consider any special issues related to abandoned and/or sealed wells in an underwater environment. In particular, they must consider impact of the substantial weight that will be experienced at well sites from the impoundment as well as the unique weathering forces that will occur with fluctuating water levels, and the potential impacts of those forces on sealed well and well bore integrity.

The Technical Memorandum discloses that impounded water could cause a hydraulic gradient away from the reservoir, citing this as a rationale to not be concerned about adjacent wells contaminating the proposed reservoir. Oil and Gas Development at the Proposed Galeton Reservoir Site Technical Memorandum (an SDEIS technical report) at 8. There is, however, no discussion of the potential impacts resulting from the new hydraulic gradient carrying contaminates from well bores located under the

proposed reservoir footprint to nearby and adjacent water wells and/or surface seeps. A hydraulic analysis of the post-impoundment groundwater flow must be conducted with attention given to potential contamination off-site from spills or failed well integrity originating from abandoned, current, and planned wells located within the proposed Galeton Reservoir footprint.

The SDEIS states that hydraulic fracturing ("fracking") has occurred at the proposed Galeton Reservoir site. SDEIS at 3-91. Only about 30% of fracking fluid that is injected into a well during completion is recovered during the job. Studies have shown that over 75% of the chemicals used in fracking can affect skin, eyes and other sensory organs including respiratory and gastrointestinal systems. About 40-50% of the chemicals could affect the brain and nervous system, immune system, cardiovascular system or kidneys. About 37% affect the endocrine system and 25% of the chemicals have the potential to cause cancer or mutations. Colborn, et al., 2001, attached here in Appendix E (E10). There is also danger from high levels of salts (25-180 g/L) and naturally occurring radioactive materials and oil and gas. Vengosh, 2014, attached here in Appendix E (E28) and Abualfaraj, Gurian, and Olson, 2014, attached here in Appendix E (E01). The Corps must consult with qualified experts and consider the potential for contamination from lost fracking fluid.

Cost of Mineral Right Buy-out and Well Closure and/or Relocation Analysis

Although the SDEIS identifies numerous active and planned wells at the reservoir site and acknowledges that some or all of the wells may require relocation (SDEIS at 2-46, "The District would relocate any well that would interfere with reservoir operations"), the Corps undertakes no analysis of impact of these wells on the cost of the project. The only justifications for this omission are the unsupported statements of the project proponent that the wells will be abandoned prior to development of the reservoir. SDEIS at 2-46, "The District anticipates that all of the wells would be abandoned by the operator before Galeton Reservoir was built", SDEIS Appendix F at 55 "Northern Water has cooperated with and reviewed plans by the well operators to ensure that the operator's oil and gas development plans are consistent with the construction of Galeton Reservoir"). The SDEIS provides no meaningful data to support the conclusion that the wells will be abandoned at the time of reservoir construction and therefore fails to meet the "hard look" requirements of NEPA. As discussed above, the on-the-ground situation in the oil patch changes rapidly and there is no reason to take on faith that the wells will be abandoned and the minerals will be depleted in the time frame that the project proponent outlines for NISP. Recent developments in technology and techniques have extended the utility of wells that were

previously considered to be at the end of their productive lifespans. *See* "Refracking is the new fracking," attached here in Appendix E (E22).

The Corps must either: 1) provide a detailed cost analysis for the buy-out of mineral rights that would be impacted by construction and/or operation of the proposed Galeton Reservoir and well closures and/or relocations, or 2) a competently documented analysis of the life-span of the oil and gas field underlying of the proposed Galeton Reservoir that objectively supports the conclusion that all existing and planned wells as well as underlying mineral rights will be abandoned prior to the proposed reservoir construction.

A detailed cost analysis must include, but is not limited to:

1. An estimate of the cost of "abandoning" active and planned oil and gas wells that would be impacted by the proposed Galeton Reservoir. A recent University of Colorado study, "Assessment of Oil and Gas Industry Economic and Fiscal Impacts in Colorado in 2010" (2011, attached here in Appendix E (E48)), estimated that each oil and gas well generates an average $1.76 million/year in Colorado, and approximately $20 million over a well's lifetime. Any costs analysis must consider the full net present value of wells drilled at the time of inundation, as well as any industry infrastructure development costs that would be lost due to abandonment of the site, as re-location of the wellheads may not be possible. This estimate must explicitly address split estate lands and the possibility of acquisition costs for separate mineral rights and surface ownership and must document ownership records.

2. An analysis of the possibility of relocating wells in the affected oil and gas field and an estimate of the cost of relocating active and planned oil and gas wells that would be impacted by the proposed Galeton Reservoir. A 2014 Denver Post newspaper article, "Falling oil prices aren't dampening Colorado drilling" (attached here in Appendix E (E57)), estimates that the average cost of drilling an oil or gas well in Colorado is $4 million. This estimate must explicitly address split estate lands and the possibility of acquisition costs for separate mineral rights and surface ownership and must document ownership records.

3. An analysis of the impact of development of the proposed Galeton Reservoir on owners of currently undeveloped or not fully developed mineral rights on underlying lands and an estimate of the cost to buy-out all of the rights that would be negatively impacted. The Corps

must consult qualified experts and determine the lost net present value of mineral rights whose values will be reduced or eliminated. Current development reflects current market conditions rather than the true value of the minerals that might be impacted. Mineral right holders have extensive rights of access under Colorado law that could be compromised by development of the reservoir. This estimate must explicitly address split estate lands and the possibility of acquisition costs for separate mineral rights and surface ownership and must document ownership records.

Subsequent to developing the detailed cost analysis for the buy-out of mineral rights that would be impacted by construction and/or operation of the proposed Galeton Reservoir and well closures and/or relocations, the Corps must explicitly review the feasibility of all of the action alternatives that depend upon the proposed reservoir for their implementation. The Corps must reassess the overall project cost estimates and timelines and determine if each of the action alternatives continues to meet the alternative screening criteria.

Consideration of Flooding and Fracking Fluid Spills

The Corps must consider the potential for flooding upstream of the proposed Galeton Reservoir and the potential for fracking fluid spills into and near the reservoir. During the Colorado Front Range floods of 2013, there were 50 spills of fracking fluid and oil and gas development-associated wastewater in less than a week. The chemicals that are used in fracking fluids are often stored on site so there is potential for high concentrations of chemicals to be released into or near the proposed reservoir during a flood event. Colorado Oil and Gas Conservation Commission 2014 Annual Report, 2014, attached here in Appendix E (E49)). If the Corps permits NISP, the Corps also must develop as mitigation a specific emergency action plan for flood response.

Consideration of Surface Excavation on Well Sites

The Technical Memorandum states that the surface of the reservoir site will be scraped of unconsolidated material, potentially to a depth of the groundwater table (suggested at 18-35 feet depth within the reservoir site). Oil and Gas Development at the Proposed Galeton Reservoir Site Technical Memorandum at 7. The Corps must consider how such excavation will impact previously abandoned wells and how the excavation will impact the proposed reservoir-related well abandonment.

Transparency of Cooperation and Coordination between the Project Proponent and Well Operators

The Corps must not rely on blanket assurances about cooperation and coordination between the project proponent and well operators concerning the future longevity of the existing wells, future development, and the impact of the development of Galeton reservoir on oil and gas operations and vice versa. The Corps' reliance on these unsupported statements in the SDEIS (SDEIS at 2-46, SDEIS Appendix F at 55) utterly fails to meet NEPA's requirement for full disclosure and make it impossible for the public to meaningfully engage in the review of the NISP proposal. The Corps must provide documentation for, and critical review of, any such statements.

35. The SDEIS Fails to Adequately Consider the Impacts on the Local Economy of the Alternatives

The Corps fails to consider the economic impact on junior water rights holders whose water use would be displaced by the diversion of the Grey Mountain right under Alternative 2. Although it is a valid conditional right, no water has been diverted under Grey Mountain to date. The over-appropriated nature of the Cache la Poudre suggests that junior water rights are currently used to divert water that would be captured by the Grey Mountain right. The Corps must identify those water rights and independently analysis the economic impact of the loss of use of water under those rights.

The SDEIS states the recreational use of Glade Reservoir would be implemented by a "qualified vendor or lessee," likely Larimer County or Colorado State Parks. SDEIS at 2-34. The Corps fails to consider the costs of construction, maintenance and ongoing operations that would be incurred by the operator and the impact of those costs on the regional economy and taxpayers. The Corps must conduct an analysis of the costs associated with ongoing operations at the proposed reservoir and the impact of those costs on public entities and the regional economy.

36. The SDEIS Fails to Present a Reasonably Complete Environmental Analysis of NISP

In addition to the many shortcomings details above, the SDEIS itself acknowledges that numerous elements of the required environmental impact analysis are incomplete. SDEIS at S-12 – S-13. The SDEIS describes five activities to be undertaken by the proponent and 13 activities to be undertaken by the

Corps "before FEIS issuance." SDEIS at S-12 – S-13. Importantly, the Corps indicates that it "indicates" that these activities will be completed before the FEIS is issued; the Corps fails to assert that they will.

The activities that the Corps identifies at SDEIS at S-12 – S-13 are critical, although not internally sufficient, to the completion of a competent environmental impact analysis of NISP. The Corps must complete all of these actions and provide for meaningful public review of the results before any decision making on NISP. Such consideration and disclosure must be consistent with, and in addition to, the other actions called for by STP in these comments.

37. The SDEIS Unreasonably Portrays the Cache la Poudre as Suffering from Inevitable Decline

The SDEIS makes numerous references to the environmental conditions of the Cache La Poudre being on projected "trajectory" or trend SDEIS at 3-74 ("These consequences of past development are reflected in the current trajectory of the morphologic and sediment transport conditions of the mainstem"); *See*, *e.g.*, SDEIS at 3-77 ("The trajectory for the channel upstream of I-25 under current conditions is a continuation of spatially discrete episodes of alignment and profile instability during short periods of unusually high flow with prolonged periods of relative stability at other times"), SDEIS at 3-79 ("There are two main reasons why the trajectory for the river downstream of I-25 is different from the trajectory for the river upstream"), SDEIS at 3-118 ("The Martinez Park site demonstrates the trajectory of the riparian woodlands associated with the Poudre River from about Fort Collins to the confluence with the South Platte River"). The SDEIS cites this trajectory as a baseline for comparison of the environmental impacts of the alternatives. *See*, *e.g.*, SDEIS at 4-154 ("the predicted river response is presented and discussed in light of the current trajectory of river condition"), SDEIS at 4-213 ("For the assessment of indirect effects, first the trajectory of the riparian and wetland resources along the Poudre River was estimated to determine context for how changes in streamflow would potentially affect the future of the resources."). In general, the trajectory is described as a decline in river health. *See*, *e.g.*, SDEIS at 4-154 ("the trajectory of the river is expected to continue under Current Conditions hydrology as the result of ongoing channel contraction, fining of surficial material, and loss of channel complexity").

By invoking the inevitably of the projected trajectory, the Corps fails to conduct an objective "hard look" at the impacts of the alternatives. The Corp's use of "trajectory" and projected trends in the impacts analysis improperly minimize the impacts of the alternatives by characterizing those impacts on river health as a continuation of the status quo. *See*, *e.g.*, SDEIS at 4-157 ("Assessments of the effects of

Alternative 2 compared to the Current Conditions confirm an amplified trajectory of the river conditions"), SDEIS at 4-158 ("the ongoing trend associated with channel contraction downstream of I-25 would likely lead to an increase in overbank flooding"), SDEIS at 4-161 ("The result would be expected to reinforce the current net depositional trend"), SDEIS at 4-162 ("the river downstream of I-25 had crossed a bio-geomorphic threshold and is on a trajectory leading to a shallower and narrower channel"), SDEIS at Table 4-69 ("Changes in flows associated with Alternative 2 are predicted to accelerate and/or reinforce the well-established trajectory"). The Corps' approach also fails to properly document the significance of the incremental effects from Alternative 2 that would exacerbate impaired or degraded conditions.

NEPA requires a review of an alternative's impacts in comparison to current conditions not in relation to historic changes. STP and other commentators (Appendix E (E03, E08)) assert that the continued decline of the Poudre is not an inevitable outcome. The NISP review process must focus on the impacts of the NISP alternatives and not on what has occurred in the past.

The Corps must reconsider its environmental impact analysis and properly disclose the environmental impacts of each alternative as a function of the environmental change that the alternative generates in relation to the current conditions. The Corps must fully consider the contribution of Alternative 2 even if there are existing or projected impacts not caused by NISP.

B. The SDEIS Fails to Establish Alternative 2 as the LEDPA under the Clean Water Act

The Corps can only permit Alternative 2 (or any other action alternative) if it affirmatively establishes that there are no practicable options that have less adverse environmental impact than the action to be permitted. *See* 40 C.F.R. 230.10(a) ("[N]o discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem …"). The SDEIS fails to do this. Two of the project alternatives (3 and 4) have demonstrably less adverse impact on stream hydrology, water quality, aquatic habitats and wetlands and riparian vegetation.

The No Action Alternative analyzed in the SDEIS fails to represent the actual steps communities in the region are taking today to meet their water supply needs. *See* "The SDEIS Fails to Establish the Reasonableness and Feasibility of the No Action Alternative." The Corps has failed to refute that a No

Action Alternative that accurately reflects the outcome of a permit denial would also have less impact than Alternative 2.

Alternatives 2, 3 and 4 described in the SDEIS all have greater adverse environmental impacts on aquatic resources than the water supply initiatives the project participants are already pursuing and are likely to continue pursuing in the future. SDEIS at 5-13. These initiatives include traditional water purchases, conservation, water use efficiency improvements, alternative agricultural transfers (rotational fallowing agreements, interruptible supply agreements, water cooperatives, municipal-agricultural water use sharing, water banks, flex markets), water reuse, and reverse osmosis. They serve a critical role in meeting the region's water needs without requiring new diversions from the Cache la Poudre River and therefore not requiring a NEPA process or a 404 permit. These actions, by virtue of not impacting special aquatic resources, muse be assumed to have less adverse environmental impact unless shown otherwise. 40 C.F.R. 230.1 ("the degradation or destruction of special aquatic sites, such as filling operations in wetlands, is considered to be among the most severe environmental impacts ").

As there are practicable alternatives which would have less adverse environmental impact on aquatic resources, NISP must not be permitted.

C. The Conceptual Mitigation Plan Fails to Provide a Clear Assessment of Mitigation Measures Practicable for NISP

The Corps' regulations require that "mitigation measures will be clearly assessed" in an Environmental Impact Statement. 32 C.F.R. 651.15(b). Such an assessment requires a clear disclosure of potential mitigation measures and a thorough review of their practicability, coupled with details on monitoring and enforcement to ensure implementation 32 C.F.R. 651.15(b), 32 C.F.R. 651.15(h). The proposed Conceptual Mitigation Plan (CMP) fails to meet those standards.

In fact, the CMP cannot possibly provide a clear assessment of mitigation for impacts that are not understood. . *Ohio Valley Envtl. Coalition v. United States Army Corps of Eng'rs*, 479 F. Supp. 2d 607, 627 (S.D. W. Va. 2007). Until the Corps completes a competent environmental impact analysis, addressing the concerns raised by STP and many others, any consideration of mitigation must be seen as hypothetical at best. The vague measures presented in the CMP do little to advance a meaningful review of NISP.

The CMP does however alert reviewers to a bias towards project implementation with unsupported statements that seem intended to provide justification for Alternative 2.

> "Typically, aquatic resource mitigation efforts that address low flow conditions would be more beneficial than high flow periods (both enhancement of low-flow and low-flow channel improvements)."

SDEIS Appendix F at 17.

Absolutely no analysis or documentation is provided in the CMP to support this significant claim that goes to the heart of what mitigation for this project must address. The only apparent support for the claim is the following sentence,

> "Glade Reservoir provides an opportunity for low-flow aquatic resources mitigation."

SDEIS Appendix F at 17.

The logic appears to be that Alternative 2 would allow for low-flow augmentation, as has been proposed, so this should be our mitigation approach. Such an assumption utterly fails to provide a clear and objective analysis of mitigation potential and needs.

(Concerns with the use of augmentation flows as both project components and mitigation are discussed in "The SDEIS Improperly Considers the Proposed Augmentation Flows under Alternative 2" above.)

The most definite proposals in the CMP involve distribution of funds for various projects. *See*, *e.g.*, SDEIS Appendix F at 68 (Steam channel improvement plan, $1 million commitment), SDEIS Appendix F at 77 (channel structures, $200,000), SDEIS Appendix F at 85 (adaptive management program, $50,000 per year for 20 years; escrow account to implement actions developed in the stream channel habitat and improvement plan, $5 million), summary table at 239. Although specific numbers are presented in the document, there is no support for the funds proposed; no indication of how adequately they would address any of the yet-to-be-determined impacts or anyway mitigate the project's implementation. It is reckless and contrary to the intent of our environmental laws, which require objective consideration of the net impacts and benefits of a proposal, to offer up funds in a fashion that appears to *See*k to facilitate approval of the project.

Importantly, the CMP fails to address the most significant impact that would result from implementation of the Alternative 2 as we current understand it—the loss of the peak flows that are critical to river health. *See* "The SDEIS Fails to Adequately Consider the Contribution of Peak Flows to the Health of the Cache la Poudre." The CMP fails to provide any meaningful mitigation for these impacts even though there is no controversy that Alternative 2 will significantly curtail these flows.

Seemingly without a sense of irony, the CMP claims as "avoidance" mitigation components of the project that have been removed from the consideration by the applicant prior to development of the CMP.

> "Two of the most significant changes in the NISP/Glade Reservoir that avoid environmental effects are the movement of the proposed reservoir from an on-channel reservoir site to an off-channel reservoir site, and the elimination of a potential point-of-diversion that would have been upstream of the North Fork confluence with the Poudre River."

SDEIS Appendix F at 28.

The proponent gave up on the in-channel reservoir, for its own purposes, two decades ago. SDEIS Appendix F at 28-29 ("Through these processes, Northern Water determined that an on-channel reservoir was not environmentally or publically acceptable, and moved its preferred alternative to its current location at Glade Reservoir"). Further, an in-channel reservoir apparently would not have passed the Corps' own screening analysis. SDEIS Appendix F at 29 ("All on-channel reservoirs were eliminated through the NISP screening process"). The diversion point change was voluntarily discarded by the proponent between the DEIS and SDEIS and does appear to have been under serious consideration by the proponent. SDEIS Appendix F at 29 ("Another feature of the NISP project that has been informally studied by Northern Water"). The CMP fails to meet the intent and application of mitigation by seeking to claim that actions taken before the project has been proposed or approved can be considered as "avoidance" of impacts that will result from NISP.

Similarly, the CMP cites the proponent's willingness to comply with water court decrees on its water rights and curtail diversions when required to do so. SDEIS Appendix F at 35. Such compliance, fundamental to its implementation of the Grey Mountain right to NISP, fails to qualify as meaningful mitigation of the impacts from the diversions that <u>are allowed</u> under the Grey Mountain right.

The Corps must develop a competent mitigation plan through a clear assessment of practicable mitigation measures, and ensure the monitoring and enforcement of any adopted measures, if any of the NISP action alternatives are permitted. The Corps must base such a plan on a thorough environmental impact analysis and must complete and implement the plan in a manner that provides for meaningful public review.

D. The Corps Failed to Provide for Adequate Public Scrutiny of the Impacts Associated with NISP

1. The Corps has Failed to Provide Adequate Opportunity for Meaningful Public Review of the SDEIS

The SDEIS is nearly 1,500 pages long and is accompanied by dozens of technical reports. Its release comes seven years after the SDEIS and comes at a cost of "nearly $10 million." Appendix E (E20). Clearly, a massive amount of effort went into generating this unfortunately incomplete document.

Despite a thorough understanding of the effort that was required to generate this analysis and the scope of the final product, the Corps has only granted the public 75 days to acquire, review, and comment on the SDEIS. "NWO-2003-80509-DEN" attached here in Appendix E (E21). The Corps' action in this regard is a clear rebuke of the intent of NEPA.

> "NEPA **procedures must insure that environmental information is available to public officials and citizens** before decisions are made and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and **public scrutiny are essential to implementing NEPA**.

32 C.F.R. 1500.1 (emphasis added).

Further, despite the volumes submitted for public review, the Corps has failed to make all of the information necessary to fully review the SDEIS publicly available. After an initial review of the SDEIS, STP submitted, on July 19, 2015, a Freedom of Information Act (FOIA) request for the Corps documents necessary for the public to fully understand several elements of the SDEIS including:

1. The alternative development and screening process, including the newly developed No Action Alternative;
2. Project cost estimation;

3. The water exchanges essential for a key component of NISP – the South Platte Water Conservation Project – to function;
4. The ability of the preferred alternative to meet the SDEIS' own firm yield criteria;
5. Data used to develop the critical irrigation-associated wetlands loss analysis; and
6. The failure by the Corps to respond to several relevant documents submitted by STP in a timely fashion for incorporation into the SDEIS analyses.

Appendix A (A04).

This request includes at least one document explicitly referenced by the SDEIS that does not appear to be publicly available.

STP did not receive a response its request until August 18, 2015, a date after the expiration of the 20-day response period that the Corps is allowed under FOIA (5 U.S.C. 552(a)(6)(A)(i)), which expired on or about August 10, 2015. The response indicated that the Corps "are trying to determine the volume of records we have responsive to your request and how long we will need to gather these records."

The day after STP received the response, believing that they would not receive the essential information in a timely fashion to incorporate the material into these comments, STP submitted a request to the Corps for an extension to the comment period. *See* Appendix A (A03). STP has received an acknowledgement of the receipt of that request but no acceptance or denial of the request. *See* Appendix A (A02).

The Corps has failed to provide the information needed to thoroughly review the SDEIS within the time that it has provided for that review. The Corps has also failed to provide a timely response to a reasonable and properly submitted extension request.

STP is unable to provide meaningful comments on the SDEIS issues cited above without the additional documents that have been requested. The Corps has failed to provide adequate opportunity for public review of the SDEIS, contrary to both the intent and implementation of NEPA.

2. The SDEIS Fails to Provide Information in a Clear and Readily Accessible Manner

The volume of information contained in the SDEIS can only be meaningfully reviewed if it is presented in a clear and readily accessible manner. The Corps has failed to do that and consequently fails to meet the

intent of NEPA. 40 C.F.R. 1502.1 ("Statements shall be concise, clear, and to the point, and shall be supported by evidence that the agency has made the necessary environmental analyses").

The sheer volume of the SDEIS (coupled with the unreasonably short review period granted to the public) makes it critical that the summary information presented in the main document be competent. Unfortunately, the Corps imposes qualitative classes on its impact descriptions. SDEIS at 4-3. The SDEIS defines these terms but does so with ambiguous, unquantifiable standards such as "slight" and "readily apparent." SDEIS at 4-3. The terms are then used for comparison of the impacts of the various alternatives. *See*, *e.g.*, SDEIS at Table 4-50, Table 4-53. By using these qualitative terms rather than the quantitative data determine during the impact analysis, the Corps fails to provide for a concise and clear comparisons in summaries. The Corps must reconsider and disclose its environmental impact analysis without the use of ambiguous impact classifications and must instead rely on quantitative measures or fully defined and quantifiable impact classes that meaningfully convey the differences between impacts.

II. The Corps Must Allow for Additional Meaningful Public Input

NEPA requires a "hard look" at the environmental impacts associated with a project. *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1985). The Corps must complete numerous additional analyses in response to the Corps' failure to present a complete and adequate disclosure of both the environmental impacts associated with NISP and the potential mitigation. 40 C.F.R. 1502.22 ("If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement"). The Corps must provide for meaningful public review of these analyses before undertaking any decision making concerning NISP. *Colorado Envtl. Coal. v. Dombeck*, 185 F.3d 1162, 1172 (10th Cir. 1999) (A document prepared under NEPA must "foster both informed decision-making and informed public participation"). Failure to provide for such public review would clearly fall short of both the intent and implementation of NEPA and the Clean Water Act.

The Corps must not wait for the issuance of a Final Environmental Impact Statement to make these disclosures. 40 C.F.R. 1502.9(a) ("The draft statement must fulfill and satisfy to the fullest extent possible the requirements established for final statements"). The required disclosures must be made through either a revision to the SDEIS or another Supplemental Draft Environmental Impact Statement.

40 C.F.R. 1502.9(a) ("If a draft statement is so inadequate as to preclude meaningful analysis, the agency shall prepare and circulate a revised draft of the appropriate portion"), 40 C.F.R. 1502.9(c)(2) (The agency "[m]ay also prepare supplements when the agency determines that the purposes of the Act will be furthered by doing so").

The Corps' Project Manager for NISP, John Urbanic, has made a statement in an email that,

> The Corps has "not made a determination regarding how that additional information will be presented to the public prior to the Final EIS. At this time we do not anticipate having a formal comment period when the FEIS is released."

"RE: FW: Fort Collins/Larimer County NISP concerns," attached here in Appendix E (E50).

If the Corps will not offer public comment on the FEIS, as is indicated by this statement, the Corp must present any and all required additional analyses in either a revision to the SDEIS or in an additional Supplemental Draft Environmental Impact Statement. If the Corps fails in this duty, it must provide a meaningful opportunity for public review of the FEIS.

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Meyer Glitzenstein & Eubanks LLP

4115 Wisconsin Avenue, N.W., Suite 210
Washington, D.C. 20016
Telephone (202) 588-5206
Fax (202) 588-5049
lmink@meyerglitz.com

2601 S. Lemay Ave., #7-240
Fort Collins, CO 80525
Telephone (970) 703-6060
Fax (202) 588-5049
beubanks@meyerglitz.com

October 4, 2018

By Internet Submission

John Urbanic, NISP EIS Project Manager
U.S. Army Corps of Engineers, Omaha District
Denver Regulatory Office
9307 S. Wadsworth Blvd.
Littleton, CO 80128

Re: Comments on the U.S. Army Corps of Engineers' Final EIS for the Northern Integrated Supply Project in Colorado

On behalf of several national, regional, and local non-profit conservation organizations including Save The Poudre: Poudre Waterkeeper ("STP"); Sierra Club, Save the Colorado, Waterkeeper Alliance, WildEarth Guardians, and Fort Collins Audubon Society ("Conservation Organizations"), we hereby submit comments on the U.S. Army Corps of Engineers' ("Corps") Final Environmental Impact Statement ("FEIS") for the Northern Integrated Supply Project ("NISP" or "the Project"). These comments incorporate by reference all previous comments individually and collectively submitted by Conservation Organizations and their officers. Although the Conservation Organizations continue to view the length of the comment period as highly inadequate to allow the public and topical experts to fully engage in the many new issues raised in the Corps' FEIS—let alone to sufficiently analyze them under federal law and the best available scientific evidence—these comments provide a general overview of the organizations' primary concerns with the FEIS. Towards that effort, the Conservation Organizations incorporate by reference the following expert reports addressing specific aspects of the FEIS and other relevant materials:

- Attachment A: Water Demand Analysis Report (LRB Hydrology & Analytics)
- Attachment B: CV of Lisa Buchanan (LRB Hydrology & Analytics)
- Attachment C: Alternatives Analysis Report (Gordon McCurry)
- Attachment D: CV of Dr. Gordon McCurry, P.G. (McCurry Hydrology LLC)
- Attachment E: Water Quality Report (Woodling Aquatics)
- Attachment F: CV of Dr. John Woodling, Ph.D.

- Attachment G: Analysis of Agricultural Water Supplies Projected to be Displaced by Development Processes on Colorado's Northern Front Range (STP)
- Attachment H: Fort Collins Whitewater Park Economic Assessment (Dr. John Loomis)
- Attachment I: Decoupling Article (John Fleck)
- Attachment J: Moffat Decoupling Comments (STP)
- Attachment K: FWMEP Comments (STP)
- Attachment L: Alternative Water Transfers in CO (EDF and WestWater)
- Attachment M: Larimer County Environmental and Science Advisory Board Comments

As discussed below, the FEIS is woefully inadequate to support the issuance of a Section 404 permit for the Project. It fails to demonstrate compliance with the criteria set forth in Section 404 of the Clean Water Act ("CWA") and its implementing regulations. To the contrary, the FEIS and other materials available to Conservation Organizations establish that, based on the existing record, NISP cannot satisfy the relevant permitting standards under the CWA. In addition, the FEIS fails to adequately analyze a full range of reasonable alternatives, as mandated by the National Environmental Policy Act ("NEPA"), 42 U.S.C. §§ 4321-4370m. Further, the Corps has failed to fully comply with the Endangered Species Act ("ESA") and the Bald and Golden Eagle Protection Act ("BGEPA"), 16 U.S.C. §§ 668-668d ("BGEPA"). Until compliance can be assured, the permit cannot be issued.

DISCUSSION

A. The Purpose and Need Statement is Too Restrictive, and Impermissibly Constrains the Range of Reasonable Alternatives, in Violation of NEPA.

An Environmental Impact Statement ("EIS") must "briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives." 40 C.F.R. § 1502.13. The purpose and need statement necessarily dictates the range of "reasonable" alternatives that the agency must consider in evaluating the environmental impacts of a proposed action. Therefore, an agency cannot define its objectives in unreasonably narrow terms. *See, e.g.*, *Colo. Envtl. Coal. v. Dombeck*, 185 F.3d 1162, 1175 (10th Cir. 1999) (providing that "the statements of purpose and need drafted to guide the environmental review process" may not be "unreasonably narrow"). Moreover, while an agency must take a private applicant's objectives into account when developing the purpose and need statement, it is the agency's responsibility to "defin[e] the objectives of an action." *Id.*

The Corps defined the project purpose and need in the Draft EIS ("DEIS"): "To provide the Project Participants with approximately 40,000 acre-feet of new reliable municipal water

supply annually through a regional project . . . which will meet a portion of the Participants' current and reasonably projected future additional water supply needs." FEIS at 1-5. The 40,000 acre-feet figure was based upon requests for additional firm yield submitted by the Participants. The Corps reported in the Supplemental DEIS ("SDEIS") that it "reviewed these 2011 demand projections . . . and found that 40,000 acre-feet of firm annual yield is still valid for NISP." SDEIS at 2-3. This figure was carried forward into the FEIS, and the Corps relied upon it to dismiss alternative water sources that would generate less than 40,000 acre-feet of annual firm yield.

While the Corps has "a duty to consider the applicant's purpose," it cannot define its purpose so narrowly to preclude the existence of reasonable alternatives. *Cf. Sylvester v. U.S. Army Corps of Eng'rs*, 882 F.2d 407, 409 (9th Cir. 1989) ("[A]n applicant cannot define a project in order to preclude the existence of any alternative sites."). Nor can the Corps formulate its purpose and need such that NISP is rendered a foregone conclusion under NEPA. *See New Mexico ex rel. Richardson v. Bureau of Land Mgmt.*, 565 F.3d 683, 710-11 (10th Cir. 2009) (finding that a project purpose "to determine which lands . . . are suitable for leasing and subsequent development" did not "take development . . . as a foregone conclusion"). The CWA and its implementing regulations give the Corps considerable discretion to regulate discharges into jurisdictional waters under Section 404 of the CWA. Accordingly, the Corps' consideration of NISP necessarily leaves open the question of whether a regional project was indeed the "least environmentally damaging practicable alternative" to meet the Participants' future water demands. Yet, the Corps framed the purpose and need so narrowly as to exclude project components that were not "regional" from detailed consideration. In so doing, the Corps ensured that a regional project was the *only* solution to meeting the Participants' alleged future water supply shortfalls, thus rendering a regional project a "foregone conclusion" in violation of NEPA.[1] *See Richardson*, 565 F.3d at 710-11.

The Tenth Circuit has previously rejected purpose and need statements that narrowly express the project's objectives as requiring the agency to adopt a particular alternative. For example, in *Davis v. Mineta*, 302 F.3d 1104, 1119 (10th Cir. 2002), the court evaluated a purpose and need statement for a traffic project that sought to improve traffic flow in part by building an additional river crossing. *Id.* The court rejected this reading, noting that "[a]lthough the scope of the Project certainly contemplates additional road capacity across the Jordan River, [it] d[id] not believe that a fair reading of the Project purposes and needs requires that this additional capacity necessarily be achieved by" construction of the additional crossing. The court further stated that "if the Project did narrowly express its purposes and needs as requiring a new crossing . . . [it] would conclude that such a narrow definition of Project needs would violate NEPA given the more general overarching objective of improving traffic flow in the area." *Id.* Similarly, the Corps cannot define NISP's purpose so narrowly as to require that the project's objectives be met by a major regional reservoir project. Rather, the "more general overarching

[1] As reported by the EPA, Conservation Organizations, and others in comments on the DEIS and SDEIS, a regional project is not the least practicable—or even the most *efficient*—option to meet future demand. Indeed, the EPA suggested water supply options that it believes "could assist in meeting a greater portion of the future demand, or might enable a smaller NISP project with fewer impacts." FEIS at A-112.

objective," *see id.*, of NISP is "to provide water," *see* FEIS at 1-5 (reporting the "basic project purpose" of NISP). To read NISP's objectives more narrowly violates NEPA.

Throughout the NEPA process, the Environmental Protection Agency ("EPA"), Conservation Organizations, and others repeatedly criticized the Corps' purpose and need statement and expressed concern that the statement impermissibly constrains the range of reasonable alternatives. *See Davis*, 302 F.3d at 1119 (explaining that an agency cannot "define the project so narrowly that it foreclose[s] a reasonable consideration of alternatives"). Significantly, in its comments on the DEIS, the EPA—which reviews and comments on all Section 404 permit applications and has the authority under the CWA to veto an individual permit, *see* 33 U.S.C. § 1344(c)—stated that NISP's purpose and need statement "artificially constrained" the alternatives analysis. FEIS at A-81. The EPA repeated this concern in comments on the SDEIS, reporting that it "remained concerned that . . . a narrow purpose and need statement in the SDEIS appear[s] to constrain the alternatives available to meet demand." FEIS A-112. The EPA suggested that the "basic" project purpose—i.e., "to provide water"—would be a more "appropriate" purpose and need statement for "this type of project." FEIS at A-111.

Despite the objections of the EPA and many other commenters, the Corps carried the purpose and need statement forward into the FEIS without alteration. Moreover, the Corps failed to give any meaningful response to the concerns raised by commenters, including its sister agency. In its response to the EPA's comments on the SDEIS, the Corps reaffirmed its decision to retain the 40,000 acre-feet and regional project requirements in the purpose and need statement, asserting that it "independently verified the purpose and need for NISP and exercised independent judgment in defining the purpose and need for the project from both the applicant's and public's perspective." *Id.* The Corps went on to state that it "determined the 'regional project' criterion was appropriately formulated and applied." *Id.* However, these conclusory statements fall far short of a "reasoned explanation" for the agency's decision. *Motor Vehicle Mfr. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) (providing that agencies must articulate a satisfactory explanation establishing a "rational connection between the facts found and the choice made"); *Olenhouse v. Commodity Credit Corp.*, 42 F.3d 1560, 1575 (10th Cir.1994) (requiring that agencies articulate a "reasoned basis for agency action"). Nor does the Corps provide such an explanation anywhere in the DEIS, SDEIS, FEIS, or supporting documentation.

Instead, the Corps conflates the alleged need for additional water supply generally with the need for obtaining that additional water supply *from NISP* specifically. Based on the report commissioned by the Corps to review the Participants' water demand projections, the Participants will require more than 40,000 acre-feet of additional water by 2060 to avoid shortfalls. BBC Research & Consulting, *Review of 2017 Demand Projections for NISP Participants Produced by Harvey Economics* 14 (Aug. 2, 2017). The Corps insists that it independently reviewed those projections and found them to be reasonable. However, there is a major difference between assessing the reasonableness of the Participants' demand projections (which themselves are suspect), and evaluating the reasonableness of the Participants' insistence that the additional demand needs be fulfilled by NISP. As noted by the EPA and other commenters, there is no reason that the additional water to meet future supply needs must come

from a large regional project. Other supply sources, storage solutions, and conservation methods to reduce the overall shortfall are available, yet were excluded from detailed analysis due to the impermissibly narrow purpose and need.[2]

Indeed, the EPA urged the Corps to explore specific components (several of which were also suggested by Conservation Organizations)—including alternative agricultural transfer methods (e.g., rotational fallowing, agricultural leasing),[3] purchasing additional units from the Colorado-Big Thompson Project ("C-BT Project"), and developing displaced water ("DDW")—that would reduce or eliminate the need to obtain the full requested amount of annual firm yield from NISP. The Corps relied on the screening criteria developed from its narrow purpose and need statement to dismiss these components out of hand, essentially rendering a regional project such as NISP a foregone conclusion, in violation of NEPA. *See Richardson*, 565 F.3d at 710-11.[4]

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[2] For example, Conservation Organizations submitted an alternative called the Healthy Rivers Alternative ("HRA"), which would have relied primarily on agricultural transfer components to supply 35,000 acre-feet of annual firm yield. The Corps dismissed this alternative because it fell 5000 acre-feet short of the arbitrary floor set by the narrow purpose and need statement. The Corps did not consider whether, as Conservation Organizations report, the annual firm yield of the HRA could be flexibly augmented by other water supply methods readily available to Participants. Nor did it consider whether the 40,000 acre-feet annual firm yield requirement was reasonable. Therefore, its basis for rejecting the alternative out of hand was unsupported and arbitrary.

[3] Alternative agricultural transfer methods were also excluded based on the Corps' screening for proven technology. However, both the EPA and Conservation Organizations vigorously dispute the Corps' assertions as to the feasibility of this component. As reported by the EPA, "[c]onsiderable efforts to facilitate the development and implementation of [alternative agricultural transfer methods] in Colorado have continued since . . . 2007." FEIS at A-115. Other states have implemented similar programs, "demonstrat[ing] that agricultural leasing is a proven method that may be a less environmentally damaging practicable alternative for this project, unless demonstrated otherwise by the project proponent." *Id.* Additionally, a recent economic study conducted by the Environmental Defense Fund and WestWater Research examining alternative water transfer methods *in Colorado* demonstrates that alternative agricultural transfer methods are cost competitive with traditional water acquisition methods, challenging the conventional wisdom in Colorado that it is too expensive and risky to lease water, and further demonstrating that these methods are viable and practicable water supply sources. *See* Attachment L. Neither the Corps, nor Northern Water have provided adequate justification demonstrating that agricultural transfer methods are impracticable under the CWA. *Accord* FEIS at A-115 (EPA comments stating same). Therefore, the Corps must give this component serious consideration before it can issue any permit authorizing the construction of NISP.

[4] In response to concerns about impacts to the headwaters of the Colorado River that might arise from use of West Slope Colorado water in the NISP system, the FEIS states that due to changes to planned operations, the only West Slope water under consideration would be from the C-BT project: "C-BT water was only retained to the extent that a portion of the Participants' C-BT water could potentially be used for reservoir first fill and State Engineer Office dam testing."

The fact that NISP was never intended to meet *all* of the Participants' future water needs only further illustrates the absurdity of the Corps' position. The Participants will already have to develop plans to obtain water to meet their remaining needs from other sources. Yet, the Corps never discussed why those other sources could not provide additional annual firm yield so as to allow some flexibility in the 40,000 acre-feet annual firm yield "need" for NISP. In fact, the record demonstrates that Participants will need to develop alternative water supply sources *during NISP's construction*, presumably introducing flexibility into the 40,000 acre-feet figure, and deferring the "need" for NISP. The Corps alleges that "Participants will need the yield from NISP no later than 2020, and these Participants will need additional supplies from that time forward." Harvey Economics Rep. at 46. Even assuming *arguendo* that the Corps' projections are accurate, it will be *more than a decade* before the main reservoir is constructed. *See* FEIS at 2-100 (reporting that "[i]n total, the period activity from detailed design of the main reservoir to completion of the entire project is estimated to take about 13 years"). Therefore, it is illogical to maintain that Participants require NISP to meet demand needs after 2020 when NISP will not be constructed until 2031 at the absolute earliest. Thus, the Corps' projected "need" for a regional project is unexplained and contradicted by the Corps' own statements, and as a result, is arbitrary and capricious under NEPA and the Administrative Procedure Act ("APA"). *See Olenhouse*, 42 F.3d at 1575.

Finally, as a practical matter, serious flaws in the Corps' population analysis and demand projections undermine the Corps' position that there is even a "need" for NISP. In comments on the DEIS and SDEIS, experts voiced serious concerns with the Corps' arbitrary selection of 40,000 acre-feet of projected need. In fact, the EPA criticized the fact that the screening criteria for alternatives were based on this figure, stating that the "alternatives analysis may be artificially constrained" as a result. FEIS at A-81. The EPA noted that the Corps' methodology used to project future water demand—i.e., multiplying historic water use factors by projected population growth—"tend[s] to overestimate future water demand." *Id.* Therefore, 40,000 acre-feet of projected need is likely an inaccurate estimate, and its use as a screening criterion "could have eliminated viable alternatives." *Id.* In response, the Corps insists that, "[i]f water use factors decreased over time, the Participants would still need the 40,000 AF of firm yield from NISP;

FEIS at A-111. The FEIS furthers states that the amount would be capped at 20,000 acre-feet (presumably, but not explicitly stated, per year). *Id.* Finally, the response to comment concludes without support that because "NISP would not increase nor change the timing of withdrawals of water from the West Slope, effects on West Slope resources were not described in the FEIS." *Id.* This assertion that either providing storage for or use of (depending on your interpretation) of 20,000 acre-feet of water from the C-BT system would have no impact on the operations of the C-BT system, including in the amount of water that could be diverted from the West Slope fails to pass the straight face test. At the very least, transfer of the C-BT water to Glade Reservoir opens up additional storage somewhere else in the system and could provide the opportunity for additional diversion of the Colorado's flow in wet years when physical and legal water is available. The Corps' must either provide a meaningful defense for its assertion of no change to amount or timing of C-BT operations or must model the impacts on the Colorado River of the transfer of 20,000 acre-feet to Glade Reservoir over a variety of hydrologic conditions, in order to comply with NEPA's "hard look" standard and the CWA.

additional future water needs in addition to NISP may be less." *Id.* This response is circular; if the Participants' future water demand is in fact less than projected, then alternatives that would provide a lower annual firm yield with fewer adverse environmental impacts are both feasible and practicable to meet the purpose and need of the project, which under the CWA would prohibit the Corps from adopting NISP at the conclusion of its decisionmaking process. The Corps' continued adherence to the 40,000 acre-feet and "regional project" requirements prevents the Corps and the public from seriously considering those options. Such an approach contravenes NEPA's purpose—i.e., "to require agencies to consider environmentally significant aspects of a proposed action, and, in so doing, let the public know that the agency's decisionmaking process includes environmental concerns," *Utahns for Better Transp. v. U.S. Dep't of Transp.*, 305 F.3d 1152, 1162 (10th Cir. 2002)—and is antithetical to NEPA's command to take a "hard look" at "all reasonable alternatives" to a proposed action, 40 C.F.R. § 1502.14(a).[5]

Turning to the analysis itself, the FEIS still fails to present a realistic picture of likely future water demand within the NISP service area. *See* Attachment A. First, the Corps' *own* analysis has been inconsistent throughout the NEPA review process. In fact, each iteration of water demand projection—from the DEIS through the SDEIS to the FEIS—has substantially lowered the end demand. *See id*. at Fig. 1. Second, as demonstrated by the expert analysis conducted by LRB Hydrology & Analytics ("LRB Demand Analysis"), the water use intensity—i.e., the rate that water is used by each person within the service area—has also steadily declined since 2000. *See id.* at Fig. 3. Despite this clear downward trend in water use intensity, the FEIS projects future water use demands based on an average of past intensity, incorporating only currently planned conservation activities as a downward pressure on water use. *See id.* 11-13. Indeed, the SDEIS' projections based on average historic water use intensity have proven to be substantially higher than the actual use for the periods for which data for comparison is available (2010 and 2015). *See id.* at Fig. 5. Further, the projections presented in the FEIS easily outstrip a simple linear extension of the recent water use record, ignoring the long-running downward trend in water use intensity. *See id.* at Fig. 5. In sum, the FEIS projections of future water demand fail to accurately reflect the changing nature of water use in the service area and Colorado in general, and substantially overstate the amount of water that the participants will need to meet their needs over the planning period.

[5] Another reason the Corps' arbitrary adoption of the need for 40,000 acre-feet of water resulting from this federal action—not a drop more, not a drop less—is unlawful is that it illegally segments the analysis of impacts under NEPA and the CWA for this 40,000-acre-foot action from the impacts that will necessarily occur if and when Northern Water seeks to meet additional demand it asserts will exist in the future. Especially where the Corps acknowledges that "[b]y 2040, the excess of combined demands over current firm supplies is predicted to exceed the 40,000 AF firm annual yield from NISP, and by 2060 projected demand over current firm supplies is projected to be almost 75,000 AF," FEIS at S-3, the Corps has not provided any legal or logically justification for failing to analyze the fully array of options available to meet the *entire* demand needs of the Participants through 2060 or some other date for which demand is reasonably foreseeable at this time. *See, e.g.*, *Del. Riverkeeper Network v. FERC*, 753 F.3d 1304, 1313 (D.C. Cir. 2014) ("An agency impermissibly 'segments' NEPA review when it divides connected, cumulative, or similar federal actions into separate projects and thereby fails to address the true scope and impact of the activities that should be under consideration.").

Relatedly, the downward trend in water use intensity is reflective of a phenomenon seen throughout the Colorado River Basin, known as decoupling. Indeed, as demonstrated by John Fleck, a well-respected expert on water issues in the American Southwest and the Director of the Water Resources Program at the University of New Mexico:

> Overall consumptive use of Colorado River water in the U.S. and Mexico peaked in 2002 and has declined by 6 percent since then, even as population and agricultural productivity have risen. . . . [T]his pattern suggests growth of population and economic activity is no longer necessarily linked to growing water use, creating opportunities for water managers attempting to cope with declining reservoirs and the threats of long term drought and climate change.

See Attachment I. Although increasingly recognized by experts and extensively documented by empirical evidence from municipalities across the region, the Corps failed to even *mention* decoupling in the FEIS. Instead, the Corps simply assumed that water demand will increase in parallel with population growth. The Corps' failure to address the most significant trend in water management and use in the Southwest in the past two decades undermines its demand projections, again calling the "need" for NISP into question.[6]

B. The Corps Unlawfully Avoided its Obligation to Consider a Full Range of Alternatives Under NEPA, Including Those that Would Reduce Adverse Environmental Impacts.

NEPA requires that the Corps "[r]igorously explore and objectively evaluate *all* reasonable alternatives" to the proposed action, including a "no action" alternative. 40 C.F.R. § 1502.14(a) (emphasis added); *see also id.* § 1508.9(b); *Custer Cty. Action Ass'n v. Garvey*, 256 F.3d 1024, 1039 (10th Cir. 2001). Because NEPA's overriding purpose is to "help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment," 40 C.F.R. § 1500.1, NEPA's implementing regulations, which are binding on all federal agencies, provide that the consideration of alternatives for reducing adverse impacts "is the heart of the environmental impact statement." 40 C.F.R. § 1502.14. Accordingly, EISs "should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public." *Id*.

1. The FEIS Fails to Include a True "No Action" Alternative Because Cactus Hill Reservoir Requires a Section 404 Permit.

The no action alternative serves as "a baseline for measuring the effects of the proposed action." *Biodiversity Conservation All. v. U.S. Forest Serv.*, 765 F.3d 1264, 1269–1270 (10th Cir. 2014). "[N]o action" means that "the proposed activity would not take place and the

[6] Save the Poudre previously submitted comments to the Corps discussing decoupling and its importance in developing accurate demand projections during the environmental review for the Moffat Collection System Project. *See* Attachment J. Those comments apply equally here, and are therefore incorporated along with the attachments by reference herein.

resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward." FEIS at 2-42. The Corps' NEPA Implementation Procedures further provide that the "no action" alternative is one that results in no activities requiring a Corps permit. *See* 33 C.F.R. § 325, app'x B.

The Corps regulates the discharge of dredge or fill material into wetlands and other waters of the United States under Section 404 of the CWA. Federal agencies have additional responsibilities to avoid, minimize, and mitigate unavoidable impacts on wetlands under Executive Order 11990. Corps regulations define wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, a prevalence of vegetation typically adapted for life in saturated soil conditions." 33 C.F.R. part 323.2(c). Wetlands subject to the Corps' jurisdiction (i.e., jurisdictional wetlands) meet the Corps' definition of wetlands and are adjacent, neighboring, or have a surface tributary connection to interstate or navigable waters of the United States.

In the DEIS, the Corps gave a preliminary evaluation of a "conceptual" no action alternative "intended to represent the possible water supplies that each Participant could obtain" if NISP was not permitted. DEIS at 2-20. The Corps assumed that the Participants would develop various smaller projects—individually or in small groups—that would meet individual storage needs without a large reservoir project. The Cactus Hill Reservoir was proposed as a component of *action* alternatives 3 and 4. The DEIS acknowledged that while "the determination of the jurisdictional status of wetlands" for the proposed project area and alternatives had not yet been made, "[d]uring a preliminary review, the Corps determined that *all of the project alternatives* would have activities that would involve the discharge of dredge or fill material into jurisdictional wetlands and/or waters of the United States." DEIS at 3-48 (emphasis added). Moreover, "although some wetlands and other waters in the study area may not fall under the Corps' jurisdiction under Section 404, they still are aquatic resources that will be addressed by the Corps under Section 404 and NEPA." *Id.* A preliminary review of the Cactus Hill Reservoir Study Area reported 45.1 acres of potential jurisdictional wetlands, and 7.3 acres of other waters potentially falling under Section 404 of the CWA. *Id.* at 3-50.

The no action alternative underwent sudden, significant, and unexplained revision in the SDEIS. The Cactus Hill Reservoir, a large-scale construction project with "major" permanent effects, *see* SDEIS at D-12, was included as a component of the *no action* alternative because, according to the SDEIS, construction of the reservoir would not require a Section 404 permit to move forward. This assertion is directly contradicted by the Corps' own statements later in the SDEIS, where it identified fifty acres of potentially jurisdictional wetlands and waters of the United States within the proposed project area related to Cactus Hill Reservoir. *See* SDEIS at D-54. Moreover, the Corps stated that the Cactus Hill Reservoir would directly impact, among other things, 31.8 acres of wetlands and 6.5 acres of waters (e.g., ponds, lakes, canals), and will indirectly impact 218.6 acres of wetlands. *See* SDEIS at D-12. Thus, the Corps' conclusion in the SDEIS that Cactus Hill Reservoir did not require a Section 404 permit is, at best, contradicted by the agency's own statements and evidence provided elsewhere in the SDEIS.

Based on this information, it is evident that Cactus Hill Reservoir requires a Section 404 permit under both CEQ and Corps regulations, and therefore cannot lawfully serve as a

component of the no action alternative. *See e.g.*, *Ramsey v. Kantor*, 96 F.3d 434, 444 (9th Cir. 1996) ("If a federal permit is a prerequisite for a project with adverse impact on the environment, issuance of that permit does constitute major federal action and the federal agency involved must conduct an EA and possibly an EIS before granting it."); 33 C.F.R. § 325, app'x B (defining "no action" alternative in the Section 404 permitting process as one that results in no activities requiring a Corps permit). In an attempt to avoid this inevitable conclusion, the Corps insists that while the construction of the smaller Cactus Hill Reservoir would involve the discharge of fill material into drainages and wetlands, those wetlands "do not *appear* to be subject to jurisdiction under Section 404 of the CWA." FEIS at A-131 (emphasis added). This conclusory assertion does not adequately explain or support the Corps' sudden change in position regarding the proposed reservoir's impacts on jurisdictional wetlands. Moreover, it seems that such evidence will not be forthcoming—while the Corps states that it will issue an approved jurisdictional determination for the Glade Reservoir, Upper Galeton Reservoir, and the U.S. 287 realignment study area before issuing the ROD, it remains silent on the Cactus Hill Reservoir site. *See* FEIS at A-131. Without an official determination of the Cactus Hill Reservoir's impacts to jurisdictional wetlands and waters of the United States, the Corps cannot definitively conclude that the reservoir's construction would not require a Section 404 permit, especially in light of evidence presented in the DEIS and SDEIS.[7] Therefore, the Corps' no action alternative in the FEIS contravenes basic NEPA principles, and is not a genuine "no action" alternative because it requires action by the Corps under Section 404 of the CWA.

As a practical matter, the use of Cactus Hill Reservoir as the no action alternative skews the Corps' entire analysis of alternatives. The no action alternative is a measuring stick that allows for meaningful comparison between the purported benefits of the proposed action, and its environmental impacts. *See Ctr. for Biological Diversity v. U.S. Dep't of Interior*, 623 F.3d 633, 642 (9th Cir. 2010) (providing that the no action alternative is intended to "provide a baseline against which the action alternative" is evaluated). Without "[accurate baseline] data, an agency cannot carefully consider information about significant environment impacts … resulting in an arbitrary and capricious decision." *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1085 (9th Cir. 2011); *see also Friends of Yosemite Valley v. Kempthorne*, 520 F.3d 1024, 1038 (9th Cir. 2008) (holding an agency's no action alternative invalid because it improperly

[7] Prior to submitting these comments, Conservation Organizations attempted to ascertain whether the proposed Cactus Hill Reservoir site contained jurisdictional wetlands. Conservation Organizations submitted several requests to visit the proposed site; however, both the Corps and Northern Water denied the requests, asserting that they lacked the legal authority to grant access to the property. Conservation Organizations also submitted a request to the Corps for any documentation relevant to jurisdictional wetland determinations for the proposed reservoir sites. Although the Corps provided Conservation Organizations with wetland delineation maps in GIS formats, the Corps declined to provide documents involving the Corps' development of jurisdictional determinations. By email dated September 17, 2018 the Corps informed Conservation Organizations that any further records related to jurisdictional determinations would only be provided through FOIA. Given the abbreviated timeline—comments on the FEIS are due by October 4, 2018— and the mandated twenty-day deadline for FOIA responses, Conservation Organizations would be unlikely to obtain a response from the agency in time to incorporate the records into their comments.

defined the baseline). This is precisely what occurred here, where the use of Cactus Hill Reservoir as the no action alternative deprived the Corps and the public of a meaningful opportunity to assess the impacts of a regional project against those of less environmentally destructive projects. *Accord* FEIS at A-116 (EPA comments noting that the no action alternative "miss[ed] the opportunity to incorporate alternatives that were screened out due to not being regional in nature"). Thus, the current alternatives analysis for NISP is fundamentally flawed. To comply with NEPA, the alternatives analysis must be revised to include a true no action alternative that accurately serves as the baseline for its NEPA analysis.

This point is further reinforced by the fact that, as of the date of these comments, the Corps cannot definitively state whether Cactus Hill Reservoir can even serve as the no action alternative. As noted above, the Corps previously reported the likely presence of jurisdictional wetlands at the Cactus Hill Reservoir site. Therefore, the Corps *knew* that any proposed project at the site may require a Section 404 permit, precluding its use as the no action alternative under both NEPA and Corps regulations. *See* 40 C.F.R. § 1502.14(a); 33 C.F.R. § 325, app'x B. As a practical and logical matter, where the Corps relies on the absence of jurisdictional wetlands to justify a particular no action alternative, the Corps should make the relevant jurisdictional determinations *prior to* undergoing the NEPA process both to provide a legally adequate baseline, and an accurate analysis and comparison of the proposed project's impacts. This is especially true here, where the NEPA process has spanned over ten years and consumed a significant amount of agency resources. The Corps' failure to consider such a highly relevant factor—i.e., the presence of jurisdictional wetlands at a site it proposes to use as its no action alternative—is arbitrary and capricious, and therefore, renders its analysis legally inadequate.

If it is the Corps' position that Cactus Hill Reservoir would not require a Section 404 permit, then at minimum the Corps must provide a comprehensive explanation and factual basis for this conclusion— including a delineation of the wetlands on the proposed site, and an official jurisdictional determination as to whether those wetlands fall within the waters of the United States. *See Olenhouse*, 42 F.3d at 1575 ("In addition to requiring a reasoned basis for agency action, the 'arbitrary or capricious' standard requires an agency's action to be supported by the facts in the record."). In the absence of a formal jurisdictional determination finding otherwise, the evidence presented in the DEIS and SDEIS that Cactus Hill Reservoir will, in fact, require a Section 404 permit renders the Corps' current formulation of the no action alternative arbitrary, capricious, and contrary to NEPA and its implementing regulations.[8]

2. Because the Action Alternatives are Substantially Similar, the FEIS Fails to Analyze a Reasonable Range of Alternatives.

NEPA imposes a clear-cut procedural obligation on the Corps to take a "hard look" at alternatives that would entail less significant impacts on resources affected by the project. *Balt.*

[8] Additionally, the Corps' failure to consider a no action alternative that does not contemplate the construction of a large-scale reservoir project suggests that the Corps skewed the analysis to require the selection of Northern Water's preferred alternative. *See Davis*, 302 F.3d at 1119 (explaining that an agency cannot "define the project so narrowly that it foreclose[s] a reasonable consideration of alternatives").

Gas & Elec. Co. v. Nat. Res. Def. Council, 462 U.S. 87, 100 (1983). EISs must "[r]igorously explore and objectively evaluate all reasonable alternatives" and, in particular, "should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public." 40 C.F.R. § 1502.14. The regulations further mandate that the EIS must "[i]nclude reasonable alternatives not within the jurisdiction of the lead agency," but that may nonetheless meet the overall objectives of the action while ameliorating environmental impacts. *Id*.

The FEIS violates these requirements. The *only* alternatives afforded "rigorous" treatment—i.e., a *comparative* analysis of impacts, thus affording a "clear basis for choice among options," *id.*—are those that involve the construction of the Upper Galeton reservoir, which will have a capacity of 45,624 acre-feet, and one other large-capacity reservoir. The Corps considered only two options for the second reservoir—Cactus Hill Reservoir, a component of the no action alternative, Alternative 3, and Alternative 4; and the Glade Reservoir, a component of Alternative 2 and the preferred alternative (Alternative 2M). As the EPA observed, there is not "a major environmental impact difference among the action alternatives." FEIS at A-98.

The Corps' failure to rigorously explore a single action alternative that would result in lower impacts on wetlands, the Poudre River, and other resources[9]—e.g., an alternative that would not require the construction of large reservoirs—is a flagrant violation of NEPA. Importantly, a central purpose of the proposed action (issuance of a 404 permit) is (and, under the CWA, *must* be) to evaluate whether less environmentally damaging practicable alternatives are available for non-water dependent projects. This definition of the "purpose" of the proposed federal action *necessarily* requires the Corps to consider reasonable action alternatives that would *better* protect wetland and riparian habitat, and minimize the adverse impacts on these important habitats, than Northern Water's preferred approach. *Cf. Union Neighbors United, Inc. v. Jewell*, 831 F.3d 564, 577 (D.C. Cir. 2016) ("Accordingly, because the Service in these circumstances did not consider any other reasonable alternative that would have taken fewer Indiana bats than Buckeye's plan, it failed to consider a reasonable range of alternatives and violated its obligation under NEPA.").

Courts have rejected precisely this type of avoidance approach by agencies in the past. *See Muckleshoot Indian Tribe v. U.S. Forest Serv.*, 177 F.3d 800, 813 (9th Cir. 1999) (concluding that the EIS violated NEPA when the two action alternatives considered in detail were "virtually identical"). Indeed, "the evaluation of 'alternatives' mandated by NEPA is to be an evaluation of alternative means to accomplish the general goal of an action; it is not an evaluation of the alternative means by which a particular applicant can reach his goals." *Van Abbema v. Fornell*, 807 F.2d 633, 638 (7th Cir. 1986). While an agency must take a private

[9] For example, as the Corps admits, "[a]ll alternatives would have a reservoir site, either Cactus Hill or Upper Galeton, where past oil and gas development has occurred." FEIS at S-44. Thus, all alternatives will expose water users to potential contamination from past oil and gas development, heightening the need to explore alternatives with fewer adverse environmental impacts.

applicant's objectives into account when developing the purpose and need statement, it is the agency's responsibility to "defin[e] the objectives of an action and then provide legitimate consideration to alternatives that fall between the obvious extremes." *Colo. Envtl. Coal.*, 185 F.3d at 1175. Here, however, it appears that the Corps merely accepted Northern Water's objectives as its own,[10] and developed alternatives that skewed the analysis towards the applicant's preferred alternative.

The Corps' analysis is devoid of *any* meaningful consideration of alternatives that fall between the "obvious extremes"—i.e., a regional project involving the construction of large reservoirs, and smaller local projects involving less environmentally damaging alternatives. Even the *no action* alternative contemplated the construction of a 120,000 acre-foot reservoir, and deprived the FEIS of a meaningful baseline against which to measure NISP's anticipated impacts. Moreover, by considering only alternatives that involved large-scale reservoir projects with no "major environmental impact difference," the FEIS essentially considered *only* the impacts from alternatives representing *one* of the extremes. Such an approach cannot satisfy the agency's obligations under NEPA to examine "*all* reasonable alternatives," including those that lie outside the jurisdiction of the agency. *See Citizens for Envtl. Quality v. United States*, 731 F. Supp. 970, 989 (D. Colo. 1989) ("Consideration of alternatives which lead to similar results is not sufficient under NEPA[.]"); *Friends of Yosemite Valley v. Kempthorne*, 520 F.3d 1024, 1038 (9th Cir. 2008) (finding that SEIS "lacked a reasonable range of action alternatives" because "the [three action] alternatives are essentially identical" and thus are "not varied enough to allow for a real, informed choice"). NEPA does not prohibit the Corps from ultimately adopting a proposal to build a regional water diversion project; however, it is deeply "troubling that the [agency] saw fit to consider from the outset only those alternatives leading to that end result." *California v. Block*, 690 F.2d 753, 768 (9th Cir. 1982).

While NEPA does not require the Corps to "consider every possible alternative to a proposed action, nor must it consider alternatives that are unlikely to be implemented or those inconsistent with its basic policy objectives," *Seattle Audubon Soc'yy v. Moseley*, 80 F.3d 1401, 1404 (9th Cir. 1996), it is particularly troubling here that the Corps failed to consider *any* alternatives that were more consistent with the basic policy objectives of the CWA and its Guidelines than the alternatives subjected to detailed consideration. As the Corps acknowledged, NISP is not a "water dependent" project. Therefore, there is a presumption that "practicable alternatives that do not involve special aquatic sites" exist, and that these alternatives "have less adverse impact on the aquatic ecosystem." 40 C.F.R. § 230.10(a)(3). These presumptions hold unless "clearly demonstrated otherwise." *Id.* Yet, the Corps failed to examine in detail *a single alternative* that would not involve the construction of a large reservoir, the destruction of jurisdictional wetlands, and large-scale water diversion.[11] Accordingly, the Corps' alternatives

[10] Indeed, as discussed *supra* at page 4-5, it appears that the Corps conflated the need for additional water with the need to obtain that water *from NISP*, and merely accepted Participants' request for 40,000 acre-feet of annual firm yield from NISP without meaningful evaluation of the reasonableness of that request.

[11] The Corps' actions are especially egregious in light of comments from the EPA, Conservation Organizations, and others suggesting specific alternatives that would have fewer adverse impacts

analysis fails to present a reasonable range of alternatives, and violates NEPA. *See Muckleshoot Indian Tribe*, 177 F.3d at 813-14 (holding that consideration of only "two virtually identical" action alternatives was inadequate).

3. The Corps Cannot Rely on Overly Restrictive Screening Criteria to Artificially Constrain the Range of Alternatives and Preclude Reasonable Alternatives from Detailed Consideration.

The Corps developed screening criteria to assist in the development of its range of alternatives. The purpose and need screening process used two primary screening criteria to determine whether alternatives could satisfy the project's purpose and need: firm yield and "regional" project. FEIS at 2-3. The firm yield criterion required that "viable water sources . . . . must be able to provide at least 30% of the total requested firm annual yield of 40,000 [acre-feet], which is 12,000 [acre-feet]." FEIS at 2-3. According to the Corps, reducing the number of potential water sources to four is "logistically reasonable for a water supply project of this magnitude." FEIS at 2-3. Notably, the Corps did not provide any support for this assertion. The regional project criterion required that project components considered "assist in providing the Participants with a common solution" to their water supply needs. FEIS at 2-3 to -4.

As described *supra* at Section A, the Corps narrowly defined the project purpose and need such that viable, less environmentally damaging alternatives were improperly excluded from detailed analysis, in violation of NEPA. The Corps' screening criteria, designed to eliminate alternatives that fail to meet the overly restrictive purpose and need, violate NEPA for the same reasons. NISP is premised on the false assertion that a regional project providing 40,000 acre-feet of annual firm yield is the *only* way to meet the Participants' future water needs. Accordingly, the Corps' purpose and need screening criteria are designed to ensure that only large regional water projects are given serious consideration. *See* FEIS at 2-3 to -4. For example, the 12,000 acre-feet requirement is designed to limit the number of water supply sources, but does not leave any room for considering a combination of lower-yield water supply sources, or combining a lower-yield supply source with two or three higher-yield water supply sources.[12]

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on the environment, while meeting the overarching purpose and need of the project. *See, e.g.*, FEIS at A-113. For example, the EPA criticized the Corps' failure to consider conservation methods and agricultural transfer methods as components for reasonable and feasible alternatives. Far from giving the EPA's comments serious consideration, the Corps instead relied on its impermissibly narrow purpose and need statement and arbitrary screening criteria to dismiss these suggestions from detailed analysis. *Id.* at A-113 to -114.

[12] For example, the HRA proposed by Conservation Organizations was dismissed because it only supplied 35,000 acre-feet of annual firm yield. Additionally, two of the components of the HRA were dismissed in part because they did not meet the firm yield criteria. However, as discussed *supra* at page 3, the 40,000 acre-feet firm yield "need" was derived not from an actual quantitative determination of need, but from the Participants' requests for additional water. Moreover, as Conservation Organizations noted in their comments on the SDEIS, the small difference between the annual firm yield of the HRA and the desired firm yield goal could be "flexibly augmented" in a variety of ways, including aggressive conservation measures,

The Corps does not explain why combining water sources in this way is infeasible. Nor does it explain why limiting the number of supply sources to four is more "logistically reasonable" than five, six, or even more.[13] Without such explanations, the Corps' firm yield screening criterion is arbitrary. As a result, the Corps' use of the criterion to constrain the range of alternatives considered violates NEPA.

Similarly, the Corps automatically excluded project components that were not "regional" in nature from detailed consideration. *See* FEIS at 2-4 ("[A]lternatives that would not assist in providing the Participants with a common solution were eliminated from further review."). The only justification the Corps gave for relying on the "regional project" criterion was that "NISP is a regional water supply project addressing a portion of the current and anticipated water supply needs of the Participants." *Id.* at 2-3. However, this circular logic cannot suffice as an explanation for *why* a regional project is necessary where viable—and less environmentally impactful—"local" solutions to meeting the Participants' collective future water needs exist. For example, the Healthy Rivers Alternative ("HRA") proposed by Conservation Organizations incorporated the use of development displaced water ("DDW") as a potential water supply source for the Participants. The Corps applied its screening criteria to DDW to determine whether it could serve as a feasible component of an alternative. *See* Hydros, *Evaluation of the "Healthy Rivers Alternative" Proposed by Save the Poudre: Poudre Waterkeeper Using the NISP Alternatives Screening Criteria* (Oct. 18, 2012) ("HRA Evaluation"). The Corps' analysis indicated that DDW was a viable solution to meeting the Participants' future water demand needs. In fact, the Corps reported that "NISP Participants *anticipate* DDW as a supply source of water." HRA Evaluation at 47. However, because DDW is "local in its nature and would not constitute a regional project," the component was excluded from detailed analysis *even though* its inclusion could lessen the demand on NISP and reduce the negative environmental impacts from the Project.[14] *Id.* By setting such an arbitrary floor, the Corps screened out feasible alternatives that were less environmentally damaging, in violation of NEPA.

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purchases of water rights in existing reservoirs, and agricultural transfers. SDEIS Comments at 16-17. Yet, because these reasonable alternatives did not satisfy the arbitrary firm yield screening criterion, they were excluded from detailed consideration altogether.

[13] By its own assertion, Northern Water's boundaries include 960,000 people and 1.6 acres, and in the growing season "Northern Water also delivers water to more than 120 ditch, reservoir, and irrigation companies serving thousands of farms and more than 640,000 acres." N. Water, *Who we are*, http://www.northernwater.org/AboutUs/WhoWeAre.aspx (last visited Oct. 4, 2018). Thus, considering Northern Water's extensive experience managing a complex system of multiple water sources and storage facilities on both sides of the Continental Divide, developing a project with a mere handful of additional components would not be an impossible task.

[14] The Corps' failure to adequately assess the utilization of farmland irrigation water displaced by land development—which in nearly all cases is purchased and converted out of agricultural use and into developed land use—was also arbitrary for its complete failure to account for demonstrated development and population trends in Northern Colorado, even as it relied on flawed population trends to justify the purported "need" for NISP. In assessing the feasibility of water supply sources, the Corps neglected to analyze how the vast majority of farmland in

Additionally, the Corps' screening criteria were not uniformly imposed, with favored alternatives allowed to inappropriately pass. For example, the "Practicable Screening Criteria" are intended to eliminate alternatives that, among other standards, are located on designated hazardous material sites or abandoned mineral or coal mines. FEIS at 2-5. Despite these criteria, all of the alternatives that are advanced to final consideration, including the preferred alternative, "have a reservoir site, either Cactus Hill or Upper Galeton, where past oil and gas development has occurred." FEIS at S-44. The Corps proposes to "minimize adverse effects of oil and gas development on reservoir water quality" without presenting a complete analysis of the current conditions of the abandoned wells at these sites, instead relying on a review of reported spill incidents." FEIS at S-44, 4-559, 4-561 – 562. Further, in its discussion of Alternatives 3 and 4, the FEIS states that, "[i]t is not known if Northern Water would be successful in changing the point of storage for these water rights to Cactus Hill Reservoir." FEIS at 2-90. Consequently, two of the action alternatives that were given final consideration are speculative at best and should have been eliminated as not meeting the standard of "capable of being done." 404 (b)(1).

The FEIS clearly states that "[t]he firm yield screening criterion requires that viable water supply sources must be capable of providing a firm annual water yield." FEIS at 2-3. Firm yield is further defined as "[t]he annual yield that is available during a defined drought period." *Id.* at xxxiv. The defined drought period is the drought period in the hydrologic record developed for hydrologic modeling. *Id.* Inexplicably, however, the FEIS selected as the basis for its drought standard a less severe drought period (1954–1956) than has been recently recorded. The Corps explains that the alternatives selected for detailed consideration "are not sized to meet full firm yield requirements during more severe droughts, such as the recent drought (2000–2005)." FEIS at 2-76. Therefore, the NISP Participants would need to pursue other water supply options including interruptible water supply agreements implemented on a temporary basis. *Id.* These statements illustrate the bias in the FEIS that results from the Corps' adherence to a drought standard based on periods of less severe historic drought. *See* Attachment C at 3. Indeed, the

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northern Colorado will be sold off, subdivided, and developed through 2060. STP conducted an independent analysis of the growth patterns in the Northern Front Range Metropolitan Planning Organization ("NFRMPO") Growth Management Areas ("GMAs") to determine the amount of water that would be made available following the conversion of irrigated agricultural land to developed land. *See* Attachment G at 1-2. STP's analysis demonstrates that the DDW available to Participants is far greater than the FEIS predicted. *Id.* at 1. In fact, the analysis predicted that by 2060, DDW could supply between 85,071 acre-feet and 152,812 acre-feet of water, which is 188% to 338% of the projected "need" under the No Action Alternative. *Id.* at 2. Further, the development that NISP is *intended to support* will inevitably result in the transfer of agricultural water and "dry-up" of farmland. *Id.* Thus, contrary to the Corps' insistence that without NISP, Participants will have to "buy and dry" thousands of farm acreage, land development will displace a large amount of water independent of NISP, and that water will be sold on the open water market. *Id.* In other words, NISP will not cause the largescale "buying and drying" of agricultural lands. The FEIS fails to consider DDW as a viable, less environmentally impactful water supply source, and as such, is arbitrary and capricious, and fails to support the conclusion that the preferred alternative is the least environmentally damaging practicable alternative.

Corps' use of the outdated drought standard led to the detailed consideration of project concepts that would not meet the water supply goals stated in the Purpose and Need based on *recent* observed hydrologic conditions. *Id.* Therefore, it would be inappropriate for the Corps to approve the Preferred Alternative and any of the actionable alternatives based on the recent hydrologic record and on the uncertainty in future hydrologic conditions based on climate change. *Id.* The Corps must provide a reasoned and well-supported justification for its use of this screening criteria when it appears to be based on an arbitrary selection of the hydrologic cycle, and further, does not appear to screen for alternatives that actually accomplish the Participants' objectives.

In sum, the Corps' screening criteria were too restrictive and eliminated from detailed consideration reasonable alternatives that would meet the project's basic purpose and inflict less damage on sensitive areas and resources. The goal of NEPA is not to reinforce a predetermined conclusion. Rather, NEPA is designed to provide a range of alternatives—including, but expressly not limited to, the applicant's preferred alternative—that present decisionmakers and the public with a reasoned choice. *See Colo. Envtl. Coal.*, 185 F.3d at 1172 (noting that NEPA "prohibits uninformed . . . agency action, and to further that goal, an EIS' form, content, and preparation must "foster both informed decision-making and informed public participation"). By creating a screening method designed to preclude consideration of any alternative that deviated significantly from Northern Water's desired project—yet would still satisfy Northern Water's overarching objective—the Corps artificially constrained the range of alternatives and failed to present the information necessary to make a reasoned choice. *See id.* ("What is required [in an alternatives analysis] is information sufficient to permit a reasoned choice of alternatives as far as environmental aspects are concerned.").

Accordingly, for all of these reasons, it is clear that the Corps cannot issue a permit for NISP until the serious flaws in its NEPA analysis are corrected.

C. The Corps' Issuance of a Section 404 Permit Authorizing Construction of NISP Will Violate the CWA.

The CWA is a comprehensive statute designed to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a). To this end, the CWA generally prohibits the discharge of dredged or fill materials into waters of the United States unless authorized by a permit ("Section 404 permit"). *Id.* § 1311. When reviewing Section 404 permit applications, the Corps must follow binding guidelines jointly established by the Corps and the EPA ("404 Guidelines" or "Guidelines"). These Guidelines are codified at 40 C.F.R. part 230.

The Guidelines prohibit the Corps from issuing permits for projects where there "is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences." 40 C.F.R. § 230.10(a). The Guidelines further prohibit the Corps from issuing a permit where it "will cause or contribute to significant degradation of the waters of the United States," which includes adverse effects on the "life stages of aquatic life and other wildlife dependent on aquatic ecosystems," "loss of fish and wildlife habitat," and "loss of the capacity of a wetland to assimilate nutrients, purify water, or reduce wave energy." 40 C.F.R. §

230.10(c). The Corps is also prohibited from issuing a permit where it "[c]auses or contributes . . . to violations of any applicable State water quality standard." *Id.* § 320.10(b).

In applying these criteria, the Corps must make detailed factual determinations as to the potential environmental effects of the proposed action, *see id.* §§ 230.11, 230.12(b) and it must indicate whether the project complies with the Guidelines in the record of decision based on the FEIS. *See* 33 C.F.R. § 325.2(a)(6). For the reasons discussed below, the FEIS utterly fails to demonstrate the Corps' compliance with these Guidelines. Accordingly, the Corps cannot lawfully permit the Project.

1. Because the Corps Failed to Demonstrate that Less Damaging Practicable Alternatives to NISP Do Not Exist, It Cannot Lawfully Issue the Permit.

The Corps' burden in finding the least damaging practicable alternative under the Guidelines is heaviest for non-water dependent projects planned for a "special aquatic site," such as a wetlands area. *See Holy Cross Wilderness Fund v. Madigan*, 960 F.2d 1515, 1524 (10th Cir. 1992). To be "practicable," an alternative must be "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." 40 C.F.R. § 230.10(a)(2).

Where projects are not water dependent, there is a presumption that "practicable alternatives that do not involve special aquatic sites" exist, and that these alternatives "have less adverse impact on the aquatic ecosystem." 40 C.F.R. § 230.10(a)(3). These presumptions hold unless "clearly demonstrated otherwise." *Id.* The Tenth Circuit has explained that in such a case, the Corps may not issue a § 404 permit unless the applicant, "with independent verification by the [Corps] , . . . provide[s] detailed, clear and convincing information proving " that an alternative with less adverse impact is "impracticable." *Utahns for Better Transp.*, 305 F.3d at 1186-87 (requiring denial of a permit "where insufficient information is provided to determine compliance"); *see also Greater Yellowstone Coal. v. Flowers*, 321 F.3d 1250, 1262 n.12 (10th Cir. 2003) ("[U]nder the CWA, it is not sufficient for the Corps to consider a range of alternatives to the proposed project: the Corps must rebut the presumption that there are practicable alternatives with less adverse environmental impact.").

The FEIS does not demonstrate that the preferred alternative would be the least damaging practicable alternative. To the contrary, the Corps itself acknowledged that the basic purpose of the project—to provide water to the Participants—is not "water dependent," and therefore, practicable alternatives to NISP "are (1) presumed to exist and (2) presumed to be less environmentally damaging than the proposed action, unless clearly demonstrated otherwise." FEIS 1-5. The FEIS fails to rebut this presumption, and is therefore the Corps' approval of this project would be unlawful under the CWA.

As discussed *supra* at Section A, the Corps adopted a narrow statement of purpose and need, impermissibly constraining the Corps' analysis of practicable alternatives and rendering it inadequate under NEPA and under the CWA. As reported in the FEIS, the Corps and Northern Water jointly developed NISP's purpose and need statement. While the Corps "has a duty to take into account the objectives of the applicant's project," those objectives must be "legitimate."

Greater Yellowstone Coal. v. Flowers, 359 F.3d 1257, 1270 (10th Cir. 2004) (citations omitted). The Corps cannot permit developers to "artificially constrain the Corps' alternatives analysis by defining the projects' purpose in an overly narrow manner." *Nat'l Wildlife Fed'n v. Whistler*, 27 F.3d 1341, 1346 (8th Cir. 1994). Yet, that is precisely what happened here. Neither the agency, nor Northern Water, ever explained *why* a regional solution to meet individual Participants' water needs was necessary to meet the overarching purpose of the project, i.e., to meet a portion of the Participants' future water needs.

Moreover, the Corps relied on narrow screening criteria to arbitrarily exclude less environmentally damaging practicable alternatives to meeting the Participants' future water needs from detailed consideration. *See supra* Section B. By screening out alternatives that do not provide 12,000 acre-feet of annual firm yield, or are not regional in nature, the Corps ensured that the only alternatives given meaningful consideration are large-scale regional projects. However, it is clear from comments by Conservation Organizations, local governments, and the EPA that a regional project is not the *only* alternative that could meet the Participants' water needs, nor are such projects the least damaging practicable alternatives that could satisfy the project's basic purpose. *See, e.g.*, *supra* Section B; STP, *Healthy Rivers, Healthy Communities: A Balanced Proposal for the Cache la Poudre River in Colorado* (2011) ("Healthy Rivers Alternative" or "HRA"); City of Fort Collins, Resolution 2015-082 Directing the City Manager to Submit to the U.S. Army Corps of Engineers the City's Comments on the Supplemental Draft Environmental Impact Statement for the Northern Integrated Supply Project (Sept. 1, 2015) ("Fort Collins Comments");[15] FEIS at A-112 to -113.

Indeed, the EPA, which has special expertise and jurisdiction over Section 404 permits, repeatedly criticized the Corps' use of a narrow purpose and need and screening criteria to preclude alternatives from detailed consideration. In comments on the DEIS, the EPA protested the Corps' use of "regional project" in the purpose and need statement and screening criteria, noting that the term "has the effect of eliminating several alternatives" prematurely. FEIS at A-83. The EPA also requested that rotational fallowing and conservation measures be given serious consideration as alternatives. *Id.* at A-84. The Corps dismissed the EPA's concerns and retained the purpose and need and the screening criteria because "Northern Water is a regional water supply entity with responsibilities for water supply planning and management for the region and they are proposing a regional water supply project to meet the water supply needs of the [] Participants." FEIS at A-82. However, this circular logic—NISP is a regional project, and therefore a regional project is necessary—cannot satisfy the Corps' obligation to provide a reasoned explanation for its actions, nor does it demonstrate that other, less damaging alternatives do not exist. Moreover, "[t]he CWA test is not, however, whether features of a proposal would make a more desirable project. Rather the Applicant and the [Corps] are obligated to determine the feasibility of the least environmentally damaging alternatives that serve the *basic* project purpose." *Utahns for Better Transp.*, 305 F.3d at 1188-89. Thus, the

[15] The Fort Collins City Council recently voted unanimously to send its comments of nonsupport of the FEIS to the Corps. *See* Nick Coltrain, *Fort Collins Won't Support NISP Reservoir Project*, COLORADOAN (Oct. 2, 2011), *available at* https://www.coloradoan.com/story/news/2018/10/02/fort-collins-wont-support-nisp-reservoir-project/1507391002/.

Corps cannot exclude practicable alternatives from its analysis under the CWA simply because Northern Water wants to build a regional project.

The EPA raised the same concerns in its comments on the SDEIS, stating that it "remain[s] concerned that the selected screening criteria and a narrow purpose and need statement in the SDEIS appear to constrain the alternatives available to meet demand. These constraints may result in exclusion of potentially less damaging practicable alternatives." FEIS at A-111. The EPA again urged the Corps to consider conservation measures, rotational fallowing,[16] and acquisition of water units from the C-BT, and DDW as less damaging, practicable alternatives. *Id.* at A-113 to -116. However, again, the Corps brushed aside the EPA's concerns, asserting simply and without support that "[t]he purpose and need statement did not unreasonably limit the range of alternatives," and reiterating its determination that "the 'regional project' criterion was appropriately formulated and applied." *Id.* at A-112. However, these conclusory statements do nothing to address the EPA's substantive, *repeated* concern that flaws in the alternatives analysis render it inadequate to demonstrate that NISP is the least damaging practicable alternative under the CWA. The Corps' failure to meaningfully engage with the EPA—a federal agency with expertise in interpreting and applying the CWA to projects of this kind—to consider and address the EPA's criticisms preclude the Corps from relying on the FEIS to demonstrate its compliance with the CWA. *See All. to Save the Mattaponi v. U.S. Army Corps of Eng'rs*, 606 F. Supp. 2d 121, 132 (D.D.C. 2009) (holding that the Corps must "demonstrate that it has considered significant comments and criticisms by explaining why it disagrees with them; it may not dismiss them without adequate explanation").

In sum, Conservation Organizations and others—including the EPA—proposed several alternatives that would be objectively less environmentally damaging and would also meet the portion of the Participants' future water needs for which they seek coverage in this Section 404 permit. Yet, those alternatives were never analyzed in any meaningful way. Nor did the Corps or Northern Water provide sufficient information as to why the proposed alternatives would be impracticable, beyond the empty assertion that they did not meet the arbitrary screening criteria. As a result, the Corps cannot overcome the strong presumption that practicable alternatives to NISP exist, and are less environmentally damaging. *See Utahns for Better Transp.*, 305 F.3d at 1187 ("[W]here insufficient information is provided to determine compliance, the Guidelines require that no permit be issued.").

[16] The Corps also rejected rotational fallowing as a viable alternative—or component of an alternative—as "unproven technology" because it does not provide a firm yield. *See* FEIS at 2-9. As discussed *supra* note 3, both the EPA and Conservation Organizations vigorously dispute the Corps' assertions as to the feasibility of this component. Additionally, the Corps' statement regarding rotational fallowing seriously misconstrues the "firm yield" and "proven technologies" standards. Although individual rotational fallowing projects may be interruptible, a provider could chain a number together to generate a firm supply.

2. The Corps Did Not—and Cannot—Demonstrate that Issuance of the Permit Will Not Result in the Significant Degradation of Wetlands.

Under the 404 Guidelines, the Corps may not permit discharges of fill material that will "cause or contribute to significant degradation" of wetlands. 40 C.F.R. § 230.10(c). Effects contributing to significant degradation include "significantly adverse effects" on: "the life stages of aquatic life and other wildlife dependent on aquatic ecosystems"; "aquatic ecosystem diversity, productivity and stability" including "loss of fish and wildlife habitat"; and "recreational, aesthetic, and economic values." *Id.* The Corps is directed to make factual findings on the potential short-term and long-term effects of the proposed discharge on various physical, chemical, and biological components of the aquatic environment. *Id.* § 230.11. The extent and duration of the impacts on wetlands, as well as the wetlands' uniqueness, are relevant considerations. *See Bering Strait Citizens for Responsible Res. Dev. v. U.S. Army Corps of Eng'rs*, 524 F.3d 938, 949 (9th Cir. 2008). If the Corps finds that the project would significantly degrade wetlands, it may issue a permit conditioned on minimization of, or compensation for, impacts. *See City of Olmstead Falls v. EPA*, 435 F.3d 632, 637-38 (6th Cir. 2006); *Ohio Valley Envtl. Coal. v. U.S. Army Corps of Eng'rs*, 674 F. Supp. 2d 783, 790 (S.D. W. Va. 2009). However, inadequacies in plans for minimization or compensation may invalidate the decision to allow discharge. *See All. to Save the Mattaponi*, 606 F. Supp. 2d at 134.

As a practical matter, it is clear that the Corps' preferred alternative will permanently destroy or degrade aquatic habitat that is crucial to the survival of the threatened Preble's meadow jumping mouse, and will destabilize the Poudre River's ecosystem, precipitating an ecological regime shift that will adversely impact hundreds of acres of high-functioning wetland and riparian habitat. The overwhelming evidence to these effects alone requires denial of the permit. *See* 40 C.F.R. §§ 230.10, 230.11, 230.30 (404 Guidelines); *Olenhouse*, 42 F.3d at 1575 (requiring agency decisions to be supported by substantial evidence in the record). As a legal matter, the Corps' failure to adequately analyze these impacts, meaningfully respond to expert comment, and satisfactorily explain its decision render the FEIS legally inadequate to support the issuance of the permit. *See Wyo. Outdoor Council v. U.S. Army Corps of Eng'rs*, 351 F. Supp. 2d 1232, 1238 (D. Wyo. 2005) (providing that when issuing decisions under the CWA, agencies must "examine[] all relevant data and articulate[] a satisfactory explanation for its action, including a rational connection between the facts found and the choice made"); *Friends of the Earth v. Hall*, 693 F. Supp. 904, 945-46 (W.D. Wash. 1988) (noting that where the Corps' decision to issue a permit relies on a NEPA document, flaws in the underlying analysis may call into question the Corps' finding that the project would not result in significant degradation of wetlands).

First, NISP will have significant adverse effects on the conservation and recovery of the Preble's jumping mouse. 40 C.F.R. § 230.10(c) (prohibiting the issuance of a permit where it would adversely affect the life stages of wildlife). Specifically, the construction and operation of NISP will cause the "impairment or destruction of habitat" to which the Preble's meadow jumping mouse is limited. 40 C.F.R. § 230.30(b)(2) (directing the Corps to consider the proposed discharge's impacts to habitat for endangered and threatened species). The construction and operation of NISP will permanently destroy over 40 acres of Preble's jumping mouse habitat, all of which is "occupied." FEIS at S-33; FEIS at 4-383. NISP will also result in the "temporary"

degradation of over 25 acres of habitat, *id.*; however, it must be noted that "areas that have been disturbed in the past have often failed to recover." Comments on NISP DEIS Treatment of Preble's Meadow Jumping Mouse from Save the Poudre, to U.S. Army Corps Eng'rs 4 (2015) [hereinafter STP Comments]. Therefore, it is likely that the "temporary" disturbance of habitat will nevertheless result in permanent loss.

Important wetland and riparian habitat will also be impaired by the indirect effects resulting from the construction and operation of NISP. Reductions in flow from the Poudre River will impact the composition, density, and health of the riparian vegetation on which the Preble's meadow jumping mouse depends. Indeed, in the Service's Draft Recovery Plan for the Preble's meadow jumping mouse, it acknowledges that "[c]hanges in the timing and abundance of water may be detrimental to the persistence of Preble's in these riparian habitats," and warns that the depletion of groundwater via water diversion projects results in the conversion of habitats from the "mesic, shrub-dominated systems" suitable for Preble's mice to "drier grass-dominated systems [that] would preclude Preble's from these areas." STP Comments at 2. The loss of this habitat will have dire consequences for the conservation of the species. These consequences will only be compounded by NISP's impacts on hydrology and water quality—e.g., changes in water temperature, increases in pollution and sewage, and reductions in the habitat's capacity to dilute pollutants and move sediment—which will impair and destroy not only habitat of the Preble's meadow jumping mouse, but may also impact the habitat of other aquatic obligate species in and downstream of the Poudre River.

As discussed *infra* at Section C.2.2, the Corps' analysis of water quality and hydrology are fundamentally flawed. As a result, NISP's impacts on the *occupied habitat* of the Preble's jumping mouse were never accurately analyzed in the FEIS or the 2007 Biological Opinion. For the same reason, NISP's impacts on the four listed, aquatic obligate species that occur downstream of the project and that the Corps acknowledges will be adversely affected by the project—namely, the whooping crane, the least turn, the piping plover, and the pallid sturgeon—were not accurately assessed. Without such an analysis, the Corps cannot demonstrate that NISP will not result in significant adverse effects to wetland and riparian habitat. Accordingly, the Corps cannot issue the permit.

Second, NISP will adversely impact the diversity, productivity, and stability of the aquatic ecosystem in several significant ways. 40 C.F.R. § 230.10(c). Specifically, the construction and operation of NISP will lead to the significant degradation of riparian habitat, alter and degrade water quality and circulation, contribute to the loss of significant environmental values, and adversely affect recreational and economic opportunities in the region. The proposed mitigation measures are insufficient to offset these substantial impacts.

1. Degradation of Riparian Habitat

As an initial matter related to the above, NISP will severely degrade hundreds of acres of high-functioning riparian habitat, including occupied habitat for several listed species. For example, occupied habitat for the Preble's meadow jumping mouse will be adversely affected by the construction and operation of the project. However, NISP's adverse impacts to riparian habitat are not limited to Colorado. As reported in the 2007 Biological Opinion appended to the

FEIS, the water depletions associated with NISP are likely to reduce flows on the Platte River *through Nebraska*. Thus, the construction and operation of NISP will harm four threatened and endangered species in addition to the Preble's meadow jumping mouse: the whooping crane, the least turn, the piping plover, and the pallid sturgeon. FWS maintains that the continued existence and recovery of these four species depends upon protecting and restoring water flows to the central and lower Platte River ecosystems. *See* FWS, *Programmatic Biological Opinion on the Platte River Recovery Implementation Program* 11 (2006) ("The committee is firmly convinced that upstream storage, diversion, and distribution of the river's flow are the most important drivers of change that adversely affect species habitat along the Platte River."); *accord* Nat'l Res. Council, Endangered & Threatened Species of the Platte River 243 (2005) ("The committee is firmly convinced that upstream storage, diversion, and distribution of the river's flow are the most important drivers of change that adversely affect species habitat along the Platte River."). If built, however, NISP will cause water depletions and decreased peak flows in the Platte River Basin. Constructing a new water diversion project that will instead *decrease* water flows to those ecosystems is antithetical to the meaningful recovery of listed species, and to the statutory purpose of the CWA—i.e., to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters," 33 U.S.C. § 1251(a).

These impacts were given short shrift in the FEIS. Indeed, the Corps' analysis of NISP's impacts on the Preble's meadow jumping mouse primarily relied on the very outdated 2007 Biological Opinion, which was written prior to the designation of critical habitat in the Project's analysis area. Moreover, the FEIS *does not even address* impacts to listed species that occur downstream, despite the fact that reductions in flows to the Platte River threaten those species' recovery. These impacts are clearly secondary effects, and must be disclosed to the public and to the decisionmaker before a Section 404 permit can be issued. *See* 40 C.F.R. § 230.11(h) (defining secondary effects as those effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material"). A full picture of the impacts to riparian habitat is required before the Corps can issue a permit that will have serious direct, indirect, and cumulative impacts on the aquatic environment.

2. Alterations to Water Circulation, Fluctuation, and Salinity

The construction and operation of NISP will degrade the overall water quality throughout the analysis area. 40 C.F.R. § 230.11(b). The proposed discharge will dramatically alter water flows and temperature, which will alter the composition of vegetation communities along the Cache la Poudre River. The proposed reservoirs would also seriously increase the salinity of water in the Poudre and South Platte Rivers, leading to deleterious impacts to water quality and riparian habitat.[17] As a result, the ecosystem services provided by wetlands and riparian vegetation and habitat will be jeopardized.

[17] The increased salinity of the water in the Poudre and South Platte Rivers caused by NISP will also negatively impact the region's agricultural industry. *See* Farm Fact Sheet. Due to several factors—including the replacement of water from the Poudre River with water from the far saltier water from the South Platte River, the diversion of saline water into the Galeton Reservoir for use by farmers who are now using water from the less saline Poudre River, and the

In response to comments critiquing the water quality analyses in the DEIS and SDEIS—including comments from the EPA, *see* FEIS at A-103 to -104—the Corps updated its analysis. However, the severe, chronic analytical problems that were present throughout the DEIS and SDEIS remain present in the FEIS, and render the analysis woefully inadequate to support the issuance of a Section 404 permit. To begin with, "[t]he NISP FEIS water quality analysis section fails to describe the water quality environment of the Poudre River that will be potentially impacted, and to describe and measure the impacts to the Poudre River." Attachment E at 2. While the FEIS describes the quantitative changes to water quality that will result from the construction and operation of NISP, it does not meaningfully *describe* how those changes will *impact* the aquatic environment.[18] *See id.* As a result, the FEIS failed to provide a meaningful benchmark analysis to aid the public and the agency in determining how specific changes in water quality would impact the aquatic environment. *See id.* at 2-3.

Additionally, the Corps' water quality analysis is littered with internal inconsistencies—e.g., conflicting data in different chapters, and conclusions that conflict with statistics and analyses completed in the FEIS and its supporting documents. There are multiple places in the FEIS where different quantitative values for water quality measures are reported with an insufficient—or absent—explanation for the discrepancy. *See id.* at 3. *Compare, e.g.*, FEIS at 4-111 (reporting a total phosphorous concentration at the Fossil Creek Outlet in Segment 12 of the project of +0.05 to +0.26 mg/L from May to July), *with* FEIS at 5-68 (citing a total phosphorous concentration of +0.07 to 0.38 mg/L at the Fossil Creek Outlet in Segment 12 of the Project over the same period). The public and expert commenters were unable to determine which values were accurate and why. *See* Attachment E at 3. Consequently, the FEIS fails to provide information vital to establishing the Project's compliance with the Section 404 Guidelines, i.e., whether the Project will degrade water quality.

Exacerbating this issue is the fact that many of the fundamental analyses about key water quality measures are entirely missing, grossly lacking, or blatantly inaccurate, and further, seriously obfuscate the actual impacts of the proposed project. The issues with the Corps' analysis of specific water quality measures is thoroughly discussed in the Aquatic Resources Assessment of the U.S. Army Corps of Engineers' FEIS for NISP ("Aquatic Resources Assessment"), which are attached to these comments and incorporated by reference. *See* Attachment E. A particularly egregious omission cited in the Aquatic Resources Assessment is

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exacerbating effect that evaporation will have on the salinity of the water in Galeton Reservoir—will lead to crop yield issues and the permanent salinization of up to 20% of fields receiving water from Galeton Reservoir. *Id.* As previously reported by Conservation Organizations, "this could lead to a significant decrease in crop yields and the loss of over 3,000 acres of irrigated agriculture." *Id.*

[18] Such a perfunctory analysis is also forbidden under NEPA, which requires that impact analyses "provide a useful analysis of the . . . impacts" of an action. *See Kern v. U.S. Bureau of Land Mgmt.*, 284 F.3d 1062, 1075 (9th Cir. 2002) (quoting *Muckleshoot Indian Tribe*, 177 F.3d at 810); *see also Nat. Res. Def. Council, Inc. v. Hodel*, 865 F.2d 288, 299 (D.C. Cir. 1988) ("These perfunctory references do not constitute analysis useful to a decisionmaker in deciding whether, or how, to alter the program to lessen cumulative environmental impacts.").

the Corps' failure to include "a fact-based discussion . . . that describes dissolved oxygen levels or patterns in [the] Poudre River." *Id.* at 6. "Dissolved oxygen is one of the most important water quality constituents," *id.* at 17, yet the FEIS utterly fails to provide an accurate baseline against which to evaluate NISP's impacts. Nor does it provide any data with regard to how NISP will impact the attainment of dissolved oxygen standards in certain affected segments of the Poudre River. *Id.* Similarly, the Aquatic Resources Assessment lays plain that the FEIS' conclusions regarding periphyton growths—i.e., the algae, Cyanobacteria, fungi, protozoans, and inorganic and organic debris that cover the surface of a river's substrate—are not only unsupported by the scientific literature, but are *specifically refuted* by the literature. *See* Attachment E at 20-26. In particular, the FEIS alleges that a flow rate of 0.3 m/sec was sufficient to disrupt periphyton accumulation on the river substrate, thereby preventing the long-term water quality degradation associated with undisrupted periphyton accumulation. However, the available literature demonstrates that much higher flow rates are necessary to slough periphyton from the river bottom.

Finally, the Corps repeatedly cited a "lack of data" as the reason for its failure to include key water quality analyses in the FEIS. *See* Attachment E at 4. The Corps has had fourteen years from the initial project proposal to the issuance of the FEIS during which the project and analyses have undergone multiple iterations and revisions. Thus, the Corps had ample time within which to consider and fill the data gaps that preclude its ability to fully analyze NISP's impacts on water quality. Yet, it failed to do so. In the past decade, sensor and datalogger technology has continued to improve, and it is inexcusable that the Corps and/or Northern Water failed to collect the data required to adequately disclose NISP's impacts. Accordingly, given these and the other deficiencies in the Corps' water quality analysis identified in the Aquatic Resources Report and comments previously submitted by Conservation Organizations and others, it is once again clear that the FEIS is insufficient to support the issuance of a Section 404 permit.

Throughout the NEPA process, Conservation Organizations exhaustively catalogued the flaws in the Corps' effects analysis, and communicated their expert findings to the Corps. However, these efforts were to no avail; the Corps dismissed Conservation Organizations' concerns with little to no meaningful analysis. Significantly, Conservation Organizations are not alone in their concerns regarding the Corps' water quality analyses. Indeed, in comments on the SDEIS, the EPA noted that the Phase I water quality analyses were inadequate to predict the magnitude of NISP's effects on water quality. EPA further noted that "without adequate mitigation, the project's flow reductions *are likely to cause or contribute to temperature impairments on the Poudre River*, and may exacerbate other water quality impairments through loss of dilution flow." FEIS at A-98. EPA reminded the Corps that "[u]nderstanding the magnitude of water quality effects is necessary to demonstrate the project can be implemented consistent with [CWA] requirements," and concluded that "[a]t this time, the EPA is not able to determine whether this project can avoid objectionable or unacceptable impacts to water quality." *Id.*

The Corps claims that the FEIS corrected the flaws in its water quality analysis; however, as demonstrated here, those analyses remain woefully inadequate to support a finding that NISP will not cause significant degradation to wetlands. As a result, the FEIS cannot support the

Corps' conclusion that NISP will not result in significant degradation to wetlands. *See Friends of the Earth*, 693 F. Supp. at 945-46. Although the Corps is only obligated to "consider and respond" to expert agencies' and scientists' comments, the Corps still "must demonstrate that it has considered significant comments and criticisms by explaining why it disagrees with them; it may not dismiss them without adequate explanation." *All. to Save the Mattaponi*, 606 F. Supp. 2d at 132 (citing *ARCO Oil & Gas Co. v. FERC*, 932 F.2d 1501, 1504 (D.C. Cir. 1991) ("[C]onclusory statements cannot substitute for the reasoned explanation that is wanting in this decision[.]")). Before it issues any permit, the Corps must fully address the comments raised by the EPA, Conservation Organizations, and other experts.

3. Loss of Environmental Values

Moreover, the FEIS failed to capture the full extent of the "loss of environmental value" caused by NISP. 40 C.F.R. § 230.11(e). Reductions in flow volume alter riparian vegetation and habitat, adversely impacting the life cycles of species such as the Preble's meadow jumping mouse. Likewise, NISP's impacts to water quality, which include higher water temperatures, will combine with lower water flows and higher water pH, which will likely result in increased concentrations of ammonia, decreases in dissolved oxygen, and adverse effects to other water quality constituents. These impacts could be so severe as to place multiple affected segments of the Poudre River on Colorado's list of impaired waterways. Even small surface water drawdowns can have dire consequences for ecosystems during the driest months of the year. Yet, the FEIS failed to meaningfully discuss these impacts.

4. Loss of Recreational and Economic Value

As noted in comments by Conservation Organizations and corroborated by comments from local governments, NISP will also result in significantly adverse effects on "recreational, aesthetic, and economic values" in the region. Pursuant to the 404 Guidelines, the Corps must take into account both the impacts of the proposed discharge on human use of the impacted waterway, 40 C.F.R. § 230.10, and the secondary effects (i.e., the indirect effects) of the proposed discharge, 40 C.F.R. § 230.11. *See also Fox Bay Partners v. U.S. Army Corps Eng'rs*, 831 F. Supp. 605 (N.D. Ill. 1993) (approving of the Corps' reliance on impacts to recreational use of the lake that would result from a proposed marina project to deny a Section 404 permit). However, the Corps' analysis of NISP's impacts to recreational opportunities in the region fails to properly disclose the full extent of the anticipated effects.

For example, the City of Fort Collins has spent a significant amount of money investing in conserving and restoring the segment of the Poudre River that runs through its boundaries. It has also developed a Master Plan to guide future development of recreation and economic opportunities, including a proposed "whitewater park." These opportunities will be significantly adversely affected by a major water diversion project such as NISP. An analysis completed in 2011 by Dr. Loomis at Colorado State University indicated that maintaining river flows in the downtown segment where the Whitewater Park is being constructed supports total economic activity up to $745,000 per year. *See* Attachment H at 10. Increasing river flows could increase annual revenues by an additional $83,000 per year above that value. *See id.*

Moreover, the FEIS fails to meaningfully consider impacts to recreational activities other than boating. The Corps assumes that NISP will not result in "discernable visual effects on the recreation experience along the Poudre River and Poudre River Trail," and concludes without support that "effects on the recreation value of the Poudre River Trail would be negligible." FEIS at 4-482. However, this statement ignores the significant impacts that reduced flows will have on wetland and riparian habitat. To the contrary, it is far more likely that as wetland and riparian habitat along the Poudre River degrade, the recreation value of the Poudre River Trail will decrease. Indeed, as reported by Fort Collins in its comments on the SDEIS, a reduction in peak flow of 50% would reduce visitation to the Poudre River for recreational opportunities (other than boating) by 33%. *See* Fort Collins Comments at 11. The loss of these visitors and the economic value they bring to the city cannot fairly be categorized as negligible or minor. At minimum, the Corps should quantify the economic consequences of approving NISP using well-established methodologies for measuring lost recreational opportunities and the associated reduction in spending in the community.

The Corps' assessment of the impacts of NISP on the recreational and economic opportunities provided by the Poudre River is cursory, inaccurate, and inadequate. Accordingly, the Corps cannot demonstrate compliance with the Guidelines, and cannot issue the permit.

5. Inadequate Mitigation Plan

Nor are the proposed mitigation measures sufficient to avoid the significant degradation of wetlands. A finding that NISP will not cause or contribute to the significant degradation of the waters of the United States requires that the Corps ensure that the loss of wetland functions and values caused by the Project are adequately compensated. However, the Conceptual Mitigation Plan appended to the FEIS, *see* FEIS at App'x B,[19] fails to satisfy this obligation. The record is replete with letters from experts—including the EPA—expressing serious concerns with the effectiveness and adequacy of the Corps' "conceptual" mitigation. The failure to adequately offset project impacts is grounds for the denial of a permit application, *see Norfolk v. U.S. Army Corps of Eng'rs*, 968 F.2d 1438, 1449 (1st Cir. 1992) (providing that the basic proposition of CWA law is that if mitigation measures are insufficient the permit should be denied), and it is not clear from the FEIS that Northern Water is able to fully compensate for NISP's impacts.

The Corps' regulations require that "mitigation measures will be clearly assessed" in an EIS. 32 C.F.R. § 651.15(b). Such an assessment requires a clear disclosure of potential mitigation measures and a thorough review of their practicability, coupled with details on monitoring and enforcement to ensure implementation 32 C.F.R. 651.15(b), 32 C.F.R. 651.15(h). The proposed Conceptual Mitigation Plan ("CMP") fails to meet those standards. In fact, the CMP cannot possibly provide a clear assessment of mitigation for impacts that are not understood. *Ohio Valley Envtl. Coalition v. United States Army Corps of Eng'rs*, 479 F. Supp. 2d 607, 627 (S.D. W. Va. 2007). Until the Corps completes a competent environmental impact

[19] Because the Conceptual Mitigation Plan ("CMP")—appended as Appendix B to the FEIS—is not consecutively numbered with the other appendices, these comments reference the CMP's page numbers as reflected in that document. It should be understood that references to the CMP are to Appendix B of the FEIS.

analysis, addressing the concerns raised by the Conservation Organizations and many others, any consideration of mitigation must be seen as hypothetical at best. The vague measures presented in the CMP do little to advance a meaningful review of NISP.

In general, although potential mitigation measures are listed and some level of description is provided, there is little to no attempt to assess the practicality of these measures. For example, the CMP asserts that "Northern Water commits to developing, establishing and maintaining the compensatory wetlands sites in a timing and manner that maintains the need for no more than a one-to-one ratio." CMP at 32. However, no analysis accompanies this assertion, and no basis for the consideration of the applicable standard is provided. The CMP itself indicates that the ability to meet the standard is based on "the likelihood of success, differences between functions, temporal losses, difficulties in restoring, or long distances between the affected and replacement sites are expected," CMP at 32, yet provides no investigation into the impact of any of these factors on mitigation.

The lack of critical examination of the mitigation measures is illustrated throughout the CMP:

- "Northern Water will remain in contact and coordinate with the [oil and gas] operators as these activities progress," CMP at 25, without any indication of how Upper Galeton Reservoir might be impacted by changes of the operators plans or how this might impact the overall NISP;

- "For the wetlands along the Poudre River south of CO Highway 14, *it is likely* that ground water associated with the Poudre River is close to the surface in this location" CMP at 31 (emphasis added), without any attempt to groundtruth the likelihood of this statement (with a similar statement concerning Cactus Hill wetlands at 32);

- "The riparian areas would be surrounded by upland habitat that would be restored to near native conditions for Preble's habitat," CMP at 31, without any examination of the potential effectiveness of habitat restoration or presentation of a monitoring regime to determine such;

- "Northern Water would continue to work with the ditch companies to determine both instantaneous and long-term blending ratios that significantly reduce the potential for crop yield reduction that could be caused by the SPWCP," CMP at 41, without any consideration of how such blending ratios might be achieved or how such an effort would impact NISP operations;

- "Northern Water will investigate opportunities to augment ditch company diversions to compensate for potential losses in crop yield," CMP at 42, without any discussion of how the potential sources of water listed might impact NISP operations of modify the project's impacts on the environment as described in the FEIS.

These examples of the CMP's failure to establish the practicality of the proposed mitigation measures clearly illustrate that the CMP fails to meet the basic standards required by the CWA

and NEPA. As it stands, the CMP is little more than speculation of what might be done if it were to be shown to be possible and the resources to implement it were found.

Moreover, the CMP relies heavily on the State of Colorado's 2017 Fish and Wildlife Mitigation and Enhancement Plan ("FWMEP") to flesh out the meager offerings in its pages; indeed, 52 of 72 listed mitigation measures come directly from the FWMEP. *See* CMP at 3, 4; *see also* FEIS at S-9, 1-23, 2-65, 4-418. But the FWMEP is itself fatally flawed.

As STP has explained in prior comments on the FWMEP:

> [T]he draft plan proposed by the NCWCD fails to include required elements, and the elements it does include are not grounded in the best available scientific information or best professional judgment [...] does not present a complete discussion of the impacts of the NISP, including both direct and indirect impacts, and cumulative impacts [and] the mitigation proposed in the draft plan is not certain to occur 'concurrently with or prior to project development;' it is not proportional to project impacts; and it is not proposed to last for the entire period in which impacts to wildlife resources persist.

Attachment K at 2.

In addition to providing an expert review that found that the plan's implementation of adaptive management could not meet the goals of that process, STP also specifically identified the following shortcomings:

- The draft plan makes promises, but extensive loopholes implemented at the discretion of the NISP applicant, NCWCD, provide no assurances to the public that essential mitigation actions will be implemented when necessary. Consequently, *the draft plan fails to provide any meaningful enforcement or accountability for mitigation outcomes* and is instead structured to support NCWCD's desired water yield.

- *The draft plan offers no analysis of the likelihood of success, or the benefits of the proposed mitigation actions, in relation to the impacts of the project*. Although the draft plan presents a number of proposed actions, it fails to establish that any actions, individually or collectively, would meaningfully mitigate the impacts of the proposed project. Further, the draft plan repeatedly states that it is mitigating impacts described in the NEPA process Draft Environmental Impact Statement (DEIS) and the Supplemental DEIS (SDEIS) documents, but those documents do not fully describe the impacts of NISP and are highly controversial.

- *The draft plan proposes mitigation for water quality and water temperature impacts even though such impacts have not been fully analyzed or even disclosed in the NEPA process*. Further, the SDEIS, the most current NEPA documentation, is based on a river flow analysis that ignores the most recent ten years of flow data collected on the river. If the analysis had incorporated all of the best available data – as is required by law – the SDEIS' statistical findings and expected impacts would have been dramatically altered.

The draft plan fails to explain how effective mitigation can be implemented for impacts that are not yet fully understood.

- *The draft plan does not consider the effects of ongoing and accelerating climate change effects on NCWCD's ability to achieve its mitigation goals*. Without such an analysis, the draft plan fails to account for how the proposed mitigation actions will function in the real world.

- HB 1158 requires that NISP "maintains a balance between the development of the state's water resources and the protection of the state's fish and wildlife resources," but *the draft plan completely fails to address the fact that 63% of the flow in the Cache la Poudre River has already been diverted out of the river before the river reaches downtown Fort Collins*. Thus, the river is already terribly out of "balance."

- The proposed "conveyance realignment" mitigation in the draft plan [now the basis of the preferred alternative] stops at the Timnath Inlet which is just past Lemay Avenue in Fort Collins. As such, *the entire downstream stretch of the Poudre River*—including at the Colorado State University "Environmental Learning Center" and out to the confluence with the South Platte River near Greeley—*would not be mitigated with any base flow and suffer the extreme negative impacts of NISP*.

Attachment K at 2-3.

To the extent that the FWMEP is incorporated by the Corps' into its evaluation of the alternatives and the mitigation of those impacts, the Corps' must consider the attached comments on the FWMEP. This is especially true given that the FWMEP was adopted prior to release of the FEIS and could not have fully considered the impacts that are described in the recently released FEIS. The State of Colorado failed to meet the standards of its own laws (*see* Attachment K at 1-2), but the Corps must not compound that error by uncritically accepting this fatally flawed mitigation plan and adopting the FWMEP as its own. Although the state adopted the plan, the Corps has an independent duty to develop and analyze a robust and enforceable mitigation plan under the CWA, and reliance on the state's deficient FWMEP as proposed in the FEIS fails to meet the overarching legal requirements imposed on the Corps. Additionally, the Corps must adopt permit conditions that require updates to the FWMEP that would ensure that it is an effective and enforceable plan that fully considers the impacts identified in the FEIS and subsequent analyses identified through public comment and subsequent review.

Importantly, the CMP fails to adequately address the most significant impact that would result from implementation of the Alternative 2M —the nearly complete loss of the peak flows that are critical to river health. The CMP relies on FWMEP to address this issue; STP has provided an informed critique of that approach in earlier comments. *See* Attachment K at 5-6. Due to this reliance on the state's incompetent mitigation proposal, the CMP fails to provide any meaningful mitigation for these impacts even though there is no controversy that Alternative 2M will significantly curtail these flows.

Reliance on the FWMEP also removes certainty from the mitigation proposal by the FEIS's statements that the FWMEP may be modified following adoption of an alternative or due to the Corps' permit conditions. *See, e.g.,* FEIS at 2-80, 2-85, 2-88, 2-93. The CMP does not clarify if the measures it incorporates would remain even if modified or struck from the FWMEP. Consequently, it is impossible for a reviewer to know which of the proposed measures will actually be executed in the future.

Similarly, although a proposal is presented for compensatory mitigation, the CMP asserts that "Northern Water will develop a final wetlands and Preble's mitigation plan for review and approval by the Corps between the Final EIS and the record-of-decision. . . . The wetlands and Preble's mitigation areas and plans may be adjusted from the descriptions provided below depending on final mitigation requirements, site conditions, and other factors." CMP at 28. This will obviously eliminate the opportunity for public review of that final plan and renders consideration and comment at this point moot, in violation of NEPA and the CWA.

The CMP further obfuscates the final real-world impact of the various alternatives by limiting the application of several of the measures incorporated from the FWMEP to only the preferred alternative. *See, e.g.,* CMP at 35 ("Because the comprehensive mitigation and enhancement package presented in the FWMEP was developed specifically for Alternative 2M as described in the FWMEP, it is not included as mitigation for the other alternatives"). Although some of the measures constrained to this alternative are specific to Glade Reservoir, at least three are not and could be applied to all of the alternatives including the No Action Alternative. *Id.*; CMP at 36 (identifying AG-03, AG-05, and WQ-05). The CMP fails to provide any justification for restricting the application of these measures to the preferred alternative, other than that they are classified as "enhancement" in the FWMEP. *Id.* If these measures are not credible mitigation for impacts of the project to the river, and instead are enhancement that instead corrects past damage, the benefits of the measures must either be considered for all alternatives or for none. If Northern has the capability of conducting these measures, they should be implemented regardless of which alternative is ultimately adopted by the Corps.

A theme of failing to take mitigation seriously pervades the CMP. Seemingly without a sense of irony, the CMP claims as avoidance and/or minimization components of the project that have been removed from the consideration by the applicant prior to development of the CMP.

> Two of the most significant changes in the NISP/Glade Reservoir that avoid environmental effects are the movement of the proposed reservoir from an on-channel reservoir site to an off-channel reservoir site, and the elimination of a potential point-of-diversion that would have been upstream of the North Fork confluence with the Poudre River.

CMP at 13 (citation omitted).

In reality, the project proponent gave up on the in-channel reservoir, for its own purposes, two decades ago. *See* CMP at 30 ("Through these processes, Northern Water determined that an on-channel reservoir was not environmentally or publically acceptable, and moved its preferred alternative to its current location at Glade Reservoir"). Further, an in-channel reservoir

apparently would not have passed the Corps' own screening analysis. *See id.* ("All on-channel reservoirs were eliminated through the NISP screening process"). The diversion point change was voluntarily discarded by the proponent. *See id.* ("These options were eliminated due to environmental effects"). The CMP fails to meet the intent and application of mitigation by seeking to claim that actions taken *before* the project has been proposed can be considered as "avoidance" of impacts that will result from NISP. The knowledge that the proposal might have had more environmental impact than it does in its final form cannot be rationally considered as mitigation.

The reconfigured preferred alternative, 2M, is also presented as a form of mitigation. *See id.* 15 ("Conveyance Refinement: Convey 18 cfs (winter) to 25 cfs (summer) of deliveries to NISP participants via the Poudre River by releasing from Glade Reservoir."). While possibly less impactful than the originally proposed alternative, this remains a component of the *action*, not a mitigation measure. Courts have previously rejected similar attempts to masquerade mitigation measures as baseline data. While "[m]itigation measures may help alleviate impact *after* construction, [they] do not help to evaluate and understand the impact before construction." *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1084 (9th Cir. 2011). Reliance on mitigation measures to preclude a full discussion of the impacts of a proposed action impermissibly "presupposes approval" because "[i]t assumes that—regardless of what effects construction may have on resources—there are mitigation measures that might counteract the effect without first understanding the extent of the problem." *Id.* at 1084-85. Compounding this problem in the specific context of NISP, it is unclear to what extent this option will even operate and contribute any beneficial effect.[20]

Similarly, the CMP cites the proponent's willingness to comply with water court decrees on its water rights and curtail diversions when required to do so. *See* CMP at 37. Such compliance, fundamental to its implementation of the Grey Mountain right to NISP, fails to qualify as meaningful mitigation of the impacts from the diversions that are allowed under the Grey Mountain right.

In short, the Corps must develop a competent mitigation plan through a clear assessment of practicable mitigation measures, and ensure the monitoring and enforcement of any adopted

[20] The description of the potential operations of NISP makes it clear that the "conveyance refinement" will not always be in effect and leaves it unclear as to how much difference this will make to stream diversions and downstream river impacts. *See, e.g.*, N. Water, *Draft Operations Plan* 20 (Dec. 1, 2017) ("Diversions cannot be made through the Poudre River Intake if there is insufficient demand from the Participants. Therefore, there may individual days when the delivery rates cannot be reached, and deliveries to the Poudre River Intake cannot be made. At full operations, this should not be the case per the design methodologies described above, but could infrequently occur. However, during initial NISP operations before full NISP demands are met, this may happen more frequently. "); *id.* at 37 ("Prior to full buildout conditions, NISP commits to conveying no less than 36 percent of total NISP deliveries through the Poudre River Intake[,]" where this clearly refers to deliveries to participants but not timing or quantities of diversions from the river).

measures, if any of the NISP action alternatives are permitted. The Corps must base such a plan on a thorough environmental impact analysis and must complete and implement the plan in a manner that provides for meaningful public review. Accordingly, the Corps must deny the permit, or at the very least, fully address NISP's impacts and explain how proposed mitigation measures are sufficient to compensate for the anticipated losses.

3. The Corps Cannot Issue the Permit Because NISP Will Contribute to the Violation of Several State Water Quality Standards.

The Guidelines prohibit the issuance of a Section 404 permit where the activity will "[c]ause[] or contribute[] . . . to violations of any applicable State water quality standard." 33 C.F.R. § 320.10(b). Applicants for Section 404 permits must provide the Corps with a Section 401 certification, made by the state where the discharge will occur, declaring that the discharge will comply with the applicable provisions of the CWA, including state water quality standards. *See* 33 U.S.C. § 1341. States maintain a list (a "303(d) list") of water bodies that do not meet water quality standards, i.e., "impaired waters." 33 U.S.C. § 1313(d).

The Corps has not yet provided the results of the state water quality certification required under Section 401 of the CWA. The FEIS further asserts that the water quality models used to assess the Project's predicted impacts to water quality cannot be used to predict compliance with water quality standards. FEIS at 4-95. Therefore, the public lacks sufficient information regarding NISP's impacts on the Poudre River's compliance with state water quality standards to offer informed comment and ensure the Corps has made a reasoned choice.

From the information available, it is apparent that NISP will impact segments of the Poudre River that are on Colorado's 303(d) list of "impaired waters." Diversions from the Poudre River to NISP are likely to trigger or exacerbate these violations of state water quality standards. These include ammonia, pH, water temperature, phosphorus, dissolved oxygen, and potentially several other indicators of water quality. Therefore, the Corps cannot issue a permit.[21]

D. The Corps Must Undergo Formal Consultation and Obtain an Updated Biological Opinion Assessing the Impacts of NISP on Newly Designated Critical Habitat for the Preble's Meadow Jumping Mouse in the Project Area.

Pursuant to Section 7 of the ESA, before undertaking any action that may have direct or indirect effects on any listed species, an action agency must engage in consultation with the FWS in order to evaluate the impact of the proposed action. *See* 16 U.S.C. § 1536(a). The FWS has

[21] The Larimer County Environmental and Science Advisory Board also raised concerns with the FEIS's "[i]nadequate data or analysis," [i]nadequate presentation of material," and "[u]nder-developed mitigation plan" related to several key water quality issues implicated by NISP. Attachment M at 2. The advisory board concluded that "the language and data figures/tables in the FEIS underestimate the probable adverse impacts and consequences of the NISP upon the Poudre River," and that "the simple description of models, data figures/tables, and simulations, without interpreting the meaning and impacts, is not sufficient to provide understanding given that the FEIS is intended for public review." *Id.*

defined the term "action" for the purposes of Section 7 broadly to mean "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies," 50 C.F.R. § 402.02, "in which there is discretionary federal involvement or control." *Id.* § 402.03. An agency may only avoid this consultation requirement for a proposed action if it determines that its action will have "no effect" on threatened or endangered species or critical habitat. *Id.* § 402.14(a).

The purpose of consultation is to ensure that the action at issue "is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of [designated] habitat of such species." 16 U.S.C. § 1536(a)(2). As defined by the ESA's implementing regulations, an action will cause jeopardy to a listed species if it "reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." 50 C.F.R. § 402.02.

In formal consultation, FWS must analyze "the best scientific . . . data available" on the status of the species, and determine how the species would be affected by the proposed action. 16 U.S.C. § 1536(a)(2). At the conclusion of consultation, FWS issues a biological opinion ("BiOp") that includes an analysis of the direct and indirect effects of the proposed action and the cumulative effects of, as well as the FWS' determination as to whether the proposed action is likely to jeopardize the continued existence of a listed species or destroy or adversely modify any designated critical habitat. *See* Consultation Handbook at 4-14 to 4-31. Even after the BiOp is issued, ESA regulations require that formal consultation be reinitiated where "new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered. 50 C.F.R. § 402.16.

The Corps determined that NISP "is likely to adversely affect" the threatened Preble's meadow jumping mouse, the endangered whooping crane, the endangered interior least tern, the endangered pallid sturgeon, and the threatened piping plover. FEIS at App'x D. Accordingly, on February 5, 2007, the Corps requested to initiate formal consultation with FWS. *See* 50 C.F.R. § 402.14 (requiring action agency to undertake formal consultation when it finds that listed species may be present in the project area and that the proposed action "may affect" listed species or critical habitat); *see also* FWS, Endangered Species Consultation Handbook ("Consultation Handbook") at 3-13 (1998). Consultation was concluded on October 5, 2007, and FWS issued a BiOp summarizing the direct and indirect effects of the proposed action on the five listed species, the cumulative effects of reasonably certain future state, tribal, local, and private actions, and the FWS' opinion that NISP was not likely to jeopardize the continued existence of any of the listed species.

However, as discussed extensively above, the Corps' water quality analyses are fundamentally flawed, and therefore cannot serve as a basis for an effects determination. *See* 16 U.S.C. § 1536(a)(2) (requiring consultation to be based on "the best scientific . . . data available"). Therefore, the BiOp's conclusion that NISP is not likely to adversely affect listed species is legally inadequate and must be redone using the best—and most accurate—scientific data available.

The Corps has represented that it "will complete Section 7 consultation with the [FWS] before the ROD." FEIS at A-119. Specifically, the Corps has stated that it will prepare a Biological Assessment to determine whether NISP is likely to adversely affect listed species. However, in light of the flaws in the underlying data on which FWS originally based its conclusion, the Corps must reinitiate *formal* consultation with FWS and obtain a new BiOp *before* any action is taken to approve Northern Water's permit application. *See* 50 C.F.R. § 402.16 (requiring the reinitiation of formal consultation where "new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered").

The 2007 BiOp is woefully inadequate, and the Corps is prohibited from making any irreversible or irretrievable commitment of resources that would foreclose "the formulation or implementation of any reasonable and prudent alternatives" until the reinitiated consultation is concluded and a new BiOp is issued. 50 C.F.R. § 402.09. Should the Corps fail to obtain an adequate biological opinion and incidental take statement, any activities taken by the Corps and/or Northern Water in implementing this Section 404 permit that are likely to result in the incidental take of members of listed species are unlawful. 16 U.S.C. § 1538(a)(1)(B). Accordingly, should Northern Water undertake such activities, or should the Corps authorize such activities, *id.* § 1538(g), either entity may be subject to criminal and civil federal enforcement actions, as well as civil actions by citizens for declaratory and injunctive relief, *see id.* § 1540.

E. The Corps Must Ensure that Northern Water Obtains an Incidental Take Permit Under BGEPA Prior to Issuing Any Permit.

BGEPA prohibits the "take" of bald and golden eagles without a permit. 16 U.S.C. § 668(a). "Take" is statutorily defined to include "molest or disturb." *Id.* § 668c. Regulations promulgated to implement BGEPA elaborate that "disturb" means "to agitate or bother" an eagle "to a degree that causes, or is likely to cause, . . . (1) injury . . . , (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." 50 C.F.R. § 22.3.

The FEIS reports that the construction of Glade Reservoir would permanently affect 8 acres of bald eagle nest buffer. FEIS at 4-385. Additionally, Glade Reservoir would be developed as a recreational site, with public access to a fishery, and opportunities for fishing, boating, hunting, camping, hiking, horseback riding, and biking. FEIS at 4-476 to -477. Northern Water would provide funding for the development of recreational facilities. *Id.* Therefore, it is highly likely that the construction and operation of the reservoir and associated activities will disturb bald eagles. Therefore, the Project cannot lawfully proceed in the absence of a permit issued pursuant to BGEPA by FWS. By the same token, the Corps cannot issue a Section 404 permit authorizing the project without simultaneously insuring that the project will be constructed and operated in such a manner as to comply with BGEPA, including BGEPA's permitting requirement. Indeed, to do otherwise would place the Corps itself in legal jeopardy under the APA, which prohibits federal agency action that is "arbitrary, capricious, an abuse of

discretion, *or otherwise not in accordance with law*." 5 U.S.C. § 706(2)(A) (emphasis added).[22] Therefore, contrary to the Corps' representation in the FEIS, *see* FEIS at 4-385 (asserting that compliance with BGEPA is the responsibility of Northern Water), the Corps must ensure that Northern Water complies with BGEPA *prior* to issuing a permit under Section 404.

CONCLUSION

For the foregoing reasons, the FEIS for NISP is legally deficient. If the Corps nonetheless proceeds to issue a Section 404 permit under the CWA, it will be doing so in clear violation of federal environmental law. In lieu of taking that step, the Conservation Organizations urge the Corps (and Northern Water) to explore less environmentally destructive alternatives and to solicit public comment on those additional alternatives, as well as the other issues raised herein.

Sincerely,

/s/ Elizabeth Lewis
Elizabeth Lewis

/s/ William S. Eubanks II
William S. Eubanks II

[22] NISP cannot proceed in the absence of a BGEPA permit. To issue an incidental take permit under BGEPA, FWS must find that the taking is "*necessary* to protect a legitimate interest in a particular locality," and that the "applicant has avoided and minimized impacts *to the extent practicable*," 50 C.F.R. § 22.26(f) (emphasis added). Thus, BGEPA requires FWS to scrutinize whether there are "practicable" alternative routes that would avoid or minimize eagle impacts. In addition, the issuance of a BGEPA permit is itself a federal action triggering NEPA responsibilities to take a "hard look" at environmentally enhancing alternatives.

Meyer Glitzenstein & Eubanks LLP

4115 Wisconsin Avenue, N.W., Suite 210
Washington, D.C. 20016
Telephone (202) 588-5206
Fax (202) 588-5049
lmink@meyerglitz.com

2601 S. Lemay Ave.
Unit 7-240
Fort Collins, CO 80525
Telephone (970) 703-6060
Fax (202) 588-5049
beubanks@meyerglitz.com

March 12, 2019

Via E-Mail
John Urbanic, NISP EIS Project Manager
U.S. Army Corps of Engineers, Omaha District
Denver Regulatory Office
9307 S. Wadsworth Blvd.
Littleton, CO 80128
nisp.eis@usace.army.mil

Re: Request For Supplemental NEPA Review By The Corps For The Northern Integrated Supply Project In Light Of Significant New Information Bearing On The Proposed Action

On behalf of the nonprofit organization Save The Poudre, I hereby request that the U.S. Army Copy of Engineers ("Corps") conduct supplemental environmental analysis pursuant to the National Environmental Policy Act ("NEPA"), 42 U.S.C. §§ 4321-4370m, by preparing a supplemental environmental impact statement ("SEIS") or, at bare minimum, a supplemental environmental assessment ("EA") to address and evaluate new circumstances and significant information relevant to this project and its environmental impacts. As explained below, **we request a response from the Corps by no later than March 29, 2019** informing Save The Poudre whether the Corps intends to conduct any supplemental NEPA review, and, if not, explaining the reasons why the Corps has declined to take this action.

BACKGROUND

I. STATUTORY AND REGULATORY FRAMEWORK

Congress created NEPA more than four decades ago "[t]o declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment . . . ." 42 U.S.C. § 4321. In light of this mandate, the Supreme Court has reasoned that NEPA is "intended to reduce or eliminate environmental damage and to promote 'the understanding of the ecological systems and natural resources important to' the United States." *Dep't of Transp. v. Pub. Citizen*, 541 U.S. 752, 756 (2004) (quoting 42 U.S.C. § 4321).

In achieving NEPA's substantive goals, Congress created two specific mechanisms through which federal agencies must evaluate the environmental and related impacts of a

particular federal action—an EIS and an EA. *See* 42 U.S.C. § 4332(c). These procedural mechanisms are designed to inject environmental considerations "in the agency decisionmaking process itself," and to "'help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment.'" *Pub. Citizen*, 541 U.S. at 768-69 (emphasis added) (quoting 40 C.F.R. § 1500.1(c)). Therefore, "NEPA's core focus [is] on improving agency decisionmaking," *Pub. Citizen*, 541 U.S. at 769 n.2, and specifically on ensuring that agencies take a "hard look" at potential environmental impacts and environmentally enhancing alternatives "as part of the agency's process of deciding whether to pursue a particular federal action." *Balt. Gas & Elec. Co. v. Nat. Res. Def. Council*, 462 U.S. 87, 100 (1983). The alternatives analysis "is the heart" of an EIS or EA. 40 C.F.R. § 1502.14. NEPA's implementing regulations require that the agency "present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public." *Id.*

An EIS must be prepared by an agency for every "major Federal action significantly affecting the quality of the human environment." 42 U.S.C. § 4332(c). Under the Council on Environmental Quality's ("CEQ") regulations that implement NEPA, "significance" requires consideration of both context and intensity. Where a significant environmental impact is not expected, the agency must still prepare an EA and a Finding of No Significant Impact ("FONSI"). *Id.* §§ 1508.9, 1501.3. Where an EA or EIS has been previously prepared, NEPA's regulations require an agency to supplement its prior NEPA review when "[t]he agency makes substantial changes in the proposed action that are relevant to environmental concerns," or "[t]here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." 40 C.F.R. § 1502.9(c).

II. FACTUAL BACKGROUND

The Corps commenced its decisionmaking and NEPA review process for the Northern Integrated Supply Project ("NISP") in August 2004. *See* Corps, *Environmental Impact Statement – Northern Integrated Supply Project*, https://www.nwo.usace.army.mil/Missions/Regulatory-Program/Colorado/EIS-NISP/. The Corps issued its Draft EIS in April 2008, its Supplemental Draft EIS in June 2015, and its Final EIS in July 2018. *Id.* According to the Corps' project website, the agency intends to issue a Record of Decision ("ROD") authorizing this project later this year (i.e., in 2019). *Id.*

It would be a major understatement to say that this project has engendered substantial controversy. Save the Poudre, affected municipalities such as the City of Fort Collins, and many other interested parties have submitted extensive comments criticizing myriad aspects of the Corps' decisionmaking process including the agency's impermissibly narrow purpose and need statement, the artificially constrained analysis of practicable alternatives, the use of inappropriate screening criteria in examining project alternatives, and major project impacts that have not been adequately analyzed. Those comments are all part of the public decisionmaking record.

DISCUSSION

Although the Corps evidently intends to issue its ROD later this year, the Northern Colorado Water Conservancy District ("Northern Water")—i.e., the project proponent—recently made a major change in project operations that alters many of the basic assumptions underlying the NISP project and the ability of Northern Water to fill the proposed Glade Reservoir. On February 28, 2019, Northern Water revealed—*for the first time ever*—that, in order for NISP to be viable, Northern Water may have to purchase at least "25,000 acre-feet of water" from northern Colorado farmers, which Northern Water representatives estimate "would take about a decade and 100 or more farms, depending on their size." Loveland Reporter, *Northern Water Buys First Farm for NISP Water* (Feb. 28, 2019), *available at* http://www.reporterherald.com /news/larimer-county/ci_32483944/northern-water-buys-first-farm-nisp-supply. Indeed, in purchasing its first water from a northern Colorado farm in furtherance of NISP, Northern Water spent $330,000 to purchase a mere 30 acre-feet of water—i.e., $11,000 per acre-foot. Even assuming other farms will sell to Northern Water at no more than this rate (a proposition that is far from certain), purchasing all of the required water would add an additional $275 million in total project costs. *See id.* On the same day that local newspapers revealed this approach, Northern Water separately unveiled its new regime—called the WaterSecure program—and launched a website providing information about it. *See* Northern Water, *WaterSecure*, *available at* https://www.northernwater.org/sf/nisp/watersecure. For several reasons, these purchases would represent a wholesale change to the approach Northern Water will take to acquire the water for NISP, and is a fundamentally different and highly significant modification to the project that bears directly on the proposed action, its impacts, and its alternatives.

First, Northern Water's new approach of purchasing some or all of the required 25,000 acre-feet of water from northern Colorado farms—i.e., more than 60% of the 40,000 annual acre-feet of water that Northern Water alleges is a necessary project component of NISP—has *never* been analyzed as part of the Corps' Draft EIS, Supplemental Draft EIS, or Final EIS. To the contrary, the Final EIS makes clear that under Northern Water's preferred alternative—as well all other action alternatives—"$0" would be spent on "water rights acquisition." Final EIS at 2-103. In contrast, the Corps estimated that under the *no-action* alternative, Northern Water would have to spend $700 million on water rights acquisition by buying water rights from farms at approximately $15,500 per acre-foot. *See* Final EIS at 2-102. Accordingly, because Northern Water's new approach fundamentally transforms the preferred action and its underlying assumptions and operational mechanics, at minimum the Corps must prepare supplemental NEPA review disclosing to the public this new approach and soliciting public input on this substantial change.[1]

[1] The Final EIS states that Northern Water already owns the water rights necessary to implement the preferred alternative. *See* Final EIS at 2-77 ("With the exception of Upper Galeton Reservoir as a point of storage for the SPWCP water right, *Northern Water owns the water rights with the necessary points of diversion and storage for Alternative 2M*." (emphasis added)). Thus, the fact that Northern Water actually does *not* own some of these water rights—to the tune of 25,000 of annual acre-feet of water (more than half the water Northern Water claims to need from this project)—is a colossal change in the preferred alternative that alters the entire landscape of this project is a significant way.

Second, supplemental NEPA review is necessary because Northern Water's new approach completely alters the baseline against which practicable alternatives are measured, especially in light of the significantly increased project costs. Even if Northern Water is able to buy 25,000 acre-feet at approximately $11,000 per acre-foot—which is not certain given the fair market price for such water rights, *see* Final EIS at 2-102—this would add at least $275 million to overall project costs, which means that certain alternatives previously dismissed due to higher costs might now be "practicable" when compared to the much higher costs of the preferred alternative in light of Northern Water's new farm purchasing scheme. Given the new cost baseline for the project, the Corps must re-examine all practicable alternatives as judged against the new projected costs of Northern Water's preferred alternative.[2]

Third, the Corps and Northern Water previously rejected alternatives that included as a component alternative agricultural transfer methods (including agricultural leasing), and did so by implementing faulty screening criteria for proven technology—i.e., rejecting the leasing of agricultural water on the purported grounds that such methods are technologically unproven. *See* Final EIS at A-115 (EPA comments advocating the consideration of alternative agricultural transfer methods). Now that Northern Water has dramatically changed course and *is* purchasing and/or leasing water from northern Colorado farms, the Corps must revisit the concept of alternative agricultural transfers and analyze other alternatives involving this concept that is, in fact, feasible as demonstrated by Northern Water's selection of this new approach to acquire more than half of the water needed for this project to be viable.

Fourth, Northern Water's significant change in operations for the preferred alternative necessarily modifies many of the key factors under NEPA related to this project, such as the purpose and need and whether the preferred alternative can even achieve the purported need for this project. In particular, since there is much uncertainty as to whether and when Northern Water would be able to achieve its goal of purchasing 25,000 acre-feet of water from northern Colorado farms, it is highly speculative as to whether the preferred alternative can provide 40,000 acre-feet of water (which is a requirement to satisfy the project's stated need).[3] The Corps

[2] The costs associated with NISP have grown exponentially since the beginning of this project. In 2008, the Corps estimated that the project would cost $350 million. By the 2018 Final EIS, the Corps estimated that the project would cost $1.1 billion—i.e., three times what the Corps estimated only ten years earlier. With Northern Water's new approach, the estimated costs will increase at least another $275 million and likely much more than that as farms sell their water rights at higher per-unit rates.

[3] Northern Water has indicated that it intends to resell the purchased land, conditioned to allow the exchange to operate in perpetuity, and may claim that such transactions will allow them to make these purchases at zero cost. *See* Loveland Reporter, *supra* ("Eventually, the district plans to sell the farms to private owners, he said, with the stipulation that the water would stay with the property."). Until such a time as Northern Water can provide signed contracts for resale of all of the purchased land, this approach remains speculative at best. Even if Northern Water was able to eventually resell all of the properties at favorable prices—which is far from certain—the project would incur substantial carrying costs associated with land ownership in the interim.

must analyze the likelihood that Northern Water will be able to acquire the rights to 25,000 acre-feet of water, the estimated costs of doing so, the anticipated time frame before such acquisition is completed, and what happens in the event that Northern Water is not able to acquire 25,000 acre-feet of water through this new approach.[4]

Fifth, the modeling conducted to date by the Corps and/or Northern Water is no longer accurate since the modeling assumptions previously used in assessing mass-balance water quality and return flow obligations fail to include any analysis of this new approach and how those projections change if Northern Water is (or is not) able to purchase 25,000 acre-feet of water from farms.

Sixth, there will be highly significant environmental impacts under Northern Water's new approach, in which the project proponent will separate Poudre river water from the land and replace it with South Platte water (then reselling and/or leasing the land to an irrigated agricultural user). Because of the multi-river issues inherent in this approach, there are myriad adverse effects to water quality, wildlife, and other aspects of the ecosystem that the Corps has not yet examined. The need for a "hard look" at these new impacts counsels in favor of supplemental NEPA review.[5]

Seventh, now that Northern Water's preferred alternative and the no-action alternative *both* involve as a key component the purchase of many acre-feet of water from farms, there is not an alternative that is genuinely distinct from the action alternatives. Because the Corps must include an analysis of a true no-action alternative—which must be conceptually distinct in terms of its components from the action alternatives—supplemental NEPA review is necessary to ensure that the agency explores a genuine no-action alternative as a proper baseline for assessing the action alternatives against that no-action standard.

None of these costs have been disclosed in any of the NEPA documents to date, nor compared to alternatives in determining the practicability of other approaches.

[4] Not only will Northern Water's new approach dramatically increase overall project costs and the amount of time before the project is viable due to water rights acquisition, but there will be additional costs and time expended addressing water rights issues associated with this new approach in water court. These costs and delays must also be examined as part of a supplemental NEPA analysis.

[5] Under this new approach, every purchase/exchange allows Northern Water to displace clean Poudre River water with more contaminated and more polluted water from the South Platte River. The mixing of water from these two sources will very likely adversely impact water quality for all ditch customers, including landowners who have *not* sold or leased their water rights to Northern Water. The Corps must analysis these water quality impacts, which require landowners who refuse to sell to Northern Water to nevertheless accept more polluted and lesser-quality water from the South Platte that otherwise would flow from the much cleaner Poudre River, and would require this outcome presumably without any compensation for those landowners from Northern Water or the Corps.

Eighth, in conjunction with this new approach, Northern Water expects to exchange 25,000 acre-feet of water between several ditch companies and the NISP participants. However, there is nothing in the Final EIS or elsewhere quantifying the costs of any contracts or other agreements with these ditch companies, nor any evaluation of what happens if the ditch companies are unwilling to partner with Northern Water on this project. This, too, must be addressed through supplemental NEPA analysis.

Ninth, supplemental NEPA review is necessary because Northern Water's new approach to the preferred alternative changes the assessment of impacts to the irrigated agriculture-related economy of northern Colorado. Whereas the Final EIS stated that the no-action alternative "would likely result in a moderate to major effect on irrigated agricultural economy in the study" due to widescale purchase of water rights under the no action alternative, Final EIS at 4-541, the Corps stated that "[u]nlike the No Action Alternative, Alternative 2M would not relay on transfers of agricultural water rights as a source of supply"; "[c]onsequently, there would not be effects on the irrigated agriculture-related economy due to water transfers." *Id.* at 4-545. Clearly, the Corps' earlier assumption that the preferred alternative would not involve transfers of agricultural water rights is no longer accurate, nor is the conclusion accurate that the local agricultural economy will not be impacted by implementation of the preferred alternative. This aspect of the Final EIS needs to be revised to account for current information on the preferred alternative and to accurately identify economic and other effects that will reasonably flow from Northern Water's new approach.

Given the many areas of the Final EIS that are now outdated, inaccurate, or flawed, it is imperative that the Corps update its analysis of project impacts, alternatives, and purpose and need. This critically important information requires supplemental NEPA review addressing these concerns both because Northern Water has made "substantial changes in the proposed action that are relevant to environmental concerns," and the new approach constitutes "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts," 40 C.F.R. § 1502.9(c)(1). Thus, because agencies "shall prepare supplements" to final EISs where either criterion is satisfied, *id.*, the Corps must conduct supplemental NEPA review and issue an SEIS (or at least a supplemental EA) addressing this vitally important issue that is central to the Corps' purpose and need analysis, evaluation of reasonable alternatives that could satisfy the need for this project, and the ultimate decision as to whether the Corps should authorize this project under Section 404 of the Clean Water Act. In conducting supplemental NEPA review, Save The Poudre strongly urges the Corps to subject that document to public comment and input, in light of the controversial nature of this project and the immense public interest in this project shown to date by Colorado residents. In our view, absent a supplemental NEPA analysis incorporating the new elements of the preferred alternative and public comment on that evaluation, the Corps' action would not satisfy NEPA's "hard look" standard and would, instead, be sweeping vital aspects of this project and its effects under the rug,

CONCLUSION

For the reasons explained above, Save The Poudre believes that the Corps must conduct supplemental NEPA review as directed by the CEQ's NEPA regulations to analyze various aspects of Northern Water's new WaterSecure program and how it impacts this project, its purpose and need, its impacts, and feasible alternatives. Please let me know by **no later than March 29, 2019** if the Corps intends to prepare a Supplemental EIS or EA in response to this letter and the significant new information identified herein. If the Corps decides not to conduct any further NEPA review despite the new information set forth in this letter, please provide a written response by March 29 explaining the reasons why the Corps has declined this request. I look forward to hearing from the Corps about this matter. Please let me know if you would like to schedule a conference call to discuss this matter in person.

Respectfully submitted,

William S. Eubanks II

William S. Eubanks II

LARIMER COUNTY
COMMITTED TO EXCELLENCE

ENVIRONMENTAL AND SCIENCE ADVISORY BOARD

Post Office Box 1190
Fort Collins, Colorado 80522-1190

To: Larimer County Board of Commissioners

From: Michael Lee Jones, Chair

Date: August 18, 2015

Subject: NISP SDEIS Review

The Environmental and Science Advisory Board has reviewed the Supplemental Draft Environmental Impact Statement (SDEIS) for the Northern Integrated Supply Project (NISP) and offers the following comments.

General Observations:

The environmental analysis for the SDEIS has significantly advanced from the Draft Environmental Impact Statement (DEIS). Notable examples include the updated hydrologic modeling using a Common Technical Platform (CTP) for NISP and the Halligan/Seaman projects, and the hydraulic modeling of sediment transport and aquatic habitat at the six Poudre River study sites.

The SDEIS updates the Participants' current water conservation measures. It is important to acknowledge that conservation measures have resulted in decreases in per capita water use. While conservation measures have helped to manage existing developed water supplies, the Participants have demonstrated that they have a need for additional water in the future.

Even with the advances noted above, gaps remain in the information necessary to make the final selection of the least damaging practical alternative and appropriate mitigation measures. Examples of information not available for public review at this SDEIS stage include preparation of the Supplemental Biological Assessment, completion of the Phase II water quality and stream temperature modeling, and completion of the mitigation plan.

We appreciate the Army Corps of Engineers (Corps) taking another look at hazardous materials contamination at the Atlas Missile Site. We believe that the impact assessment is sound and the proposed project changes are appropriate to address potential impacts.

The No Action alternative developed for the SDEIS does not accurately describe the current trajectory of events because it requires development of a new water project (Cactus Hill Reservoir) that would require a separate permitting process similar to NISP.

Based on the limited available data, the Preferred Alternative (Alternative 2) has an important advantage over Alternatives 3 and 4 in that it requires the smallest total withdrawal of water. However, a number of specific issues discussed below prevent an effective assessment of the impacts from any of the alternatives compared to current or future conditions.

Serious Concerns:

Impacts on Surface Water

As was criticized in the DEIS, *monthly* flow data are not applicable for evaluating environmental impacts of the alternatives on streamflow and create a false impression that environmental impacts have been properly characterized. Instead, *minimum* and *maximum daily* flow data provide the most appropriate information to assess environmental effects. However, daily flow data presented in the SDEIS are mostly *median* flows, which are also uninformative of environmental effects. New figures need to be created illustrating the *minimum* and *maximum* daily flows of each of the alternatives.

Figures of the more useful daily flow data are poorly presented in the SDEIS and technical reports such that it is difficult to adequately assess environmental impacts. For example, figures of the time series of the maximum, mean, median, and minimum daily flows (e.g., Water Resources Technical Report Figure 6.15) do not graph the y-axis on a logarithmic scale. Another example is the figures of daily flow duration curves (e.g., SDEIS Figure 4-30) that do not graph the y-axis on a logarithmic scale. Distinguishing the effects of the alternatives on daily flow durations at high and low exceedance probabilities is problematic because of this incorrect scaling. Additionally, figures such as SDEIS Figure 4-2 need to compare the minimum and maximum, not the median, daily flows. Full interpretation of environmental impacts would be facilitated if these figures displayed the effects of the alternatives as a percentage change from the current or future conditions hydrology.

No standard scientific performance metrics are given in the SDEIS or technical reports as evidence of how well the CTP hydrology model performed. Confidence in any of the flow-related resource effects analyses is limited because it is unknown how well the CTP simulated the observed streamflow.

Impacts to Fish Habitat

Habitat suitability curves were developed from data on habitat use by fish during low flows, but the depths and velocities measured during this time do not represent the depths and velocities available during high flows. The curves are scientifically and statistically unsound because they were projected from low flow data into times of high flows that are beyond the range of observed depths and velocities. Interpretations of habitat use during spring runoff are unfounded because the lack of observations results in predictions with extreme uncertainty. Moreover, the interpretation that habitat use by fish will increase during spring runoff because the alternatives will reduce high flows demonstrates a misunderstanding of fish ecology in rivers that are primarily influenced by snowmelt. High flows are important, not for habitat use by fish during spring runoff, but because they maintain the channel and resulting habitat that is available to fish during low flows throughout the remainder of the year. Predicting habitat use by fish in the main channel during spring runoff is not meaningful, except for adults of species that spawn during this time.

Physical habitat data presented in the SDEIS and technical reports provide flawed information for determining environmental impacts of the alternatives on fish (e.g., Figure 3-2, Aquatic Biological Resource Effects Technical Report). The data that are presented for weighted usable area (WUA) in median, 20th and 80th percentile *WUA years* are artificial and unrealistic representations of habitat availability in any given year. They are specific to each species and life stage of fish, meaning that they are not comparable to one another and are unacceptable for discriminating the different effects of the alternatives. Figures should present data for WUA in median, 20th and 80th percentile *streamflow years* because it allows the differentiation of the alternatives' effects on fish by showing how WUA will be affected in any given dry, average, or wet streamflow year.

Impacts to Water Quality

Water quality impacts to the Poudre River below the project diversion are a serious issue that has not been addressed in adequate detail in the analyses and proposed mitigation actions. The information in the SDEIS is insufficient to demonstrate that exceedances of water quality standards will not occur. We acknowledge that additional important Phase II water quality modeling is still ongoing and strongly urge the Corps to issue the completed modeling study as an addendum to the SDEIS so that it can be subject to public review prior to publication of the Final Environmental Impact Statement (FEIS).

Mitigation Measures:

The descriptions of mitigation actions are still not specific enough, despite numerous comments from stakeholders (e.g., EPA Region 8 and City of Fort Collins) that reviewed the DEIS in 2008. Likewise, the mitigation activities generally do not explain how or why they will be effective at alleviating adverse environmental impacts.

Hydrology will be impacted by the project, creating a cascade of impacts that include changes in stream morphology and sediment transport, alteration of aquatic and riparian habitat, degradation of water quality, and increased risk of flooding in the lower reaches of the Poudre River. The mitigation measures under consideration are not sufficient to address these serious impacts. Acceptable mitigation actions also need to include the provision for episodic high spring flows in the Poudre River to promote natural geomorphic processes and rejuvenation of instream and floodplain habitat. Such a measure would ideally be provided in partnership with other projects (e.g., Halligan/Seaman) to increase its effectiveness.

A credible rationale should be provided regarding the effectiveness of two proposed actions in mitigating adverse environmental impacts of the Preferred Alternative: 1) the proposed low flow augmentation to maintain 10 cubic feet per second (cfs) in winter, and 2) the proposed channel and habitat improvements to rehabilitate two 1.2-mile river reaches. An explanation should be provided in the SDEIS or technical reports that clarifies why releasing this minimum flow or rehabilitating this distance of river at these two sites would be beneficial to aquatic or riparian biological resources. It is suggested that the low flow augmentation will increase habitat availability for fish, but this alone is not a well-reasoned argument for its effectiveness.

As shown in the SDEIS and technical reports (i.e., Stream Temperature and Dissolved Oxygen Analysis, Table 4), temperature excursions are already happening in March and July through September in Segment 10, and in July and August in Segment 11. These temperature excursions are likely to increase with the Preferred Alternative, particularly in July and August. The proposed low flow augmentation would not mitigate this impact because water releases would occur in September and in November through April, but not in July and August, when excursions will have the most significant environmental impact on fish. Furthermore, the proposed Glade Reservoir enlargement also would not mitigate temperature excursions in July and might exacerbate them. However, this proposed mitigation (i.e., enlargement) is illogical because it would attempt to mitigate the adverse impact of Glade Reservoir during summer low flows by intensifying its adverse impact on spring high flows.

Principal Recommendation:

We recommend that the additional technical information and mitigation measures planned for the FEIS be prepared and presented as part of an addendum to the SDEIS. The addendum will allow the public and the Corps access to adequately detailed information that is sufficient to select the least damaging practical alternative and evaluate necessary mitigation measures.

Comments on Draft Environmental Impact Statement for Northern Integrated Supply Project

Dated: September 10, 2008

City Manager's Office
300 LaPorte Ave
PO Box 580
Fort Collins, CO 80522
970.221.6505
970.224.6107 - fax
fcgov.com

September 10, 2008

Mr. Chandler J. Peter
U.S. Army Corps of Engineers
Denver Regulatory Office
9307 South Wadsworth Blvd.
Littleton, CO 80128-6901

Dear Mr. Peter:

Please find accompanying this letter detailed comments and associated reference material from the City of Fort Collins regarding the Draft Environmental Impact Statement for the Northern Integrated Supply Project. Please make this submission a part of the administrative record in this matter. We respectfully submit these comments for your consideration and look forward to the Army Corps' response.

A public review version of these comments (without technical references) will be posted on the City's web site at: http://fcgov.com/nispreview/

On September 2, 2008, the Fort Collins City Council unanimously adopted Resolution 2008-082 (see attached), directing that these comments be submitted on behalf of the City. By the same Resolution, City Council also endorsed a City request that the Corps issue a Supplemental Draft Environmental Impact Statement. This request is being made so that there would be further analysis by the Corps intended to respond to the comments of the City and others, and also further opportunity for review and comment by the public after the Supplemental has been completed. In addition, the Council expressed its opposition to the project as it is described in the Draft Environmental Impact Statement.

If you have any questions, please feel free to contact me, or you may also contact Kevin Gertig with our Utility at (970) 221-6637, or John Stokes with our Natural Resources Department at (970) 221-6263.

Thank you.

Sincerely,

Darin Atteberry
City Manager

Attachments: 1. Resolution 2008-082 of the City Council of the City of Fort Collins
2. Comments of the City of Fort Collins on the NISP DEIS

pc: Mayor and City Councilmembers
Steve Roy, City Attorney
Lori Potter, Esq.

RESOLUTION 2008-082
OF THE CITY OF FORT COLLINS
DIRECTING THE CITY MANAGER TO SUBMIT TO
THE U.S. ARMY CORPS OF ENGINEERS COMMENTS ON
THE DRAFT ENVIRONMENTAL IMPACT STATEMENT ("DEIS")
FOR THE NORTHERN INTEGRATED SUPPLY PROJECT ("NISP")
AND EXPRESSING THE CITY COUNCIL'S OPPOSITION
TO NISP AS DESCRIBED IN THE DEIS

WHEREAS, the Northern Colorado Water Conservancy District (the "District") is seeking approval of a large water storage and supply project known as the Northern Integrated Supply Project ("NISP"); and

WHEREAS, in order to move forward with the necessary permitting for NISP, the District is required by the National Environmental Policy Act ("NEPA") to complete an environmental impact review process, conducted in this case by the U.S. Army Corps of Engineers (the "Corps") as the permitting agency under the federal Clean Water Act; and

WHEREAS, as part of the review process, the Corps on April 30, 2008, issued a draft Environmental Impact Statement ("DEIS") describing the "proposed action" and three alternative projects, and the environmental impacts associated with each, and providing for submission of public comment up to September 13, 2008; and

WHEREAS, the proposed action involves the construction of a new reservoir to the northwest of Fort Collins near the mouth of the Cache la Poudre River ("Glade Reservoir") and related projects; and

WHEREAS, at the direction of City Council, City staff has undertaken a thorough and detailed technical analysis of the DEIS primarily as it pertains to the proposed action and its direct impacts in Fort Collins and to the City; and

WHEREAS, based on the efforts of City staff, working with the assistance of outside technical experts, the City has concluded that the DEIS is substantially deficient in its analysis of potential impacts to the City; and

WHEREAS, the City's review has identified major adverse impacts that the proposed action would have upon that portion of the Cache la Poudre River that flows through Fort Collins and is a focal feature of the City's Downtown River Corridor Project, and upon other short-term and long-term City interests, plans and projects; and

WHEREAS, based on its thorough and detailed analysis, the City also believes that the proposed action as described in the DEIS will have profound and detrimental impacts upon associated aquatic and terrestrial plant and animal populations; the use and value of recreational facilities, parks, natural areas and other public assets on or near the river in Fort Collins; the quality

of City drinking water sources and supply, City wastewater treatment operations and restrictions, stormwater and floodplain mapping and requirements in the Poudre River Basin; quality of life and economic development in the City; and other matters of concern to the City; and

WHEREAS, such impacts to the City's economic plans, its quality of life, and in particular to the City's drinking water sources and supply and wastewater treatment operations could cause one-time damages in excess of $200 million and ongoing costs of millions of dollars annually; and

WHEREAS, in the course of its review of the DEIS, the City has identified data gaps, insufficient analyses, and technical inconsistencies and significant errors in the DEIS that call into question and undermine important conclusions in the DEIS; and

WHEREAS, to the extent reasonably possible in view of these data gaps, limitations, and errors, the limited time for review of the DEIS, and the lack of information and description provided in some portions of the DEIS pertaining to the proposed action, City staff has outlined major comment themes (the "Comment Themes") as the basis for a formal comment document to be prepared and submitted to the Corps by its September 13, 2008, deadline, as more specifically described on Exhibit "A", attached hereto and incorporated herein by this reference; and

WHEREAS, in order to maximize the amount of staff time available to further develop, refine, and finalize the comments to be submitted to the Corps, the City Manager has requested and recommended that the Council approve the Comment Themes as the general basis for the comments to be submitted to the Corps, recognizing that staff's ongoing work will produce a better refined, more comprehensive and technically detailed explanation of the Comment Themes, and the primary and other issues within each Comment Theme, and additional related matters identified as concerns regarding the DEIS; and

WHEREAS, the Council has reviewed the preliminary review information at the Council's December 11, 2007, and June 10, 2008, work sessions, and at this September 2, 2008 regular meeting, and has considered the Comment Themes and supporting information provided by staff, and supports the approach that the City Manager has recommended; and

WHEREAS, it is clear from the Comment Themes, the DEIS, and staff's analysis that the DEIS is substantially deficient and that a Supplemental Draft Environmental Impact Statement must be prepared by the Corps in order to meet the requirements of NEPA and the federal Clean Water Act; and

WHEREAS, in view of the significance of the impacts that NISP would have upon the City and the Fort Collins community, it is in the City's best interest to comment upon the DEIS and the proposed action and to carefully monitor the response to the City's comments and other comments submitted.

NOW THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF FORT COLLINS as follows:

Section 1. That the City Council opposes NISP as it is described and proposed in the DEIS and also opposes any variant of NISP that does not address the City's fundamental concerns about the quality of its water supply and the effects on the Cache la Poudre River through the City, which are critical to the City's quality of life, health, economic development and environment.

Section 2. That the City Manager is hereby authorized and directed to further develop, refine and finalize formal comments for submission to the Corps that are consistent with and that build upon the Comment Themes and this Resolution, and to submit those comments to the Corps in response to the NISP DEIS in accordance with the deadline for such submission.

Passed and adopted at a regular meeting of the Council of the City of Fort Collins this 2nd day of September A.D. 2008.

Mayor

ATTEST:

City Clerk

EXHIBIT "A"
SUMMARY OF COMMENT THEMES
NISP DRAFT EIS

1. WATER MANAGEMENT ISSUES - Source Water Quality

Issue: Deliveries to Horsetooth Reservoir from the Glade-to-Horsetooth pipeline for NISP have the potential to degrade water quality at the Fort Collins Water Treatment Facility intake at Soldier Canyon Dam.

2. WATER MANAGEMENT ISSUES - Wastewater Treatment

Issue: ***Reduced flows in the Cache la Poudre River and degradation of water quality in the River due to NISP may force the City to design, operate, and maintain, "advanced wastewater treatment systems" at great expense.***

3. WATER MANAGEMENT ISSUES - Trichloroethylene (TCE) Groundwater Contamination

Issue: TCE contaminates groundwater near the Glade pumping site and NISP may cause TCE to contaminate public drinking water supply and/or the Cache la Poudre River.

4. ENVIRONMENTAL ISSUES - Riparian Vegetation and Wetlands

Issue: Reductions in annual Spring flows in the Cache la Poudre River of from 25% to 71% are expected to have a significant detrimental impact on the riparian vegetation in the River corridor through Fort Collins.

5. ENVIRONMENTAL ISSUES - Aquatic Habitat Quality and Aquatic Life

Issue: The hydrologic, geomorphic, and water quality changes from NISP are expected to have a significant detrimental impact on fish and aquatic insects in Fort Collins.

6. ENVIRONMENTAL ISSUES - Terrestrial Wildlife and Bird Species within the Poudre River Corridor

Issue: The DEIS and Wildlife Technical Report fail to adequately identify and analyze the potentially significant impacts the proposed action could have on terrestrial wildlife and bird species within the Cache la Poudre River's riparian corridor.

7. ENVIRONMENTAL ISSUES - Loss of River Channel Capacity through Sedimentation

Issue: Increased sedimentation of the Cache la Poudre River through Fort Collins is expected to reduce river channel flood capacity.

8. RECREATION ISSUES

Issue: Reduced flows in the Cache la Poudre River, and the effects on the River corridor from reduced flows, are expected to have a significant detrimental impact on recreation along the River, including boating, tubing, fishing, walking, biking, running, hiking, and nature and wildlife viewing.

9. AESTHETIC AND SOCIOECONOMIC ISSUES – Aesthetics

Issue: Reduced flows in the Cache la Poudre River, and the effects on the River corridor from reduced flows, are expected to have a significant, detrimental impact on the aesthetics of the River corridor.

10. AESTHETIC AND SOCIOECONOMIC ISSUES - Socioeconomics

Issue: The DEIS does not address socioeconomic impacts NISP would have on Fort Collins (other than recreation), which may be significant and are expected to be detrimental.

11. CUMULATIVE IMPACTS

Issue: The DEIS section on "Reasonable Foreseeable Actions" does not identify or consider several important Fort Collins projects, such as the Discovery Science Museum, the Mason Transportation Corridor, and other planned improvements that have a relationship to the River.

12. MITIGATION

Issue: The DEIS does not develop sufficient information regarding impacts to predict impacts in a meaningful way, hindering consideration of avoidance, minimization and mitigation of impacts. The DEIS offers mitigation ideas but insufficient information to allow evaluation of those ideas. The mitigation approaches that are suggested in the DEIS have not been sufficiently analyzed to know whether they will effectively address the concerns they are intended to address. Moreover, the DEIS fails to offer any mitigation measures at all for several of the City's concerns.

13. CLIMATE CHANGE AND AIR QUALITY IMPACTS

Issue: The analysis of climate change and air quality impacts from NISP in the DEIS is inadequate, and the DEIS does not sufficiently characterize or address these impacts.

14. ERRORS AND OMISSIONS

Issue: The DEIS contains other technical, procedural and logical errors and omissions that impact the validity and sufficiency of the conclusions.

Comments on Draft Environmental Impact Statement
for
Northern Integrated Supply Project

Dated: September 10, 2008

Table of Contents

City of Fort Collins NISP DEIS Comments
September 10, 2008

Part I - EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

The City of Fort Collins (City) respectfully files these comments on the Northern Integrated Supply Project (NISP) Draft Environmental Impact Statement (DEIS) issued by the United States Army Corps of Engineers (Corps) on April 29, 2008. Based on a thorough, scientific review of the DEIS by expert City staff and consultants (see biographies in Appendix A to these Comments), the City has concluded that the DEIS fails to sufficiently analyze the impacts of NISP and does not provide for the avoidance of the extensive impacts NISP would have on the City and its residents. It would be illegal to approve a permit for NISP based on the current record and project definition.

Accordingly, a Supplemental Draft Environmental Impact Statement (SDEIS) is necessary to meet the Corps' legal obligations under Section 404 of the Clean Water Act (Section 404) and the National Environmental Policy Act (NEPA). Because NISP would cause extensive impacts to the City's environment, quality of life, economy, property and budget, and NISP does not provide adequate safeguards, the City opposes NISP as it is described in the DEIS.

1. NISP Would Cause Significant Impacts to the Water Quality of Horsetooth Reservoir and to the Cache la Poudre River in Fort Collins

The City would be directly affected by NISP. NISP would build, among other things, the new 170,000 acre-foot Glade Reservoir just north of Ted's Place on U.S. Highway 287, a pipeline between the Glade Reservoir and Horsetooth Reservoir (a critical source of the City's drinking water) and a relocated U.S. 287[1]. NISP would take as much as 71 % of the water out of the Cache la Poudre River upstream of the City and place it into the Glade Reservoir. As described in the DEIS, a portion of the Glade water would be conveyed to Horsetooth Reservoir, where it would degrade the quality of the water that enters the City's drinking water treatment facility.

The City depends on the quality of its water supplies. The City provides customers some of the best water in the country, which is critical to both residents and businesses. Many of the City's largest employers – high tech companies like Hewlett-Packard and Kodak and breweries like Anheuser Busch, New Belgium and Odell – depend on this high-quality water for their processes. Degradation of one of the City's two primary sources of water, Horsetooth Reservoir, could require the City to spend in excess of $90 million in capital costs and almost $3 million annually to maintain the quality of the water delivered to customers. NISP would cause reductions in the Poudre River's flows through Fort Collins as predicted in the DEIS, which may require the City to spend up to $125 million on upgrades to wastewater treatment facilities to protect the River.

[1] For the purpose of these comments, the Cache la Poudre River is also referred to as "the Poudre River" and "the River."

The health of the Cache la Poudre River is vital to the City and its residents. The City developed along the Cache la Poudre River and is now focusing some of its key economic redevelopment along it. The City's more than 1,400 acres of Natural Areas and several Parks along the River are integral to the City's quality of life. Businesses value the City's quality of life due to the role it plays in attracting and retaining high-quality employees. The River is a focus for recreational activity such as boating, cycling, walking, tubing, fishing and bird-watching. Degradation of the River threatens the quality of life of City residents.

2. The Corps Has Not Fulfilled its Obligation to Analyze and Protect the River and City's Drinking Water Supply

The Northern Colorado Water Conservancy District (the District or NCWCD) is required to secure a permit from the Corps under Section 404 of the Clean Water Act before developing NISP. Under Section 404 and its implementing regulations, the Corps may not issue permits to projects that will cause significant degradation of the aquatic ecosystem. 40 C.F.R. § 230.11. To meet its permitting duty, the Corps must assess adverse impacts by analyzing the consequences of proposed discharges on the "physical, chemical, and biological components of the aquatic environment." 40 C.F.R. § 230.11. It must also consider potential adverse impacts to municipal and private water supplies, and possible loss of quality, including effects on color, taste, odor, chemical content and suspended particulate concentration. 40 C.F.R. § 230.50. Clean Water Act regulations further require the Corps to evaluate effects on recreational fisheries, water-related recreation, aesthetics, parks and wilderness areas, and similar preserves. 40 C.F.R. §§ 230.51 – .54. The Corps must take a hard look at the environmental consequences of the proposed action, including the downstream impacts to the Cache la Poudre River in Fort Collins.

Despite the clear legal duty to analyze the impacts of NISP on the River and the City's water quality, the DEIS fails to do so. The DEIS is riddled with omissions, inaccuracies, errors, inconsistencies and improper approaches that make it inadequate as a matter of law. The DEIS fails to adequately and accurately acknowledge the serious impacts of NISP. For example, the DEIS provides no meaningful plan for the operation of NISP, making it impossible to understand exactly how NISP would affect the River or Horsetooth Reservoir. And, because the DEIS underestimates the impacts associated with NISP, it also fails to provide adequate measures to avoid and minimize these impacts.

3. The DEIS Does Not Adequately Analyze the Impacts of NISP on Fort Collins

The following paragraphs summarize some of NISP's impacts and the DEIS deficiencies of greatest concern to the City, which are treated in detail in later sections of these Comments. These are not technicalities, but fundamental concerns that affect real people's lives. At stake is the ability of parents to bring their children to the River without algae blooms, for fishermen to still use their favorite close-in spot for catching large brown trout, for families to wade or tube in the River, for the City and Northern Colorado to continue to succeed in attracting the best high-technology employers, and for homeowners and businesses to avoid the ravages of floods.

3a. City Drinking Water Sources

The DEIS underestimates the effects that NISP will have on the quality of water that the City uses for drinking. Glade Reservoir would be filled with runoff season high flows in the Cache la Poudre River, water that has much higher levels (almost twice as high on average) of Total Organic Carbon (TOC) as the Colorado-Big Thompson (C-BT) water stored in Horsetooth Reservoir. TOC is of central importance to water supplies, because it reacts with the chlorine necessary to treat water to form cancer-causing agents called disinfection byproducts. The levels of these disinfection byproducts allowed in public drinking water are limited by the federal Environmental Protection Agency (EPA) to protect human health. The City already expends considerable effort and resources to remove TOC as part of the treatment process.

Under the NISP proposal, much of the high TOC water from the Glade Reservoir would be piped to Horsetooth Reservoir and released close to the City's water treatment facility intake. It would increase TOC levels for the raw water the City treats, degrading the drinking water supplies of the City. In order to meet federal drinking water standards, the City may have to further upgrade its drinking water treatment systems, which could cost in excess of $90 million in capital costs and almost $3 million per year for operations.

The DEIS underestimates this threat to the City's drinking water. For example, the DEIS relies on analysis that underestimates the TOC levels of the water that will fill Glade Reservoir and be piped into Horsetooth Reservoir. The best available information indicates that Glade water would have long-term average TOC levels of at least 5.5 mg/L, (milligrams per liter) almost twice the 2.9 mg/L level of Horsetooth. The DEIS then relies on the unrealistic assumption that the high-TOC water from Glade would be completely mixed with the rest of water in Horsetooth Reservoir and diluted before being used by the City, even though the Glade water would be delivered on the north end of Horsetooth right next to the City's intake.

Because high TOC levels can produce potentially cancer-causing contamination of the City's drinking water and force huge costs on the City, the City manages its water supply so that high levels of TOC in its water supply will be avoided. However, the DEIS fails to provide any meaningful analysis of these impacts or any guarantees they would be avoided, minimized and mitigated. Instead, only vague and unreliable assertions are made that NISP's proponents might examine some mitigation in the future. These assertions do not meet the requirements of the Clean Water Act and NEPA.

3b. Water Quality Impacts to the Cache la Poudre River

NISP will have serious effects on the water quality in the Cache la Poudre River that are not adequately addressed in the DEIS. The water quality of much of the River is already listed as "impaired" by EPA due to fecal contamination and potentially toxic levels of other pollutants. Reducing the flow of the River by 25% to 71% will reduce dilution of treated wastewater treatment and other releases, making the water quality in the River much worse. It will also increase the temperature of the River (which is harmful to fish) and has a detrimental affect on

other water quality parameters, such as pH and unionized ammonia. These impacts to the River may cause algae blooms and reduced dissolved oxygen levels in the River (also harmful to fish), and may make portions of the River a "no body contact" and "no swimming" zone. Lack of sufficient dilution water will degrade the environment, human health, recreational uses and aesthetics of the River. These are fundamental blows to the aquatic ecosystem that, under the Clean Water Act, require denial of the proposed permit or a fundamental restructuring of the proposed project.

The loss of river flows could also be extremely expensive to the City's taxpayers and utility rate-payers. The degradation of water quality in the River due to the loss of river flows may require the City to undertake more advanced wastewater treatment methods at its wastewater facilities. Current professional engineering estimates for such upgrades range from $75 million to $125 million to build facilities and significant additional annual operations costs.

3c. Trichloroethylene (TCE) Contamination

The DEIS fails to adequately address very serious questions about the effect of NISP on toxic contamination from a former Atlas missile site located right at the Glade Reservoir dam site. The former missile base has leaked significant quantities of the cancer-causing solvent trichloroethylene (also referred to as trichloroethene or TCE) into the groundwater at the site. Unless property characterized and addressed, this chemical may eventually reach the Cache la Poudre River. The proposed Glade Reservoir would: (1) raise groundwater levels in the vicinity of the Reservoir, including the plume of trichloroethylene; and (2) lower the groundwater levels near the River as the river flow is reduced or diverted. The net effect would be to increase the likelihood and rate of trichloroethylene migration to the River. This is a significant potential impact to the aquatic ecosystem that could result from the construction of Glade Reservoir. It could result in significant human and wildlife exposure to this hazardous chemical for which the EPA has set a preferred exposure level of zero.

Unfortunately, the DEIS does not seriously address this concern. It unreasonably relies on many untested assumptions and minimal testing to reach sweeping conclusions. It also identifies only minimal mitigation for this impact and defers most attention to this issue until after the project is approved. This is inappropriate under the Clean Water Act and NEPA. Decisionmakers need to consider the potential impacts of putting a reservoir hydrologically above a plume of the cancer-causing trichloroethene *before any decision on NISP is made*. In addition, a more reliable and comprehensive plan will be needed to avoid, minimize and mitigate impacts associated with this toxic plume.

3d. Threats to Fish Habitat and Increased Flooding Risks from Sedimentation

NISP's 25% to 71% reduction in Poudre River flows could also threaten the very structure of the River and its use by people, fish and other creatures. The largest reductions in flow would occur

during the peak of the snowmelt runoff every year. It is these peak "flushing" flows that keep the River healthy. Without the flushing and overbank flows, the River may become choked with sediment that cannot be flushed on a regular basis. Sedimentation destroys spawning habitat for fish and disrupts the insects on which fish feed. It narrows the river channel and leads to growth of more vegetation along sand bars and in the channel, dramatically changing the River's form. This impairs boating, other recreation and the aesthetics of the River.

Just as importantly, the additional sediment and plant growth would tend to reduce the ability of the River to handle flooding when it occurs. Flood control has been a significant concern since the settlement of Fort Collins. In modern times, the City has experienced a number of major (and sometimes fatal) flood events (including 1983, 1997 and 1999). In response, and in anticipation of future flood events, the City has spent millions of dollars on flood management. With the potential for higher floods due to sedimentation and vegetation encroachment, the City's efforts may become inadequate or obsolete and the City could be forced to undertake even more spending to address Poudre
River flood risks.

Despite the fact that the issue of sedimentation was raised during scoping phase of the NISP process, the DEIS dismisses it with little analysis, inconsistent findings, erroneous assumptions and other errors. The DEIS also fails to identify meaningful control measures that would address this very serious public safety and environmental problem that is a core concern under the Clean Water Act.

3e. Impacts to Vegetation and Wetlands Along the River

The DEIS states that the proposed action will cause no loss of riparian/wetland vegetation. This conclusion is unsupported by real data or case studies and inconsistent with the relevant scientific literature.

While the loss of the flushing and overbank flows is expected to lead to an increase in vegetation in the channel of the River, it is likely to cause losses to native vegetation on the River banks associated wetlands, and riverine habitat. The high flows that would be diverted from the River for NISP are critical to maintaining the water table that supports adjoining wetlands and the beautiful and mature cottonwood gallery forest along the River. The reduction in flows could lead to a loss of many important native species and lead to increased invasion by pest species such as Russian Olive or tamarisk.

Despite the fact that the DEIS requirement was triggered by the need for a Section 404 wetlands permit, the DEIS fails to identify jurisdictional wetlands along the riparian corridor through Fort Collins and to evaluate the environmental consequences of the proposed action on those wetlands. This failure to identify jurisdictional wetlands in Fort Collins does not comply with the Clean Water Act and impacts to wetlands are clearly within the range of impacts that must be evaluated.

In addition, the loss of native vegetation is likely to have a profoundly negative effect on the aesthetics of the River and recreation associated with those aesthetics . Moreover, the vegetation and wetlands along the River provide critical habitat for birds and other wildlife that rely extensively on riparian habitat in Colorado's arid climate. The DEIS does a poor job of assessing these impacts and an even poorer job of ensuring that this significant degradation of the environment will not occur.

3f. Impacts to Fish and Wildlife

The sedimentation of spawning grounds, increases in stream temperature, loss of river flows, increased pollution and effects on insects and other sources of food will have a major impact on fish in the River. The DEIS attempts to minimize this problem by using simplistic models that the EPA has already stated are insufficient and by suggesting that that fish would "adapt" to the loss of habitat and degraded water quality. However, loss of certain fish and fish populations in some sections of the River is not adaptation; it is a serious adverse effect on biological resources and recreational opportunities.

The DEIS also largely ignores the effects of NISP on birds and other terrestrial wildlife. This is a critical omission, because riparian zones like the Cache la Poudre River support 82 percent of all of the breeding birds in Colorado and attract 10-14 times the number of migrating birds as upland areas. This includes raptors, migrant songbirds and waterfowl that are treasured by residents and visitors to the City's Natural Areas and Parks. Indeed, the Natural Areas along the River are an oasis of bird life, with 223 identified species. Similarly, the River corridor is the home or migration route for deer, elk, bear, otter, mink and many other animals. It is unreasonable to conclude that losses of major vegetation like the cottonwoods, fish, and insects would not have a significant effect on the birds and other wildlife that rely on the River.

3g. Air Quality and Climate

Surprisingly, the DEIS does not evaluate the effects of changing climate and streamflows on the project and its impacts. The scientific data is clear that the climate in the Poudre River watershed has been changing, affecting streamflows. However, even though the DEIS acknowledges this change, it bases all of its planning on a 50-year data set that ends in the year 2000, ignoring the much drier period of the last eight years. A drier and more variable climate will make the impacts of the project on the River and its water quality more serious. It will also affect the ability of the project to deliver the firm yield of water promised in the DEIS. It is unreasonable to proceed without some understanding of these impacts, especially when other water providers in the area are examining the effects of climate scenarios on water supplies and revising yield projections.

In addition, the DEIS fails to address the importance of the EPA's redesignation of the area in November 2007 as a nonattainment area for ozone. This designation requires much more

extensive analyses of the impact of the project on air quality that are completely absent from the DEIS.

3h. Recreation and Quality of Life

NISP could detract from, or impair recreational uses of, the Cache la Poudre River in Fort Collins for residents and visitors. Reductions in peak River flows would limit the season for kayaking, canoeing and tubing and may make those activities impossible at times if "no human contact" restrictions are necessary due to NISP's detrimental effects on water quality.

NISP would have a similar effect on the pending proposal to establish a whitewater course in the City. As in communities throughout Colorado – such as Golden, Salida, and Denver, to name just three examples -- such a course could be a major attraction and a boon to business development. However, NISP's proposed reductions in river flows make it nearly impossible to justify developing such a beneficial facility.

Similarly, hikers, cyclists, runners and others will likely be deterred by by drastically reduced flows, loss of trees such as cottonwood, and other damages identified above. Fishermen will lose areas of the River that now support fish, and the number of quality fish is likely to drop substantially in the areas where they remain. Birdwatchers will be affected by losses of bird species along the riparian corridor.

These impacts could be a serious blow to the quality of life of many City residents, who value the River as one of the great assets of the City. A recent survey conducted by Dr. John Loomis of Colorado State University found that 75% of City residents use the River for recreation every year. Of the surveyed residents, over 80% of the households believed that a 50% reduction in the River's flow (consistent with the 25% to 71% flow reductions from NISP) would be a bad change. The survey and economic analysis found that the recreational value of the River has a net present value of $283 to $424 million. This figure does not take into account the critical role that the River has in fostering cultural and economic development in the City.

Yet, because the DEIS fails to identify or acknowledge the potential for the serious harms to the River, it unreasonably fails to identify significant impacts that NISP could have on recreation and other quality of life indicators.

3i. Socioeconomic Impacts to Fort Collins and Its Residents

The DEIS gives short shrift to the socioeconomic impacts that NISP could have on Fort Collins. The Socioeconomic Resources Technical Report asserts that "all of the components of NISP action alternatives are located outside of community boundaries." On that basis, it concludes that: "No community cohesion, quality of life or access impacts are associated with any of the action alternatives." In addition to being inaccurate and lacking any basis, the DEIS ignores the role of a healthy River as a key element of the City's Downtown development planning. Several of the City's foundational planning documents are predicated on a healthy Poudre River

ecosystem, with connections and access between the Downtown and the Downtown River Corridor and the North College Corridor. The DEIS fails to take meaningful look at the City's interest and stake in the River as an amenity, and does not address the impact of reduced flows on these connections generally.

More specifically, the DEIS takes the mistaken position that the City's Discovery Science Museum, funded and planned for construction on the River, and the Mason Street Corridor Improvements, preliminarily approved for funding and in environmental review now, are "not reasonably foreseeable," and therefore fails to assess them in the cumulative effects report. In view of the investments the City has made in preparing to move forward with these two projects, among others, these are key omissions from the DEIS's analysis.

The DEIS similarly fails to look at the effects of NISP on other reasonably foreseeable projects that are critically important to attracting and retaining businesses and their employees, such as the Poudre River Enhancement Project, the Colorado State University Clean Energy Cluster and Engines and Energy Conversion Laboratory, the Bohemian Foundation's Amphitheater/Music Venue, and Downtown River District Infrastructure Project.

These are fundamental flaws in the economic impacts discussion in the DEIS, and they must be corrected in order for the DEIS to fulfill the requirements of NEPA.

4. A Supplemental DEIS and Revised 404(b)(1) Analysis Are Necessary to Address the DEIS's Shortcomings. Along with Improving the Data and Analysis of Impacts, the SDEIS and Revised 404(b)(1) Analysis Must Contain Definite and Specific Measures Designed to Avoid, Minimize and Mitigate NISP's Significant Degradation of the Aquatic Environment

Due to the DEIS's manifold inaccuracies, omissions, errors, methodological problems and unsubstantiated conclusions discussed in these comments, the DEIS does not adequately assess the environmental impacts of NISP. To cite just a few examples:

- The DEIS excludes the City's Drake water reclamation facility from its analyses, from which 10 million gallons of treated effluent is being discharged every day, and which is permitted for a discharge of up to 23 million gallons.

- The DEIS bases all of its planning on a data set that ends in the year 2000, ignoring the much drier period of the last eight years.

- The DEIS claims that water temperatures will decrease with reduced flows; in other places it claims that temperatures will increase.

- The DEIS claims that water quality data for certain parameters downstream of the Mulberry facility was not available. However, the City has over ten years of detailed water quality data at the location in question.

- The DEIS states that a U.S. Geological Service (USGS) gage station and water quality monitoring site on the Poudre River does not exist (and thus was not available for analysis) when in fact this data is readily available via USGS websites.

The additional analysis that the City has completed, as described in the City's Comments, reveals that NISP would cause much more serious impacts than is acknowledged in the DEIS. These impacts require the denial of the permit or a much more robust program of avoidance, minimization and mitigation.

Because the DEIS and Section 404(b)(1) Analysis are so fundamentally inadequate and cannot support the Corps' obligations under either the Clean Water Act or NEPA, the Corps must prepare a Supplemental Draft Environmental Impact Statement and Revised Section 404(b)(1) Analysis. These documents must not only address and correct the errors and data gaps discussed in these Comments, but also must include much more rigorous commitments and analysis of proposed measures to avoid, minimize and mitigate the impacts of NISP.

Part II - PROCEDURAL AND LEGAL FRAMEWORK FOR CITY COMMENTS

6. **Because of the DEIS's Failure To Provide Sufficient Analysis of the Impacts of the Proposed Permit and Address Their Avoidance, Minimization and Mitigation, A Supplemental Environmental Impact Statement Is Necessary To Comply With NEPA and the Clean Water Act:** Pg. 34

7. **The Corps May Not Segment or Defer Its Analysis of the Impact of the Glade-Horsetooth Pipeline:** Pg. 37

1. The Corps Has an Obligation to Analyze, Avoid, Minimize and Mitigate Impacts Associated with NISP

1a. Section 404 of the Clean Water Act

The DEIS does not fulfill the requirements and purpose of Section 404 of the Clean Water Act to restore and maintain the integrity of the United States' rivers and other waters. Instead, the DEIS's incomplete and misleading analysis appears designed to facilitate without adequate disclosure a project that would seriously and permanently degrade -- and *reverse restoration* of -- the Cache la Poudre River, as well as the water quality of Horsetooth Reservoir.[2]

The Clean Water Act, 33 U.S.C. §§ 1251, *et seq.*, is a comprehensive statute designed to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a). To this end, Section 404 of the Clean Water Act prohibits the discharge of any pollutant, which includes dredged or fill material, *id.* § 1362(6), into navigable waters unless authorized by a CWA permit. *Id.* § 1311.

> The statute and legislative history reflects that Congress' intention in enacting the Clean Water Act was focusing on remedying the cumulative industrial and institutional practices that have spoiled much of the Nation's waters, and its concern was assuring high quality in our waters. *See* S. Conf. Rep. No. 1236, 92d Cong., 2d Sess. 99-100 (1972), 1972 U.S. Code Cong. & Admin. News 3668 (conference report explaining that in § 101 of the Clean Water Act, 33 U.S.C. § 1251, congressional intent was to eliminate pollutant discharge, *restore chemical, physical, and biological integrity of the Nation's waters*, set water quality goals, prohibit toxic discharges, and develop waste treatment projects and plans), *reprinted in* 1 *Legislative History of the Federal Water Pollution Control Act Amendments of 1972*, at 282-83 (1973).

James City County v. EPA, 12 F.3d 1330, 1332 (4th Cir. 1993) (emphasis added).

Pursuant to the mandate of Section 404(b) of the Clean Water Act, the EPA and the Army Corps of Engineers (Corps) have jointly issued mandatory guidelines ("the Section 404 Guidelines") that must be followed by the Corps in its permitting decisions under section 404. *See* 40 C.F.R. Part 230.

Under the Section 404 Guidelines the Corps must not issue permits to projects that will have a significant adverse impact on the environment. 40 C.F.R. § 230.11. To fulfill its permitting duty, the Corps is required to assess and calculate adverse impacts by analyzing the short and long term consequences of proposed discharges on the "physical, chemical, and biological components of the aquatic environment." 40 C.F.R. § 230.11. *See Environmental Defense v. Corps of Engineers*, 515 F. Supp.2d 69, 77 (D.D.C. 2007).

[2] Throughout these comments, references to the DEIS implicitly incorporate the Section 404(b)(1) Analysis included in the DEIS, unless otherwise stated.

The Corps may also approve a project only if:

1. It is the least damaging practicable alternative;

2. Its discharges do not cause or contribute to *significant degradation* of the waters of the United States, including the following types of effects;

    a) Human health or welfare, such as municipal water supplies, fish, wildlife and wetlands. [Section 230.10(c)(1)]

    b) Life stages of aquatic life and other wildlife dependent on aquatic ecosystems. [Section 230.10(c)(2)]

    c) Aquatic ecosystem diversity, productivity and stability. [Section 230.10(c)(3)]

    d) Recreation, aesthetic and economic values. [Section 230.10(c)(4)]

3. All appropriate and practicable steps have been taken to **minimize** potential adverse impacts to aquatic ecosystems.

40 C.F.R. § 230.10.

A description of the possible ways to satisfy the above-cited requirements can be found in Subpart H of the Guidelines. *See* Section 230.10(d); and NOTE to Subparts C, D, E and F. In some cases, minimization of the impact may actually require **avoiding** it altogether. *See* Subpart H of the Guidelines; *see also* 33 C.F.R. § 320.4(e) ("Action on permit applications should, insofar as possible, be consistent with, and avoid significant adverse effects on the values or purposes for which those classifications, controls, or policies were established"); and Memorandum of Agreement Between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation under the Clean Water Act 404(b)(1) Guidelines (Feb. 7, 1990). Any unavoidable impacts have to be **mitigated**.

The DEIS and 404(b)(1) Analysis fail to demonstrate that the Corps has fulfilled the duty to avoid, minimize and mitigate project impacts; accordingly, the documents are not adequate to support issuance of a 404 permit. Rather than make the point repeatedly in these comments that avoidance, minimization and mitigation have not been implemented in the plans for NISP, the City raises it here, with the qualification that it applies throughout. 40 C.F.R. § 230.10, quoted above, imposes this duty. It applies broadly to short-term and long-term effects of the discharge itself and -- importantly -- to secondary effects of the discharge. *Id.* at § 230.11.

Subparts C through F of the Guidelines describe the scope of the impacts subject to the duty to avoid, minimize and mitigate. The Guidelines require the Corps, in the DEIS and 404(b)(1) Analysis, to implement measures that avoid, minimize and mitigate numerous impacts, including "changes in normal water fluctuations [that] … can change *adjacent, upstream, and downstream areas*" (§ 230.24(b)) and activities that affect riffle/pool ratios and "reduce the aeration and

filtration capabilities at the discharge site *and downstream*, … retard repopulation of … *downstream waters* through creation of unsuitable habitat" (§ 230.45) (emphasis added). *See Utahns for Better Transportation v. USDOT*, 305 F.3d 1152, 1192 (10th Cir. 2002) (Corps violated section 404 by failing to address impacts to wildlife more than 1,000 feet from the discharge site). The scope of the duty to address indirect impacts is discussed in more detail below. The Guidelines call for the Corps to make "factual determinations" and "findings of compliance or noncompliance" that considers the effects described in Subparts C through F, of which the two examples just cited are illustrative. *See* NOTE to Subparts C through F. This the DEIS and 404(b)(1) Analysis fail to do and, as a result, the Corps has failed in its duty to implement all appropriate and practicable steps to minimize potential adverse impacts of NISP. *See also* NOTE to Subparts C, D, E and F ("possible actions *to minimize adverse impacts* … can be found in Subpart H." (emphasis added).

In addition, no discharge may be permitted if it: (1) causes or contributes to violations of any state water quality standards; or (2) jeopardizes the continued existence of a federally threatened or endangered species or adversely affects critical habitat for such a species. 40 C.F.R. §§ 230.10(b)(1), 230.10(b)(3). As discussed in detail in Section III of these comments, all available evidence shows that the proposed NISP project would trigger or exacerbate violations of state water quality standards on the Cache la Poudre River and Horsetooth Reservoir. If so, the permit cannot be approved by the Corps.

Under the Section 404 Guidelines, the Corps also may not issue a permit for NISP if it determines that doing so would be contrary to the public interest based on a "careful weighing" of the probable impacts of the project. 33 C.F.R. § 320.4(a). As is discussed throughout these comments, the current record is inadequate for the Corps to undertake this analysis, because it fails to account for the economic and noneconomic negative impacts of NISP, while exaggerating its benefits.

1b. Section 401 of the Clean Water Act

The City intends to raise specific concerns about water quality impacts of NISP before the Colorado Department of Public Health and Environment (CDPHE) during its consideration of a request for Section 401 certification under the Clean Water Act. *See* 33 U.S.C. § 1341. The City reserves its right to file additional comments during the Section 401 process, any further Section 404 proceedings and any other proceedings relating to NISP.

The City understands that the applicant Northern Colorado Water Conservancy District (NCWCD or District) submitted a request to CDPHE for a Section 401 certification on June 2, 2008. The CDPHE deemed the application insufficient for not providing the information necessary. Letter from Steven Gunderson, CDPHE, to Carl Brouwer, Project Manager, July 30, 2008. Mr. Gunderson's letter stated that "once the EIS is final and all project plans are final, the Division will take the time necessary to properly review the application, review public comments, and make the final decision on the 401 certification."

Because the City of Fort Collins has serious concerns about the water quality impacts of NISP, it has a direct interest in participating in a full and fair 401 certification process. Under the CDPHE regulations, 5 CCR 1002-82 (Regulation 82), this includes public notice and an opportunity to comment on a draft certification decision. As CDPHE has made clear in Mr. Gunderson's letter, this process can only take place after the District submits all information required to reach a certification decision.

Accordingly, it is important to the protection of the City's and the public's interest that the District make a complete submission at the appropriate time. The one-year period for CDPHE review of the request for certification pursuant to 33 U.S.C. § 1341(a) starts to run as of the time that the District makes the required submission. *City of Fredericksburg v. FERC*, 876 F.2d 1109 (4th Cir. 1989). The Corps regulations require a "valid" application to be submitted in order to trigger the one-year period. 33 C.F.R. § 325.2(b)(ii). For the application to be valid, it must contain the information that the certifying agency (CDPHE) needs to conduct certification review. *Bangor Hydro-Elec. v. Board of Environmental Protection*, 595 A.2d 438 (Me. 1991); *Long Lake v. New York State Department of Energy Conservation*, 164 AD 2d 396 (N.Y.A.D. Dept. 3, 1990); *In Re Washington County Hydro Development Associates*, 28 FERC P 61341, 1984 WL 57796 (F.E.R.C.) If the Corps treats June 2, 2008 (or some other date prior to the District's submittal of a complete application as deemed by CDPHE) as a trigger date, it will be in violation of 33 C.F.R. § 325.2(b)(ii) and the other authorities cited above.

1c. National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires the Corps to prepare an Environmental Impact Statement analyzing the impacts of and alternatives to the proposed permitting action under Section 404. NEPA mandates that the Corps take a hard look at the environmental consequences of the proposed action, including any indirect, secondary and cumulative impacts. NEPA specifically requires a "detailed statement" of the environmental impact of the proposed action. 42 U.S.C. § 4332(2)(C). The primary function of this detailed statement is to ensure "a fully informed and well-considered decision." *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc*., 435 U.S. 519, 558 (1978).

NEPA, like the Clean Water Act, requires the Corps to avoid, minimize and mitigate impacts. NEPA defines this duty as follows:

"Mitigation" includes:

> (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
>
> (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
>
> (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

(e) Compensating for the impact by replacing or providing substitute resources or environments.

40 C.F.R. § 1508.20.

1d. Summary

As discussed in detail in Parts III-V of these Comments, the DEIS is woefully deficient in its (1) analysis of impacts from the proposed NISP project pursuant to NEPA and the Clean Water Act and (2) avoidance, minimization and mitigation of these impacts under the Clean Water Act. As a result, the Corps cannot proceed to a final EIS or issue a permit pursuant to Section 404 based on this inadequate DEIS. If the project proponent wishes to proceed with the project, a supplemental DEIS (SDEIS) and considerable additional analysis under Section 404 will be necessary.

"The burden of proof to demonstrate compliance with the § 404(b) permit Guidelines rests with the applicant; *where insufficient information is provided to determine compliance, the Guidelines require that no permit be issued*. 61 Fed. Reg. 30,990, 30,998 (June 18, 1996) (citing 40 C.F.R. § 230.12(a)(3)(iv))." *Utahns for Better Transportation v. USDOT*, 305 F.3d at 1187) (emphasis added). The inadequate state of the DEIS shows that the burden of proof regarding compliance is not and cannot be met for the NISP project on the current record.

2. The Corps Must Evaluate Impacts To City of Fort Collins Drinking Water and the Cache la Poudre River, Including Special Aquatic Sites and Other Specially Protected Resources under the Clean Water Act. The EIS Must Examine Indirect, As Well As Direct, Impacts of the Project

2a. Legal Requirement To Study Indirect Impacts in the DEIS

Both NEPA and the Clean Water Act require the Corps to develop complete and scientifically valid analyses of the impacts of the proposed action, as well as the effectiveness of any proposed steps to avoid, minimize and mitigate these impacts. For NISP, this must include thorough and defensible review of (1) the effects of diverting Glade Reservoir water to Horsetooth Reservoir and (2) the serious ecological damage that would be caused by reducing Cache la Poudre River flows by up to 71 percent. However, the DEIS fails to provide adequate analysis of these critical effects on the aquatic environment.

As noted above, the Corps is required to prohibit discharges which result in "significant degradation to waters of the United States." 40 C.F.R. §230.10(c). To determine whether a proposed discharge will result in significant degradation, the Section 404 Guidelines require the Corps to make detailed factual determinations regarding the effects of the discharge on the aquatic ecosystem. *Id.* at §230.10(c). *See also* §230.11. As part of these factual determinations, the Section 404 Guidelines require the Corps to include all "secondary effects" of the proposed fill. 40 C.F.R. § 230.11(h). Secondary effects are effects that are "associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material." *Id.* at §230.11(h)(1). An example of a secondary effect included in the Section 404 Guidelines is "fluctuating water levels … downstream associated with the operation of a dam," explicitly requiring review of the effects of Glade Reservoir operation on the Cache la Poudre River. *Id.* at §230.11(h)(2).

The Corps must also consider the "cumulative effects" on the aquatic ecosystem, *i.e.*, changes attributable to the collective effect of a number of different actions and discharges (*e.g.*, the wide array of different dam and diversion projects that affect or will affect the Cache la Poudre watershed). *Id.* § 230.11(g). *See also Utahns for Better Transportation v. USDOT*, 305 F.3d 1152, 1190 (10th Cir. 2002) ("The permitting authority is to collect and solicit information about the cumulative impacts on the wetlands, and this information is to be documented and considered during the decisionmaking process concerning the evaluation of the permit application.").

Courts have applied the Section 404 Guidelines' requirement that a Section 404 permit must be denied when secondary impacts are inadequately analyzed, minimized or mitigated. For example, the Tenth Circuit Court of Appeals upheld the Corps' denial of a permit for a proposed earthen dam because of indirect effects of the dam on whooping crane habitat downstream. *Riverside Irrigation Dist. v. Andrews*, 758 F.2d 508 (10th Cir. 1985). As with NISP, the impacts on the habitat were not a direct result of discharge of fill material; rather, they were the anticipated result of increased use of water that the reservoir would bring about.

> The question in this case is how broadly the Corps is authorized to look under the CWA in determining the environmental impact of the discharge that it is authorizing … In the present case, the depletion of water is an indirect effect of the discharge, in that it results from increased consumptive use of water facilitated by the discharge. … To require [the Corps] to ignore the indirect effects that result from its actions would be to require it to wear blinders that Congress has not chosen to impose … There is no authority for the proposition that, once it is required to consider the environmental impact of the discharge that it is authorizing, the Corps is limited to consideration of the direct effects of the discharge.

Id. at 512-13.

The federal district court for the district of Colorado similarly upheld an EPA veto of the §404 permit issued by the Corps for construction of the Two Forks Dam on the upper South Platte River based on indirect impacts to recreational and fishery conditions rather than to water quality

per se resulting from direct discharge of fill material into the river. *Alameda Water & Sanitation Dist.*, 930 F. Supp. 486, 491 (D. Colo. 1996).

Noting that the Section 404 Guidelines "require an accounting of secondary effects on the aquatic ecosystem in addition to direct effects," another federal district court set aside five Section 404 permits granted by the Corps for mountaintop mining and the consequent burial of streams. *Ohio Valley Environmental Coalition v. United States Army Corps of Engineers*, 479 F. Supp. 2d 607 (S.D. W.Va. 2007) (citing 40 C.F.R. §230.11(h)(1)). The court found that the studies in the Corps documents failed to assess properly the effect of the loss of headwater streams on the downstream aquatic ecosystems, a secondary effect of the discharge of fill material.

As explained in detail below, the DEIS is particularly deficient in addressing key indirect impacts, including but not limited to the effects of reduced flows on riparian wetlands and vegetation and the effects of reduced flows and a changed hydrograph on the proposed new watercraft course in Fort Collins. The case law is very clear on the need to do thorough disclosure and analysis of indirect impacts, and this the DEIS fails to do.

2b. Legal Requirements To Study Impacts on City Natural Areas

Further, the Section 404 Guidelines call for special consideration of the numerous special aquatic sites and other protected resources along the Cache la Poudre River. As detailed in Part IV of these comments, the City owns considerable property along the Poudre that it manages for habitat, recreation, and aesthetics. Its Natural Areas and Parks include significant riparian habitat, wetlands, a pedestrian and bike trial, and park land adjacent to the river. Subparts E and F of the Guidelines list specific potential effects that the Corps must consider in assessing whether a proposal complies with the Guidelines and regulations. 40 C.F.R. Part 230, Subparts E and F. Many of these provisions are applicable to the entire reach of the Cache la Poudre through the City.

Subpart E of the Section 404 Guidelines ("Potential Impacts on Special Aquatic Sites") describes impacts to "be considered in making the factual determinations and findings of compliance or non-compliance in subpart B." "Special Aquatic Sites" are defined in Section 230.3(q-1) of the Section 404 Guidelines as:

> geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region.

Specific examples include, in addition to wetlands, wildlife sanctuaries and refuges, and riffle and pool complexes – all of which are present in or along the Cache la Poudre in the City's Parks and Natural Areas. 40 C.F.R. §§ 230.40-45; 40 C.F.R. §230.54.

Similarly, as detailed in Part III, IV and V of these Comments, the action alternatives described in the DEIS would drastically reduce flows in the Cache la Poudre River (by as much as 71 percent), resulting in major impacts to, among other things, stream morphology, riffle and pool complexes, recreational fisheries, wetlands, refuges, terrestrial and aquatic wildlife, boating recreation, birdwatching, trails, parks and aesthetics. *Id.*

The DEIS gives short shrift to these indirect impacts, providing much less analysis in areas away from the Glade Reservoir dam. This renders the DEIS inadequate for public use and for decisionmakers under NEPA and the Clean Water Act. *See Utahns for Better Transportation v. USDOT*, 305 F.3d 1152, 1180 (10th Cir. 2002) (FEIS inadequate when it failed to consider indirect effects on migratory birds).

2c. Legal Requirements To Address Impacts To City Water Supplies, Parks and Recreation

Subpart F of the Section 404 Guidelines describes potential effects on "Human Use Characteristics" that are applicable to the Cache la Poudre River in the City. It specifically requires that the Corps consider effects on municipal water supplies, recreational and commercial fisheries, water-related recreation, aesthetics, and parks and "similar preserves." 40 C.F.R. §§ 230.50-54. The subsections require the Corps to consider the possible loss of values in all these types of areas; substantial adverse impacts should be considered to exist when the Corps determines the proposal will result in significant degradation, and what kind of avoidance, minimization or mitigation must be attached to a permit, if one is issued. Among the impacts that must be avoided, minimized or mitigated are:

- impacts to municipal water supplies by rendering them unpalatable or unhealthy (*Id.* §230.50);
- impacts to recreational fisheries by, among other things, interfering with the reproductive success of aquatic species or chemical contamination (*Id.* §230.51);
- impacts to water-related recreation such as hunting, fishing, canoeing, and sight-seeing by changing aesthetics of resource area or by changing water qualities like turbidity, dissolved materials, and quality of habitat (*Id.* §230.52);
- impacts to aesthetics by degrading water quality, creating "distracting disposal sites," inducing inappropriate development, or adversely affecting particular features like trails, vegetation, air quality, mood, and noise levels (*Id.* §230.53);
- impacts to parks (including "areas designated under … local ordinances to be managed for their aesthetic, historical, recreational and/or scientific qualities, thereby reducing or eliminating the uses for which such sites are set aside and managed") (*Id.* § 230.54).

As detailed in Part III of these Comments, the DEIS fails to address the impacts of the proposed action on the municipal drinking water supplies of the City, insofar as the proposed Glade to Horsetooth Pipeline would add water to Horsetooth Reservoir from Glade Reservoir – immediately adjacent to the inlet for the City's drinking water supplies – that would have much

higher Total Organic Carbon levels. This high TOC water would impair the quality of the City's water and cause the need for extensive, expensive improvements to the City's drinking water treatment infrastructure. *See* Section III.1 of these Comments.

3. An Essential Predicate for Avoiding, Minimizing and Mitigating Impacts Is Proper Identification and Analysis of Impacts, which the DEIS Fails To Provide; the Corps Must Provide a Scientifically Rigorous Analysis

As detailed in Sections III-V of these Comments, the DEIS has failed to properly assess the impacts of the proposed permitting action and is riddled with missing analyses, inconsistent positions, incorrect or incomplete data, and methodological errors. Section 404 requires the Corps to make detailed and scientifically defensible findings analyzing the short and long term consequences of discharges on the "physical, chemical, and biological components of the aquatic environment." 40 C.F.R. § 230.11. *See Environmental Defense v. Corps of Engineers*, 515 F.Supp.2d 69, 77 (D.D.C. 2007).

"A § 404(b) permit cannot be issued if the proposed discharge will result in significant degradation of the aquatic ecosystem *or if there is insufficient information to make a reasonable judgment as to whether the discharge will result in significant degradation*. 40 C.F.R. §§ 230.12(a)(3)(ii), (iv)." *Utahns for Better Transportation v. USDOT*, 305 F.3d 1152, 1191 (10th Cir. 2002) (emphasis added). Failure to adequately consider the impacts associated with the proposed action is arbitrary and capricious under both NEPA and the Clean Water Act. *Id.* at 1192.

"Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA." 40 C.F.R. § 1500.1. "For this reason, agencies are under an affirmative mandate to 'insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements [,] identify any methodologies used and ... make explicit reference by footnote to the scientific and other sources relied upon for conclusions[.]' 40 C.F.R. § 1502.24." *Environmental Defense*, 515 F.Supp.2d at 78.

Failure to meet these requirements for scientific integrity and adequacy in NEPA documents undermines the Corps' ability to meet the requirements of Section 404. "*Unless the effects of the activity are properly identified, the agency has not met its legal obligation and any proposed mitigation measures dependant upon an incomplete environmental impact analysis necessarily fail…" Ohio Valley Envtl. Coalition v. United States Army Corps of Eng'rs*, 479 F.Supp.2d 607, 627 (D.W.Va.2007) (emphasis added). For example, failure to demonstrate that proposed mitigation addresses substantial harm to the aquatic ecosystem nullifies compliance with Section 404. *Id.* at 84.

Courts hold the Corps to these requirements. For example, in *Environmental Defense*, the court found that the Corps violated both Section 404 and NEPA when it failed to provide an adequate methodology and facts to support its conclusions regarding impact and mitigation.

> The agency's failure to incorporate known [fish] access issues into its mitigation calculation and to identify evidence supporting its determination that reduced access will be insignificant amounts to a failure to present a "complete analytic defense of its [habitat] model," *Sierra Club v. Costle*, 657 F.2d 298, 333 (D.C.Cir.1981) (internal quotations omitted) *rev'd on other grounds*,463 U.S. 680, 103 S.Ct. 3274, 77 L.Ed.2d 938 (1983). *This omission violates NEPA (requiring "scientific integrity" in environmental impact statements, 40 C.F.R. 1502.24), and undermines the Corps' conclusion that the project complies with CWA* (mandating "appropriate and practicable steps ... [to] minimize potential adverse impacts ... on the aquatic ecosystem,"40 C.F.R. 230.10(4)).

Id. at 81 (emphasis added). "The agency cannot reliably conclude that the selected project has minimized adverse impacts on aquatic ecosystems to the extent practicable when its habitat mitigation calculations are infected with an underestimate of the floodplain habitat impacted. 40 C.F.R. § 230.10(d). … The finding of full mitigation in spite of this omission was arbitrary and capricious." *Id.* at 83. "The agency's discrepant treatment of project impact and project mitigation in this area was therefore unsupported by the record and 'internally inconsistent,' undermined the conclusion that project impacts are minimized to the extent practicable as required by the CWA, and violated NEPA's regulation mandating the scientific integrity of environmental impact statements. *Id.* at 84 (citing *Air Transp. Assn. v. DOT*, 119 F.3d 38, 43 (D.C.Cir.1997).

Similarly, the United States Court of Appeals for the Tenth Circuit also invalidated the Corps' issuance of a Section 404 permit in *Utahns*, where the Corps failed, among other things, to provide a reasonable justification for its omission of an analysis of the impacts of the project at issue on migratory birds. *Utahns for Better Transportation v. USDOT*, 305 F.3d 1152, 1180 (10th Cir. 2002).

Where a benefit-cost test is used to evaluate a proposed project, NEPA requires agencies to include that test in its environmental impact statement. 40 C.F.R. § 1502.23. The benefit-cost test is therefore subject to the NEPA regulations regarding accuracy and scientific integrity. 40 C.F.R. § 1502.24. As discussed in detail in Section V of these Comments, the DEIS has included some benefit-cost information in its assessment of the public interest test under Section 404, but the benefit-cost analysis is incomplete, biased towards approval and riddled with error. Had all of the elements of cost been included, including extensive costs for water treatment, wastewater treatment upgrades, and recreational costs, the City believes the DEIS would show that Alternative 2 would fail the benefit-cost review and, therefore, the public interest test under Section 404.

4. The DEIS Fails To Satisfy the Obligation to Avoid, Minimize and Mitigate Impacts

Sections III-V of these Comments detail manifold ways in which the DEIS has failed to avoid, minimize and mitigate NISP impacts. The failure stems from a two root causes. First, as

discussed immediately above, the DEIS often fails to adequately portray impacts associated with NISP. Second, even when it does suggest "environmental commitments," the DEIS offers vague, unsupported and unreliable measures without any meaningful performance standards or criteria. *See* DEIS Chapter 5.

The failure of the DEIS to demonstrate how and why proposed measures would address impacts undermines compliance with Section 404. *E.g., Ohio Valley Envtl. Coalition,* 479 F.Supp.2d at 627; *Environmental Defense*, 515 F.Supp.2d at 84. Here, the DEIS did not even fully consider the minimization and avoidance measures that must be considered under Subpart H of the Section 404 Guidelines.

Under the Section 404 Guidelines, the Corps must specify whether a proposed discharge complies with the Guidelines outright; if not, the Corps *must* either deny the permit or show that the imposition of appropriate conditions "to minimize pollution or adverse effects to the affected aquatic ecosystems" will bring the discharge into compliance with the Guidelines. 40 C.F.R. §230.12(a). However, the DEIS fails (1) to adequately identify the adverse impacts; (2) to impose appropriate conditions; or (3) show how the vague and uncertain commitments would result in compliance with the Section 404 Guidelines.

4a. The DEIS's "Commitments" Regarding Total Organic Carbon Do Not Comply with the Clean Water Act

As an example, the DEIS completely fails to address the very serious effects of the NISP project on the quality of the City's water supply. As discussed in detail in Part III of these comments, the proposed action covered under the proposed permit would include a pipeline from Glade Reservoir to Horsetooth Reservoir. Water demand and supply patterns indicate that it is almost certain that this pipeline would be built and used.

Part III also shows that such a pipeline would place water with high levels of Total Organic Carbon (TOC) in the immediate vicinity of the City's Soldier Canyon intake to its water treatment system. TOCs lead to disinfection by-products that are regulated under federal drinking water standards because of their role as probable carcinogens. The delivery of Glade Pipeline water to Horsetooth creates a very high probability that disinfection by-product levels in City water would increase beyond acceptable levels under federal drinking water standards without massive upgrades of the City's treatment infrastructure. Increases in disinfection by-products from increased TOC are unacceptable to the City's residential and institutional water customers such as breweries (Anheuser-Busch, New Belgium and Odell) and high-technology companies (like Kodak and Hewlett-Packard). Treatment of higher TOC levels is very difficult and will require huge increases in capital and operational expenditures by the City to reduce levels of this pollutant as part of the water treatment process.

The addition of higher levels of TOC to Horsetooth Reservoir would create a very high probability of violating state non-degradation standards for Horsetooth Reservoir and would constitute a significant degradation of Horsetooth Reservoir, a Water of the United States. To comply with the Section 404 Guidelines, a discharge of dredged or fill material must not "cause

or contribute to any violations of any applicable state water quality standard. 40 C.F.R. §230.10(b)(1). In addition, no discharge may be permitted that would cause or contribute to "significant degradation of the waters of the United States." *Id.* at §230.10(c).

Regulatory Guidance Letter (RGL) 88-12 emphasizes the importance of the prohibitions listed in Section 230.10(b) and (c) of the Section 404 Guidelines. The RGL states that the Corps should terminate evaluation of a permit application if it determines that the proposal would not comply with the provisions of 40 C.F.R. Section 230.10(b) or (c) (that is, that it would cause or contribute to violation of a state water quality standard or would cause or contribute to significant degradation of the waters).[3]

Any discharge that would "significantly degrade" waters "*can never comply with the guidelines*." RGL 88-12 (emphasis added). Thus, "where an applicant is unable or unwilling to mitigate the adverse effects of a discharge to below the threshold of significance, the application must be denied." *Id.* Effects contributing to significant degradation include "significantly adverse effects" on human health or welfare, including but not limited to effects on municipal water supplies … and special aquatic sites," 40 C.F.R. § 230.10(c)(1), on "recreation, aesthetic, and economic values," *id.* at §230.10(c)(4), and on aquatic ecosystem stability, including "loss of the capacity of a wetland to assimilate nutrients [or] purify water, *id.* at §230.10(c)(3). All of these factors are implicated by the NISP proposal, as discussed in Parts III through V of these Comments.

Further, these impacts will be permanent, because NISP represents a long-term investment in infrastructure that would divert high TOC water to Horsetooth for the foreseeable future. The Section 404 Guidelines direct the Corps, when considering whether a project will contribute to "significant degradation," to place "special emphasis on the persistence and permanence of the effects" of the project. *Id.* at §230.10(c).

Section 5.8.1 of the DEIS does not satisfy the requirements of NEPA or Section 404, because it avoids addressing this critical water quality issue and defers it to an unenforceable and ineffective future. Section 5.8.1 provides first that "the District will comply with future Colorado water quality standards for total organic carbon (TOC)." This an unremarkable promise insofar as it simply states that it will be required to comply with the law. It skirts the critical issue of whether the existing non-degradation standards for Horsetooth would apply, which already forbid the addition of higher TOC water. See Part III of these comments. Section 5.8.1 then provides that:

> If TOC is not regulated by the Colorado water quality program, then 5 years prior to constructing the Glade to Horsetooth pipeline, the District will develop a plan for monitoring TOC in Horsetooth and Glade reservoirs. This plan will be submitted to the Corps and Reclamation for their review and approval. If monitoring indicates that the delivery of water from Glade Reservoir to Horsetooth Reservoir will increase the levels of TOC in Horsetooth Reservoir to

[3] Guidance in regulatory letters that have expired, as has RGL 88-12, "generally remains valid after the expiration date." RGL 05-06, "Expired Regulatory Guidance Letters" ¶2(b). The Corps has specifically identified RGL 88-12 as an expired RGL that is still applicable to the Corps Regulatory Program. *Id.*

> levels determined by Reclamation to be unacceptable, the District will develop a TOC mitigation plan for review and approval by the Corps and Reclamation. Mitigation of TOC levels in Horsetooth Reservoir may include treatment to reduce levels of TOC in water coming from Glade Reservoir or limiting deliveries from Glade Reservoir to Horsetooth Reservoir to times when the deliveries will not result in raising TOC levels in Horsetooth Reservoir to unacceptable levels. Reclamation will incorporate any mitigation requirements for TOC into its approval to connect the pipeline to Horsetooth Reservoir.

DEIS at 5-16.

This approach inappropriately seeks to avoid, delegate and defer addressing the very serious threat to water quality that delivering Glade water to Horsetooth would cause. The extensive data regarding TOC levels from the Poudre watershed and water quality modeling for Glade already show that Glade water would contain much higher levels of TOC than the Horsetooth water used for City drinking water. *See* Section 404 Guidelines at Section 230.50 (effects on the palatability and safety of municipal drinking water).

Because it is already challenging to remove and manage TOC, and because increased TOC causes serious harm to the ability of the City to meet drinking water standards and meet the expectations of customers, the increase in TOC attributable to NISP constitutes significant degradation and is unacceptable. The Corps cannot defer analysis of this issue for unspecified future monitoring or to delegate its obligations under NEPA and the Clean Water Act to the Bureau of Reclamation, which has no role under the Clean Water Act in defining water quality standards. TOC is a pollutant with unquestioned impacts on municipal water supplies and human health. Reclamation has no significant or meaningful history in determining standards for raw drinking water in the area, no information regarding the water treatment processes for the City or other entities and no understanding of the specific needs of local water customers. Delivering water with much higher TOC levels from Glade to the input of the City's system constitutes degradation that must be avoided, minimized and mitigated *now* or the permit application must be denied.

Further, the hypothetical mitigation for TOC identified is just that, hypothetical. The examples of possible mitigation are identified as measures that "may" be included. There is no analysis of whether these measures or others taken could or would eliminate (or even reduce) the detrimental effects of increased TOC water below the threshold of significance (which, the City believes, is degradation from current levels of TOC). There is no analysis of how such measures would affect the cost or benefits of the NISP project. There are no standards to apply and no guarantee that Reclamation would issue standards, let alone ones that address the imperative to protect supplies for City customers. The Clean Water Act requires the Corps to address these issues now, not to issue a permit, see what happens and hope that the criteria of Section 404 are still met.

4b. The DEIS Fails to Meaningfully Address Impacts Associated With Lost Peak Flows

As another example, the DEIS fails to address any of the serious environmental concerns associated with reductions in peak flows in the Cache la Poudre River in Fort Collins. The Supreme Court has confirmed that "reduced stream flow, *i.e.*, diminishment of water quantity, can constitute water pollution" under the Clean Water Act. *PUD No. 1 of Jefferson County and the City of Tacoma v. Washington Department of Ecology* , 511 U.S. 700, 719 (1994). The Court held that the Clean Water Act supports the use of flow requirements as a condition of a Section 404 permit. *Id.* at 724.

> In many cases, water quantity is closely related to water quality; a sufficient lowering of the water quantity in a body of water could destroy all of its designated uses, be it for drinking water quantity, recreation, navigation or as here, as a fishery.... This broad conception of pollution – one which expressly evinces Congress' concern with the physical and biological integrity of water – refutes petitioners' assertion that the Act draws a sharp distinction between the regulation of water quantity and water "quality … Moreover, §304 of the Act expressly recognizes that *water 'pollution' may result from 'changes in the movement, flow, or circulation of any navigable waters … including changes caused by the construction of dams'*. (citation omitted) This concern with the flowage effects of dams and other diversions is also embodied in the EPA regulations, which expressly require existing dams to be operated to attain designated uses."

511 U.S. 700, 719 (1994) (citing 33 U.S.C. §1314(f) and 40 C.F.R. §231.10(g)(4)) (emphasis added).

In addition, the Section 404 Guidelines give the Corps not only the authority, but also the duty, to minimize or mitigate adverse impacts to recreation, water quality, fisheries, habitat, flood conveyance, and aesthetics that result from a permitted activity. The Section 404 Guidelines provide that minimization of adverse effects on "human use potential" may be achieved by, among other things, "in the case of dams, designing water releases to accommodate the needs of fish and wildlife" *Id.* § 230.77(b). The timing of diversions to Glade Reservoir falls into the same category.

As discussed in detail in Parts III through V, the reduction of flows during the Spring and Summer will result in a number of types of significant degradation to the Cache la Poudre and resources relating to it, including but not limited to:

- Deterioration in water quality to a level that would cause algal blooms and fish kills in some locations;
- Increases in water temperature that would eliminate some species of fish and macroinvertebrates from portions of the river;

- Accelerated sedimentation that would threaten stream habitat and flood-water conveyance;
- Reduced flows and groundwater recharge, threatening riparian vegetation and wildlife that depends on it;
- Increased threats of invasive weeds and other species;
- Increased risk of trichloroethylene contamination in the river;
- Damaged or lost recreational fisheries; and
- Reduced flows that would impair recreational uses such as boating.

Despite all of these forms of substantial degradation, the DEIS does not offer or analyze adequate avoidance, minimization or mitigation, as required by the Section 404 Guidelines. Even where the DEIS identifies purported mitigation, it falls far short of the Corps' obligations under Section 404.

For example, Section 5.1.6 of the DEIS suggests:

> The District will also develop a plan to be approved by the Corps for periodically curtailing diversions from the Poudre River for at least 24 hours during high flows, which could provide the riparian areas with periodic disturbance and inundation. The diversion curtailment plan will be implemented provided the District and Corps can be assured that the passed water will flow to at least I-25 and not be diverted by junior appropriators.

However, this very general suggestion lacks information regarding the criteria for the development for the plan (e.g., the biological criteria that would indicate success), the ability to meet the I-25 and junior appropriator criteria, any information about the extent and duration of needed flows, the basis for the identified 24-hour period, the duration of possible curtailment of diversions, and other factors that would allow the Corps or the public to evaluate whether the proposed mitigation would have a meaningful effect in reducing the significant degradation to the riparian resources. Further, there is no legal basis for the arbitrary and self-imposed criterion that curtailed diversion flows would need to reach at least I-25. If curtailed diversion would avoid, minimize or mitigate significant deterioration to locations short of I-25, the Corps cannot arbitrarily eliminate the measure.

Similarly, proposals in Section 5.1.6 of the DEIS to "identify areas suitable to plant native woody riparian vegetation and disturb decadent stands of woody riparian vegetation to help compensate for the reduction in disturbance from reduced overbank flows" is incomplete at best. It does not address the root problems associated with the loss of riparian flushing and watering flows that are necessary for a healthy riparian ecosystem and, therefore, risks failure of the proposed plantings. Further, it does not commit to any particular plantings or maintenance that would be necessary to provide any assurance that any mitigation would actually occur. Any plantings and maintenance needed to compensate for the damages from NISP should be paid for by the project proponents. No analysis is provided of the extent to which the measure would be effective or would compensate for the serious harms that riparian vegetation are likely to experience from NISP. *See* Sections IV.3 and IV.4 of these Comments.

In Section 5.2.3, the DEIS makes the following claim in an attempt to partially address the

serious recreational and ecological impacts from reduced flows in the City:

> The District will seek an agreement with the Lake Canal Company to move diversions from the Lake Canal intake on the Poudre River near College Avenue to the Timnath Reservoir Inlet Canal about 3 miles downstream. On average, moving the diversions from the Lake Canal downstream would add about 50 cfs to the Poudre River for 6 weeks from late May to early July. The District does not control the water diverted by the Lake Canal, but will work with the canal company and any opposers to the change in diversion location to accomplish the change. Relocating this diversion point would allow for higher flows in the Poudre River through the City of Fort Collins, which would reduce some of the recreational impacts expected to otherwise result from the action alternatives.
> The District will also explore agreements with other water providers to retime their direct flow rights by temporarily storing water in Glade Reservoir and/or its forebay for release during late July and August. Such agreements would add to the flows of the Poudre River through Fort Collins during the summer.

Again, while this gesture points in the right direction, it falls far short of the Corps' Section 404 and NEPA obligations. All of the suggestions that the District "will seek," "will work" and "will [ ] explore" changes in the location of diversions falls fall short of showing that this partial mitigation would be achieved. There is no guarantee of any additional flows. Similarly, there is no analysis of the levels of flow necessary to preserve recreational options or ecological functions or the extent to which an average of 50 cfs meets this need. While returning 50 cfs would undoubtedly have some benefit, it would fall far short of the up to 71 percent reductions in flows contemplated by NISP and appears insufficient to address impacts to recreation. Again, there is no evidence or analysis of the proposed (unenforceable and unreliable) measure and the recreational, ecological and other values the Corps is obligated to protect.

The DEIS (at Section 5.7) also proposes a "monitoring and adaptive management program" to study various elements of stream morphology; under the adaptive management program "several mitigation measures may be available" – one of which is "regulate flows and utilize exchanges to promote the increase in water level to support adjacent riparian vegetation and other river attributes." DEIS at 5-15. As discussed below in Section II.5, this represents a misuse of the adaptive management concept and does not comply with the Corps' Clean Water Act or NEPA obligations. Even aside from the adaptive management label, the proposal is so vague as to be meaningless. There is no definition of the criteria for stream morphology impact or significance, no criteria for success and no analysis of the extent to which any of the possible – not committed – measures would actually address the serious impacts to stream morphology discussed in Part IV of these Comments. *See* Section IV.1.

4c. Section 101(g) of the Clean Water Act Does Not Diminish the Corps' Obligations under Section 404

Section 101(g) of the Clean Water Act, the so-called Wallop Amendment, does not in any way diminish the Corps' obligations to avoid, minimize and mitigate under Section 404. Section

101(g) provides that the states' water allocation authority "shall not be superseded, abrogated, or otherwise impaired," and nothing in the Clean Water Act "shall be construed to supersede or abrogate rights to quantities of water which have been established by any state."

The Supreme Court considered the meaning of Section 101(g) in *PUD #1*, and held that, while it preserves that authority of each state "to allocate water quantity *as between users*," it does *not* "limit the scope of water pollution controls that may be imposed on users who have obtained, pursuant to state law a water allocation." 511 U.S. at 720 (emphasis added). Moreover, Congress understood full well that protection of aquatic resources would have "incidental effects" on state-authorized water effects. *Id.* at 721 (citing the legislative history of the Amendment: "The requirements [of the Act] may incidentally affect individual water rights … it is not the purpose of this amendment to prohibit those incidental effects").

In *Riverside Irrigation Dist. v. Andrews*, the Tenth Circuit determined that, in implementing Section 404 of the CWA, the Corps was required to consider impacts on endangered species from reduced flows caused by a new dam could affect whooping crane habitat far downstream of the dam. The court held that Section 101(g) could not "nullify" the clear dictates of the Endangered Species Act or the Clean Water Act: "Congress did not intend to limit 404's scope where it might affect state water-rights law when it enacted §101(g)." 568 F. Supp. 583, 589 (D. Colo. 1983), *aff'd* at 758 F.2d 508 (10th Cir. 1985). Indeed, the issue in the case "is reduced to the Engineer's statutory authority to control of the quantity of water released." *Id.* at 587. And the court held that the Engineer did have authority over water quantity, in the interest of effecting the other obligations imposed by the Clean Water Act:

> Although the [District Engineer]'s actions may have a substantial effect on state water rights, such is the case with many federal laws which particularly preempt state water laws. For example, a congressional designation of a river as wild or scenic under the Wild and Scenic Rivers Act, … will bar most dams and other diversion works from being constructed on the designated section, often limiting the exercise of state water rights. Yet this act has not been successfully challenged as an improper intrusion on state water rights.

Id.

The cases that have examined Section 101(g) have distinguished between "incidental effects" of a permitting decision and actions that are directly intended to affect water rights. In *United States v. Akers*, 785 F.2d 814 (9th Cir. 1986), and again in *PUD #1*, courts held that "incidental effects" on state water rights did not implicate the Wallop Amendment. Senator Malcolm Wallop, the sponsor of the Wallop Amendment, described the purpose of the amendment as follows:

> The requirements of section 402 and 404 permits may incidentally affect individual water rights.... It is not the purpose of this amendment to prohibit those incidental effects. It is the purpose of this amendment to insure that State allocation systems are not subverted, and that *effects on individual rights, if any, are prompted by legitimate and necessary water quality considerations.* This

> amendment is an attempt to recognize the historic allocation rights contained in State constitutions. It is designed to protect historic rights from mischievous abrogation by those who would use an act, designed solely to protect water quality and wetlands, for other purposes. *It does not interfere with the legitimate purposes for which the act was designed.*

3 Leg. Hist. 532 (Senate Debate, Dec. 15, 1977) (emphasis added). Thus, according to the provision's sponsor, Section 101(g) is designed to protect water rights from "mischievous abrogation" by those who would misuse the Clean Water Act's provisions for purposes *other than* protecting water quality and wetlands. The amendment is not intended to interfere with the Clean Water Act's "legitimate purposes." As such, the Corps retains authority – and in this case the obligation – under Section 404 to regulate water *flows* in order to fulfill its obligation to protect water *quality*.

Without addressing the obligations to avoid, minimize and mitigate the extensive and serious impacts of the proposed action, the Corps cannot issue a permit under Section 404. Indeed, the pervasive deficiencies of the DEIS require an SDEIS that would, among other things, adequately address the requirements of the Clean Water Act.

5. The DEIS's Use of Adaptive Management Is Inappropriate and Inadequate

One category of the DEIS's inadequate avoidance, minimization and mitigation "commitments" – adaptive management – merits its own consideration. The DEIS makes extensive use of claimed "adaptive management" approaches in an attempt to avoid any real analysis of the extent to which NISP impacts can be adequately avoided, minimized and mitigated. However, the DEIS's use of adaptive management is improper and inadequate to satisfy the Corps' Section 404 obligations. The proposed "adaptive management" provisions lack any meaningful performance objectives, criteria, implementation guarantees and analysis of effectiveness.

Adaptive management can have a legitimate place as part of an avoidance, minimization and mitigation plan, but it is not mitigation in and of itself. 73 Fed. Reg. 19,594, 19647 (Apr. 10, 2008) ("An adaptive management plan is part of a mitigation plan …, not a substitute for a complete mitigation plan."). Caselaw, agency guidance and technical guidance on adaptive management all make clear that it is not intended to serve as a license for a "trial and error" form of management. *E.g.*, U.S. Dep't. of the Interior, *Adaptive Management Technical Guidance* vii (2007) ("It is not a 'trial and error' process…"). Instead, it is an addition to the early forms of NEPA process that followed a "predict-mitigate-implement" form of management. *See e.g.*, Council on Environmental Quality NEPA Task Force, *Modernizing NEPA Implementation* at 45 (Sept. 2003) ("*NEPA Implementation*"). Adaptive management adds monitoring and adaptation to the end of the process to form a "predict-mitigate-implement-monitor-adapt" process. *Id.*

Nothing about adaptive management minimizes the need for the Corps to fully comply with the critical "predict-mitigate-implement" part of the process that is still required by the Clean Water Act and NEPA.

> To successfully use the "predict, mitigate, implement, monitor, and adapt" model in the NEPA process, the *potential impacts of the proposed adaptive actions must be considered before implementation*. Therefore, the "predict" step of the model must include an analysis of the potential impacts of the proposed adaptive actions. When the actions or new conditions exceed the scope of the original analysis, new or supplemental NEPA review is necessary.

NEPA Implementation at 48. Further, the process requires "[t]echnically and scientifically credible performance measures or thresholds used to assess progress and effects, and quality control measures that ensure the integrity and appropriateness of the adaptive management approach." *Id.* at 49.

> Generally, the NEPA document should describe:
> - The proposed adaptive management approach;
> - How the approach is reflected in the alternatives being considered;
> - The monitoring protocol;
> - The desired outcome;
> - The performance measures that will determine whether the desired outcome is being achieved or an adaptive action is needed; and
> - The factors for determining whether additional NEPA review is needed.

Id. at 52. *See also*, Council on Environmental Quality, *Aligning National Environmental Policy Act Processes with Environmental Management Systems* at 13 (Apr. 2007) ("An essential component of the adaptive management model (*i.e.*, predict, mitigate, implement, monitor, and adapt) is monitoring to assess whether predictions of environmental effects are correct, and that any mitigation is functioning as intended."); 73 Fed. Reg. 21468, 21512 (Apr. 21, 2008) (Forest Service national forest planning rule) ("Adaptive management: A system of management practices *based on clearly identified outcomes* and monitoring to determine if management actions are *meeting desired outcomes*…) (emphasis added).

The recently-issued Corps and EPA regulations for compensatory mitigation make clear the necessity of these elements for adaptive management as part of a mitigation plan. 73 Fed. Reg. 19594 (Apr. 10, 2008). "An adaptive management plan is part of a mitigation plan …, not a substitute for a complete mitigation plan." 73 Fed. Reg. at 19,647. "The focus of adaptive management should be on taking measures to *achieve performance* and *satisfy the objectives* of the compensatory mitigation project." *Id.* (emphasis added). Thus, adaptive management depends on having defined impacts (even with acknowledged uncertainty) and a concrete plan for mitigating these impacts. The core focus is on identifying with specificity and ensuring certain objectives and defined through performance measures. *Id.* at 19,648; 33 C.F.R. § 332.5 ("Performance standards must be based on attributes that are objective and verifiable. Ecological performance standards must be based on the best available science that can be measured or assessed in a practical manner.").

> Adaptive management means the development of a management strategy that anticipates likely challenges associated with compensatory *mitigation projects*

> and provides for the implementation of actions to address those challenges, as well as unforeseen changes to those projects. It requires consideration of the risk, uncertainty, and dynamic nature of compensatory mitigation projects and guides *modification of those projects to optimize performance*. It includes the selection of appropriate measures that will *ensure that the aquatic resource functions are provided* and involves analysis of monitoring results to identify potential problems of a compensatory mitigation project and the identification and implementation of measures to rectify those problems.

33 C.F.R. § 332.2 (emphasis added).

The Corps' regulations clarify that adaptive management relies on the monitoring to determine whether the already-committed mitigation project is meeting its objectives as measured by the specific performance standards identified as part of the initial planning and development of a mitigation plan. *Id.* § 332.7(c). The Corps' civil works policies have a similar focus, in which monitoring and adaptive management are aimed at ensuring "predicted" or "proposed outputs." *E.g.*, Engineer Regulation 1105-2-100, § 3-8(b)(8). There is no reasonable, non-arbitrary basis for the Corps to vary the concept of adaptive management among its Section 404 compensatory mitigation program, its civil works policy and the rest of the Section 404 process.

Courts have struck down attempts to insert vague measures that do not meet the "predict, mitigate and implement" requirements of NEPA and the Clean Water Act identified above. For example, the Southern District of New York found that adaptive management in a Corps EA for a harbor deepening project was inadequate:

> The EA also explains that the Corps will follow "adaptive management practices as it moves through construction of its contracts," thus allowing it to change future contracts should the data indicate it is necessary. These promises, however, provide no assurance of as to the efficacy of the mitigation measures. The Corps did not provide a proposal for monitoring how effective "adaptive management" would be.

Natural Resources Defense Council v. Army Corps of Engineers, 457 F.Supp.2d 198, 234 (S.D. N.Y. 2006). *See also, High Sierra Hikers Ass'n v. Weingardt*, 521 F.Supp.2d 1065, 1091 (N.D. Cal. 2007) (Forest Service's use of adaptive management violated Wilderness Act and NEPA; "Forest Service failed to adequately consider warnings from adjacent wilderness areas about its campfire policy and improperly relied on adaptive management to control the campfire policy. This demonstrates that the Forest Service failed to take a hard look as required by NEPA…").

Similarly, the Eastern District of California recently found that the adaptive management provisions in a biological opinion issued by the Fish and Wildlife Service for a water diversion operating plan failed to provide reasonable certainty to assure that mitigation would be implemented, as required by the Endangered Species Act:[4]

[4] The Endangered Species Act requirements are functionally identical for these purposes to the mandatory Clean Water Act avoidance, minimization and mitigation obligations.

> Here, the adaptive management process has *no quantified objectives or required mitigation measures*. Although the process must be implemented by holding meetings and making recommendations, nothing requires that any actions ever be taken. The BiOp asks the court to trust the agency to protect the species and its habitat. Notwithstanding any required deference to expertise, the ESA requires more.
>
> All parties agree that adaptive management can be beneficial and that flexibility is a necessary incident of adaptive management. The law requires that a balance be struck between the dual needs of flexibility and certainty. The [plan], as currently structured, *does not provide the required reasonable certainty to assure appropriate and necessary mitigation* measures will be implemented. … This aspect of the BiOp is arbitrary and capricious as a matter of law.

Natural Resources Defense Council v. Kempthorne, 506 F.Supp.2d 322, 356 (E.D. Cal. 2007) (emphasis added).[5]

In a similar way, the adaptive management provisions in the DEIS fail to comply with the requirements of the Clean Water Act and NEPA. They are vague, lack performance standards and criteria for success, and provide no real mitigation plan that would be managed in an adaptive way. They fail to supply the plan and mitigate portions of the process, which are critical omissions. Thus, the DEIS's proposals are not really adaptive management, but instead deferred management or trial and error management, neither of which are permitted under the Clean Water Act.

For example, as discussed in Section II.4 above, the DEIS (at Section 5.7) proposes a "monitoring and adaptive management program" to study various elements of stream morphology; under the adaptive management program "several mitigation measures may be available" – one of which is "regulate flows and utilize exchanges to promote the increase in water level to support adjacent riparian vegetation and other river attributes." DEIS at 5-15. This proposal represents a misuse of the adaptive management concept and does not comply with the Corps' Clean Water Act or NEPA obligations. As in the provision struck down in *Kempthorne*, there is no definition of the criteria for impact or significance, no criteria for success and no analysis of the extent to which any of the proposed – not committed – measures would actually address the serious impacts to stream morphology discussed in Part IV of these Comments. As discussed in Section IV.1, the DEIS fails even to predict the probable impacts, let alone identifying a plan to address the impact. Without proper diagnosis a proper treatment is very unlikely. An SDEIS must be prepared that (1) fully addresses the impacts associated with

[5] It is instructive to compare these cases to ones in which adaptive management or its equivalent has been upheld. For example, in *Holy Cross Wilderness Fund v. Madigan*, 960 F.2d 1515 (10th Cir. 1992), the Corps issued a Section 404 permit before completion of studies designed to develop a mitigation plan for adverse impact on wetlands, (and, because studies and plan were not completed, issued the permit before full public review of results). The permit was conditioned on a requirement that no wetlands be lost, and on a requirement that a Monitoring and Mitigation Plan be developed to ensure there would be no loss of wetlands. The court rejected a challenge to the permit-first-mitigate-later approach to the 404 permit because the permit "specifically stated that no wetlands losses would be allowed, and that a mitigation plan would have to be developed to ensure that result." There is no comparable commitment to avoid impacts to wetlands and other resources in the NISP context.

sedimentation; (2) provides a real, committed avoidance, minimization and mitigation plan; and (3) analysis of the effectiveness of these measures.

The same deficiencies are present in the DEIS's proposed mitigation of TOC impacts to Horsetooth Reservoir and the City's water supplies. As discussed above in Section II.4b, the proposed "mitigation" measures for TOC defer assessment of impact, identification of thresholds for significance and a mitigation plan until after permit issuance. This approach would not be appropriate adaptive management and would violate the Clean Water Act and NEPA.

6. Because of the DEIS's Failure To Provide Sufficient Analysis of the Impacts of the Proposed Permit and Address Their Avoidance, Minimization and Mitigation, A Supplemental Environmental Impact Statement Is Necessary To Comply With NEPA and the Clean Water Act

NEPA specifically requires a "detailed statement" of the environmental impact of the proposed action. 42 U.S.C. §4332(2)(C). The primary function of this detailed statement is to insure "a fully informed and well-considered decision." *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc*., 435 U.S. 519, 558 (1978). In order to fulfill its role, the EIS must set forth sufficient information for the general public to make an informed evaluation. *Sierra Club v. United States Army Corps of Engineers*, 701 F.2d 1011, 1029 (2nd Cir. 1983).

In so doing, the EIS insures the integrity of the decisionmaking process "by giving assurance that stubborn problems or serious criticisms have not been 'swept under the rug.'" *Silva v. Lynn*, 482 F.2d 1282, 1285 (1st Cir. 1973). This requires a level of detail that makes it possible for the decisionmaker to "consider fully the environmental factors involved and to make a reasoned decision after balancing the risks of harm to the environment against the benefits to be derived from the proposed action." *Sierra Club*, 701 F.2d at 1029 (quoting *county of Suffolk v. Secretary of Interior*, 562 F.2d 1368, 1375 (2nd Cir. 1977).

CEQ regulations governing implementation of NEPA state that a draft impact statement "must fulfill and satisfy to the fullest extent possible the requirements established for final statements in [§4332(2)(C) of NEPA]." 40 C.F.R. §1502.9. Moreover, the regulations require that an insufficiently detailed DEIS be supplemented or revised: "*if a draft statement is so inadequate as to preclude meaningful analysis, the agency shall prepare and circulate a revised draft of the appropriate portion.*" *Id (emphasis added).*

The Corps has also adopted procedures at 33 C.F.R. Parts 230 and 325 for implementing NEPA, which are intended to supplement the CEQ regulations. *See* 33 C.F.R. §230.1 (Corps regulations supplement and should be used in conjunction with the CEQ regulations). These regulations also require a detailed discussion of the environmental impacts of the proposal and alternatives. *See* 33 C.F.R. Part 325, App. B (citing 40 C.F.R. §1502.16).

Courts have interpreted these regulations to require that an impact statement must contain an adequate compilation of relevant information. *Sierra Club*, 701 F.2d at 1031. Where the statement failed to do this, the agency's subsequent decision lacked a "substantial basis in fact" and "a decisionmaker relying on [the inadequate EIS] could not have fully considered and balanced the environmental factors." *Id.*

Accordingly, courts have rejected environmental impact statements when they fell short of the level of detail required by the statute and regulations. *See e.g.*, *Westlands Water Dist. v. Dept. of the Interior*, 275 F.Supp.2d 11571198 (E.D. Cal. 2002) ("An SEIS is required for the Trinity Dan bypass RPM because Interior did not analyze or address the measure and its impacts on Northern California power supply and reliability in the DEIS."). In *Silva v. Lynn*, the First Circuit found that an FEIS submitted by the Department of Housing and Urban Development ("HUD") fell "far short of what is required," 482 F.2d at 1285, and could not serve to fulfill NEPA's mandate. *Id.* at 1287. The FEIS, concerning a proposed housing project, glossed over some of the department's key decisions without sufficient discussion:

> The project's site contains a low wetland portion in and near an area where the water table is high. Adjacent lower lying areas have historically experienced chronic flooding. This is plainly a major problem. We think it is not too much to ask that the problem be fully depicted, that HUD describe the approach that was taken, and the reasons why the particular mode of control was chosen in preference to others.

Id. In addition, the relevant section of the Draft EIS had drawn "heavy fire, as being wholly inadequate," from other federal agencies with more expertise in drainage than HUD, but the FEIS barely acknowledged the comments. *Id.* at 1286. The court also rejected as inadequate HUD's dismissal of some of the alternatives as being "economically unsound." *Id.* The agency "must go beyond mere assertions and indicate its basis for them." *Id.* As with the drainage problems, "what the courts look for is an informed and adequately explained judgment." *Id.* at 1287. *See also Johnston v. Davis*, 698 F.2d 1088 (10th Cir. 1983) (EIS inadequate and must be supplemented because of misleading, unqualified statements about likely economic value of project).

In a previous case involving a proposed dam, the court found the EIS provided insufficient detail regarding geological instability under the dam site, the proposed dam's effect on groundwater quality, and the likely effects on wildlife. *Save the Niobrara River Ass'n v. Andrus*, 483 F. Supp. 844 (D. Neb. 1979). For example, the agency doing the EIS – the Bureau of Reclamation – concluded there would be minimal impact on groundwater quality, but the conclusion was not based on scientific studies, and the court found the discussion and data concerning the expected impact on groundwater to be inadequate under NEPA requirements. *Id.* at 853.

Another court found an EIS regarding a proposed watershed project to have an inadequate discussion of the impact of sediment that would be carried downstream as a result of the project. *NRDC v. Grant*, 355 F. Supp. 280, 287 (D. N.C. 1983). The EIS disclosed the increased sediment load, but did not provide an adequate discussion of its downstream effects: "The Statement merely concludes, without supportive scientific data and opinion, that 'No significant

reduction in quality of the waters [downstream] is expected.' … Having conceded a massive increase in sedimentation, the Statement disposes of its environmental effects in one conclusory statement unsupported by empirical or experimental data, scientific authorities, or explanatory information of any kind." *Id.* In addition, the statement suggested there would be some effects on fish in the watershed, but then declared "without any supportive data" that "Most of the fishery resources in the watershed will not be affected …or will be mitigated." *Id.* This fell "far short" of NEPA's requirements. *Id.*

The Clean Water Act also requires the Corps to supplement a DEIS if it does not contain sufficient information in sufficient detail to comply with the requirements of the Section 404 Guidelines. *Utahns for Better Transportation v. USDOT*, 305 F.3d 1152, 1163 (10th Cir. 2002). ("If, however, the NEPA documents do not consider the alternatives in sufficient detail to respond to the requirements of the Guidelines, it may be necessary to supplement NEPA documents with additional information. 40 C.F.R. § 230.10(a)(4)."). *See also Louisiana Wildlife Federation v. York*, 761 F.2d 1044, 1051 (5th Cir. 1985) (supplement necessary where information "presents a seriously different picture of the environmental impact of the proposed project from what was previously envisioned").

As detailed in the comments contained in Parts III through V, the DEIS suffers from fatal deficiencies that prevent it from fully disclosing and addressing the impacts of the proposed action. In order to comply with the applicable regulations and to fulfill the requirements of NEPA and the Clean Water Act – to provide sufficient information so that decisionmakers can make a fully informed choice between the alternatives – the DEIS must be supplemented. If the Corps were to proceed directly to an FEIS with no circulation of an SDEIS, the FEIS would itself be inadequate. *Utahns for Better Transportation v. USDOT*, 305 F.3d at 1163; *Louisiana Wildlife Federation v. York*, 761 F.2d at 1051. The full and accurate disclosure of the missing information called for in the City's comments would constitute "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts" and, as such, would mandate that a SDEIS be prepared. 40 CFR § 1502.9(c)(1).

The DEIS and its technical appendices do not contain complete operational plans for the NISP project. The City of Fort Collins made two requests for supplemental information, by letters from its outside counsel dated May 7, 2008 and June 4, 2008, specifically including requests for operations data and delivery schedules for NISP. This data has not been supplied, and thus the operational impacts of NISP have not been fully disclosed or described in the DEIS.

Finally, in an August 19, 2008 meeting between the District, the City and others, the District's project manager for NISP suggested that the District was considering a completely new and different project concept consisting of pumping NISP water from the Poudre River to Glade and releasing water from Glade, then piping the water from the River to Horsetooth. Such a change in project plans, if carried forward, would constitute a "substantial change[s] in the proposed action that [is] relevant to environmental concerns" and therefore require that an SDEIS be prepared and circulated for public review and comment. 40 CFR § 1502.9(c)(1).

7. The Corps May Not Segment or Defer Its Analysis of the Impact of the Glade-Horsetooth Pipeline

Throughout the DEIS, the Corps has sought to defer its analysis of the impacts and compliance with the Section 404(b) Guidelines relating to the construction of the Glade-Horsetooth Pipeline. This is inconsistent with the Corps' obligations under both NEPA and Section 404 and substantively critical, because of the serious degradation to water quality that would result from the pipeline. *See* Section III.1 of these Comments.

The Corps may not segment its analysis of the Glade-Horsetooth Pipeline from the rest of NISP, because it is an integral part of the long-term feasibility of the project. The Northern Colorado Water Conservancy District's Individual Permit Application for NISP explicitly includes the pipeline as part of the overall project. *See* Application for Department of the Army Permit, Northern Integrated Supply Project Supplemental Information for Application for U.S. Army Corps of Engineers Section 404 Individual Permit at 2, 3, Figure 2 and Figure 13 (Apr. 24, 2008). "A pipeline connecting the proposed Glade Reservoir to the existing Horsetooth Reservoir is proposed to be constructed." *Id.* at 2.

The overall project depends on having this pipeline and/or another pipeline to Horsetooth or Carter Reservoirs to deliver project water to participants that cannot draw water from the Poudre River. The DEIS claims that the project may be able to work without the pipeline in the short term due to the potential for Colorado-Big Thompson ("C-BT") water exchanges, whereby current holders of C-BT shares in the Poudre watershed would take project water from Glade instead of C-BT water and their C-BT water taken by NISP participants. However, there will be insufficient water for such exchanges by 2020, so that a pipeline to Horsetooth or Carter Reservoir will be needed to meet the project purpose and need.

The District's April 2008 Water Delivery Report shows that just fewer than 60,000 C-BT units are owned by entities that have C-BT water delivered to the Poudre River. Of this, about 28,000 units are owned by municipalities through ownership of North Poudre Irrigation Company shares. This results in about 32,000 owned units available for delivery of water to the Poudre River. Based on annual delivery quotas from 50% to 100%, this translates into a range of 16,000 acre feet to 32,000 acre feet available for potential exchanges on the Poudre River. In addition to this, there may be a limited amount of municipally owned C-BT water available for rental to agricultural users and delivered to the Poudre. There has been, however, a clear trend of C-BT units being transferred from agricultural owners to municipal owners with less C-BT water becoming available for agricultural use. *See e.g.*, District, *NISP Phase II Alternative Evaluation* at ES-5 (Jan. 2004) (showing reduction in agricultural C-BT units by over 50% after 2020). Considering these factors, there will not be adequate C-BT water available in the Poudre Basin to accomplish the exchange referred to in DEIS Section 2.3.3.1 to meet the 29,500 acre feet of demand by the southern NISP Participants. This will necessitate the Glade-Horsetooth Pipeline or a Glade-Carter Pipeline if NISP is to operate as claimed.

Because the purpose and need for the project is to ensure the firm yield until at least 2050, the pipeline is an essential part of the overall project as it has been defined and must be fully analyzed now. Failure to do so would constitute illegal segmentation under both NEPA and

Section 404. The pipeline is a connected action under the Council on Environmental Quality regulations governing NEPA compliance: the construction of the Glade Reservoir would automatically trigger the need for the pipeline, NISP would not proceed if there were no way to get project water from Glade Reservoir to either Horsetooth or Carter Reservoirs, and the pipeline and Glade Reservoir are interdependent parts of a larger action and depend on the larger action for their justification. 40 C.F.R. § 1508.25(a)(1).

However, as discussed in greater detail in Part III, the DEIS does not provide meaningful analyses of the water quality impacts of the pipeline and completely fails to provide meaningful measures to address these impacts pursuant to Section 404.

Part III - Water Management Effects

1. Source Water and Drinking Water Treatment

1a. Comments on DEIS

DEIS Section: 1.8.1 Relationship to Other Water Supply Projects, page 1-47
Statement: *"NISP also could be physically linked to other existing facilities such as Horsetooth Reservoir* ***or the Pleasant Valley pipeline****, which could be used to convey NISP water." [Italics added]*.

Comment: Since the City receives water through the Pleasant Valley Pipeline (PVP), any direct delivery of Glade water into the PVP is likely to impair the water quality of sources treated by the City. As discussed below in the comments on DEIS Sections 4.5.1 and 4.5.5, all available evidence indicates that Glade water would have much higher levels of Total Organic Carbon (TOC) and other contaminants that would impair the raw water supply used by the City for drinking water.

No details regarding the possible connection to the PVP is provided anywhere in the DEIS and associated Technical Reports. The full impact of this connection to the City cannot be assessed without modeling specific delivery schedules and their associated water quality parameters. However, it must be stated that certain operational scenarios like those stated on page 1-47 of the DEIS could have significant cumulative impacts on water treatment processes, operating costs and finished water quality.

In order to comply with Sections 230.22 and 230.50 of the Section 404(b)(1) Guidelines, the Corps must evaluate in an SDEIS and Revised Section 404(b)(1) Analysis, and must address the impacts of the proposed project on municipal water supplies like those of the City, including the effect of introducing Glade water to the PVP in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard.

DEIS Section: 2.3.3.1 Reclamation Contract Subalternative, page 2-27
Statement: *"The proposed exchange involves the annual delivery of 29,500 AF from Carter Lake to the NISP southern Participants, with equivalent replacement water to be released (1) from Glade Reservoir directly to the Poudre River to meet C-BT irrigation needs, (2) directly from Glade Reservoir into the Munroe Canal, or (3) delivered by pipeline to Horsetooth Reservoir."*

Comment: Implementing the above-described exchanges will cause an annual average reduction 29,500 acre-feet of west-slope water flowing into Horsetooth Reservoir. These reduced inflows would negatively impact the quality of water stored in Horsetooth Reservoir.

These adverse water quality impacts must be evaluated and fully addressed in an SDEIS and Revised 404(b)(1) Analysis under Section 230.50 of the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard.

DEIS Section: 2.3.3.2 Reclamation No Contract Subalternative, page 2-27
Statement: *"For deliveries from Glade Reservoir, the Reclamation No Contract Subalternative would include the construction of a pipeline to the south (the proposed Carter pipeline) to connect Glade Reservoir to the existing Southern Water Supply Project (SWSP)."*

Comment: The Glade-to-Carter pipeline option would avoid or minimize potential adverse water quality impacts to the City's drinking water sources that are discussed in these Comments. This is the best option for delivery of NISP water to participants, if NISP is built, and necessary to avoid or minimize impacts to City municipal drinking water supplies. The proposed pipeline must also include a direct connection to the Soldier Canyon Filter Plant to avoid potential blending of Glade water and Horsetooth water in the Pleasant Valley Pipeline (PVP).

DEIS Section: 3.5.2.1 Cache la Poudre River, page 3-28
Statement: *"The water quality of the Cache la Poudre River ranges from nearly pure mountain runoff upstream …"*

Comment: Diversions from the Poudre River to Glade Reservoir will occur during periods of high flow - the May through June snowmelt runoff period. Because the District proposes to mix project water under some circumstances with the municipal drinking water supplies of the City in Horsetooth Reservoir, the quality of water within the Upper Cache la Poudre River during this time must be more thoroughly and carefully considered. The NISP DEIS Water Quality Technical Report (ERO and HDR, March 2008) presents a time series plot of Total Organic Carbon (TOC) concentrations in the Poudre River near the Canyon Mouth (Figure 8, page 80), but there is no discussion of the significance of these data in Section 3.5.2.1 of the DEIS.

Such a discussion is necessary in an SDEIS to comply with the Corps' obligations under both Section 404 and NEPA to fully evaluate the effects of the proposed permitting action on water chemistry and municipal water supplies. It must be emphasized that TOC concentrations reach their highest levels during the spring runoff period when Glade Reservoir would be filled.

In the Poudre River watershed, leaching of soil and land cover organic matter during spring snowmelt results in the TOC levels rising with the snowmelt hydrograph. During the six to eight week snowmelt runoff period, TOC concentrations in the Upper Poudre start at a baseline of about 2 mg/L, rise to a peak that in most years ranges between 8 and 12 mg/L, and then gradually fall back down to the baseline (Billica, Loftis, and Moore, 2008; Loftis and Moore, 2007a). As described in the comments (below) regarding DEIS Section: 4.28.2.1 Water-Based Actions, page 4-104, and the Executive Summary, page ES-14, the peak TOC concentration is generally related to the moisture content of the snowpack prior to runoff, with drought years resulting in lower peak TOC concentrations. So, Poudre River TOC concentrations are expected to be highest during the wet years when diversions are made from the Poudre River to Glade Reservoir.

High TOC concentrations in waters of the Upper Poudre River during the spring snowmelt runoff period have historically presented a significant treatment challenge and higher treatment costs at the Fort Collins Water Treatment Facility (FCWTF). Hence, the storage of high TOC

water in Glade Reservoir and the subsequent transfer of this water into Horsetooth Reservoir is a significant concern for the City and a fundamental issue that the Corps must address under the Section 404(b)(1) Guidelines.

TOC is detrimental to the City because it hinders the optimization and efficiency of water treatment unit operations, including coagulation and settling, and serves as the main building-block for the formation of disinfection by-products (DBPs). DBPs are potential carcinogens formed when TOC reacts with chlorine used for disinfection. Trihalomethanes (such as chloroform) and haloacetic acids (such as trichloroacetic acid) are two groups of DPBs that can be formed during chlorination. Treated water delivered from the FCWTF must not exceed Maximum Contaminant Levels (MCLs) for these two groups of DPBs as set forth in the US EPA Disinfectants/Disinfection By-Products Rule (USEPA 1998, 2001). These regulations also require the removal of TOC to minimize DBP formation if raw water TOC concentrations are greater than 2.0 mg/L. TOC removal and DBP formation both depend on the nature, composition, structure, and reactivity of the various organic compounds that make up the TOC in the raw water.

Because high TOC levels can result in corresponding high levels of potential cancer-causing contamination of the City's drinking water, they must be fully addressed pursuant to the Guidelines. *See* Section II.1a of these Comments for further discussion in this regard.

DEIS Section: 3.5.2.1 Cache la Poudre River, page 3-28
Statement: "*The quality of the North Fork of the Poudre River is somewhat poorer than the mainstem, with temperatures that occasionally exceed the standard and elevated dissolved solids concentrations.*"

Comment: In addition to the North Fork water quality characteristics identified in Section 3.5.2.1, the North Fork has TOC concentrations that are consistently higher than those on the main stem (Lewis, 2001-2007; Loftis and Moore, 2007b; Billica, Loftis, and Moore, 2008).

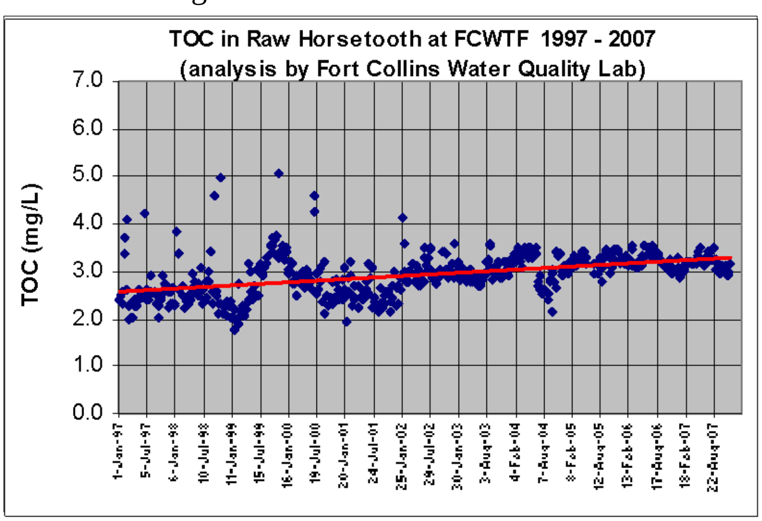
Also, the taste and odor compound, geosmin, has been detected in the North Fork reservoirs (Seaman Reservoir and Halligan Reservoir) at very high concentrations. Geosmin is one of the most difficult taste and odor compounds to remove during water treatment. It is a naturally occurring organic compound produced by blue-green algae (Cyanobacteria). When these organisms die and decompose, geosmin is released into the water. Geosmin imparts a moldy-earth, boiled raw beets odor to water and can be detected by the most sensitive noses at extremely low concentrations (about 5 nanograms per liter (ng/L) or 5 parts per trillion (ppt)). Geosmin does not pose a public health risk, but its detectible presence in treated drinking water can cause serious public concern about the safety and aesthetic quality of their drinking water. Utilities around the country receive a record number of complaints whenever a geosmin outbreak occurs in their water supply. Geosmin is of special concern to the City, because many of the industrial customers of its water, particularly the several major breweries in Fort Collins, are especially sensitive to any unusual taste or odor properties that customers may detect in their products.

Geosmin has been found in water samples from North Fork reservoirs at concentrations over 100 ng/L (Billica, Loftis, and Moore, 2008). Because of the close proximity and similarities of Glade, Halligan and Seaman Reservoirs, the Corps must analyze whether Glade may have similar geosmin issues and how introduction of geosmin-contaminated water into Horsetooth Reservoir would adversely affect municipal water supplies. It would be of significant concern to the City if blue green algal production in Glade Reservoir resulted in waters with high geosmin concentrations that were then delivered to Horsetooth Reservoir (and ultimately to the City's water treatment facility as part of the City's water supply). This concern relates not only to potential taste and odor issues for the Fort Collins community and major industries but to the significantly higher treatment costs required to remove geosmin back to "non-detect" levels.

Glade or North Fork water containing geosmin must not be delivered to Horsetooth Reservoir. The Corps must evaluate and address the proposed conveyance of Glade Reservoir or North Fork water to Horestooth Reservoir and fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard.

DEIS Section: 3.5.2.3 Horsetooth Reservoir, page 3-29
Comment: Section 3.5.2.3 summarizes some of the important water quality issues related to Horsetooth Reservoir. However, TOC was not discussed. Because it is a critical parameter of water quality and chemistry for municipal water supply, it must be assessed in detail by the Corps.

Table 8 (page 33) of the NISP DEIS Water Quality Technical Report (ERO and HDR, March 2008) identifies a 10-year average TOC of 2.9 mg/L in Horsetooth Reservoir. However, this average value does not fully characterize TOC concentrations in Horsetooth Reservoir. Horsetooth Reservoir has experienced a statistically significant upward trend in TOC concentrations over the period of record. This trend has been documented in the Haby and Loftis (2007) report prepared for the Big Thompson Watershed Forum. A plot of TOC data collected at the FCWTF raw Horsetooth sample station and analyzed by the Fort Collins Water Quality Lab is shown on the figure below.



The City is paying close attention to this trend and has initiated a study with researchers at UCLA to better understand the nature and source of TOC in Horsetooth Reservoir. This trend is problematic because, if it continues, the cumulative effect of NISP and the elevated concentrations of TOC in Horsetooth Reservoir will adversely affect Fort Collins' water treatment and the attainment of existing regulated drinking water treatment standards and goals.

The City is paying close attention to this trend and has initiated a study with researchers at UCLA to better understand the nature and source of TOC in Horsetooth Reservoir. This trend is problematic because, if it continues, the cumulative effect of NISP and the elevated concentrations of TOC in Horsetooth Reservoir will adversely affect Fort Collins' water treatment and the attainment of existing regulated drinking water treatment standards and goals. Any increase in Horsetooth Reservoir TOC concentrations that result from the proposed action will exacerbate this situation.

These high TOC levels would produce potential cancer-causing contamination of Fort Collins drinking water. The Corps must evaluate and address the TOC issue and fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard.

DEIS Section: 4.5.1 Methods, page 4-33
Statement: *"Changes in the water quality of Horsetooth Reservoir due to deliveries from the Glade-to-Horsetooth or Cactus-to-Horsetooth pipelines were estimated by completing mass balance calculations for Horsetooth Reservoir."*

Comment: The mass balance calculations for the DEIS assume that the inflow is instantaneously and completely mixed with all of the water present within the reservoir. However, the physical and operational characteristics of Horsetooth Reservoir will result in more complex flow and mixing patterns. Horsetooth Reservoir is a very long, relatively narrow, thermally-stratified reservoir that is characterized by three main pools. The Glade-to-Horsetooth pipeline would deliver water to the north end of Horsetooth Reservoir (Section 3.2.6). The City's outlet at Soldier Canyon Dam is also near the north end of Horsetooth Reservoir and provides water to the Fort Collins Water Treatment Facility (FCWTF). Significant short-circuiting could occur with some portion of the flow preferentially going directly from the Glade-to-Horsetooth pipeline to the Soldier Canyon outlet, thereby minimizing the potential for mixing and dilution by the entire volume of Horsetooth Reservoir. In such circumstances, a mass balance model incorrectly underestimates the potential impacts to the water quality at the Soldier Canyon outlet.

The DEIS analysis also does not consider the combined impact on water quality that may occur if smaller quantities of C-BT water are delivered to Horsetooth Reservoir from the Hansen Feeder Canal. Water entering Horsetooth Reservoir from the Hansen Feeder Canal is of higher quality than water from the Glade-to-Horsetooth pipeline, so decreases in Hansen Feeder Canal flows must be accounted for in the analysis since their diluting effect will be reduced. Specific operational plans will need to be developed, evaluated and modeled through a hydrodynamic model that represents the physical and chemical characteristics within the Reservoir to gain insight into mixing issues at the Soldier Canyon pool.

The DEIS Water Quality Technical Report (ERO and HDR, March 2008) indicates that releases to Horsetooth Reservoir from Glade Reservoir will occur during the non-irrigation season (November through March). This would likely lessen the influences that thermal stratification would have on mixing in Horsetooth Reservoir since thermal stratification is most significant in

the summer and early fall seasons. However, depending on actual differences in water temperature between Horsetooth Reservoir water and water in the Glade-to-Horsetooth pipeline, density gradients may still exist that will impact the flow path and distribution of Glade water in Horsetooth Reservoir.

Even without temperature and density differences, short-circuiting, incomplete mixing, and varying flows from both the Hansen Feeder Canal and the Glade-to-Horsetooth pipeline will likely occur. Their influence on water quality at the Soldier Canyon outlet must be evaluated with an appropriate physically-based, numerical model.

Effective drinking water treatment design and operation requires the careful evaluation of worst case scenarios for raw water quality. The mass balance methods used in the DEIS result in annual average values for various water quality parameters and not the extremes of the real world. This level of detail is inadequate to accurately assess potential adverse impacts to water treatment, as required by Sections 230.22 and 230.50 of the Section 404(b)(1) Guidelines. Extrapolating from "average" conditions is not "worse case" and, therefore, not adequate to understand the effects of the proposed projects on drinking water quality. Therefore, the City cannot adequately assess, evaluate or discuss this portion of the DEIS because of this lack of detail. The Corps must provide this analysis in an SDEIS to allow an adequate opportunity for notice and comment on the effects of the project on the City's drinking water supplies.

DEIS Section: 4.5.1 Methods, page 4-33
Statement: *"The water quality of the proposed Glade Reservoir was estimated by Lewis (2003) by completing a mass balance analysis ……"*

Comment: Lewis (2003) estimated the water quality characteristics of the proposed Glade Reservoir using a discharge-weighted average (mass balance) approach for the two sources of water (local watershed runoff and water delivered from the Poudre River) that will enter the Reservoir. Lewis (2003) used only data from year 2000 to calculate the composite quality of the two sources of inflowing water (composite discharge–weighted average concentrations). These values were then used to conduct qualitative projections of water quality in Glade Reservoir based on the expected fate of the key constituents entering the Reservoir.

The use of one year of data is inadequate to make substantive quantitative projections of water quality. In order to gain an adequate understanding of the anticipated range of water quality <u>delivered into</u> Glade Reservoir, this analysis, at the very minimum, must be conducted over a series of several years that include both reservoir filling and emptying cycles. This is particularly important for the evaluation of TOC concentrations, because TOC concentrations tend to be highest in wet years when Glade Reservoir would be filled.

Furthermore, in order to gain a more refined understanding of the quality of water <u>delivered from</u> Glade Reservoir, a monthly mass balance model should be applied over the same series of years (INTERA & CH2MHill, 2006b). Such a model should consider reservoir storage volumes, reservoir inflow and outflow volumes, and concentrations of key constituents (TOC) in the inflow, outflow, and within the stored volume, all on a monthly basis. If reservoir operations are well defined, this would result in a better, more refined understanding of the potential quality of

water delivered from Glade. However, as stated previously, mass balance calculations assume complete and instant mixing of influent water with water already in the Reservoir. That assumption is not correct in the real world of reservoir dynamics. In order to accurately evaluate the effects of flow dynamics on the quality of water delivered from Glade (in particular, TOC concentrations), a physically based, numerical model must be used.

This information is highly important to an assessment of the effect of the project on municipal drinking water supplies and must be included for public review and comment in an SDEIS and Revised 404(b)(1) Analysis for this project to meet the requirements of Section 404(b)(1) and NEPA.

DEIS Section: 4.5.5 Horsetooth Reservoir, page 4-35
Statement: *"Under Alternative 2, it is estimated that the average annual volume that would be pumped through the Glade-to-Horsetooth pipeline would be 2,600 acre feet, with a maximum annual volume of about 7,000 acre-feet. … Given that the average inflow would be about 2 percent of the average total storage volume during delivery, or about 6 percent during maximum delivery, and that the expected Glade Reservoir nutrient, dissolved solids, total organic carbon and chlorophyll concentrations are lower or only slightly higher than Horsetooth concentrations, it is expected that the water quality of Horsetooth Reservoir would not be negatively affected by inflows from Glade Reservoir."*

Comment: Horsetooth Reservoir is one of two source waters for the City's Fort Collins Water Treatment Facility (FCWTF). It is essential to the City that the existing high quality of its source waters be maintained in order to avoid increased treatment costs, assure overall system reliability, and to provide the highest quality water to its customers. Because of the higher Total Organic Carbon (TOC) associated with Poudre River Basin water and the proposed Glade-Horsetooth Pipeline delivery point near the FCWTF intake, discussed above, deliveries to Horsetooth Reservoir from the Glade-to-Horsetooth pipeline are likely to degrade water quality at the FCWTF intake at Soldier Canyon Dam. The Section 404(b)(1) Guidelines Section 230.50 (Municipal and private water supplies) require that impacts to the quality of drinking water supplies be fully evaluated for NISP. Increases in concentrations or changes in seasonal occurrences of TOC or other water quality parameters at the FCWTF Horsetooth Reservoir intake will impact treatment strategies, process performance, and treatment costs.

The analysis conducted for the DEIS on the potential water quality impacts of the delivery of Glade Reservoir water to Horsetooth Reservoir is inadequate for reasons as stated in comments for Sections 4.5.1. Inadequacies are present in the evaluation of TOC concentrations in waters entering Glade Reservoir, TOC concentrations in waters leaving Glade Reservoir, the flow path and extent of mixing of this water once it reaches Horsetooth Reservoir, and the changes in TOC concentration that will ultimately be observed at the Soldier Canyon Dam outlet. Although TOC is considered the parameter of most concern, these inadequacies would also apply to the analysis of other parameters of concern (including pathogens such as *Giardia* and *Cryptosporidium*, manganese, and geosmin). The conclusion stated in the DEIS that Horsetooth Reservoir would not be negatively affected by inflows from Glade Reservoir is, therefore, untenable until it is supported by a more thorough and rigorous analysis.

The statement "*… it is estimated that the average annual volume that would be pumped through the Glade-to-Horsetooth pipeline would be 2,600 acre feet with a maximum annual volume of about 7,000 acre-feet"* is not supported by an adequate description of the proposed deliveries. Further documentation is needed to show how these delivery volumes were calculated and the underlying assumptions behind them. This description must cover a range of specific delivery scenarios, including the worst-case scenario. For example, it is not clear whether these estimated deliveries were based on the amount of Colorado-Big Thompson (C-BT) water available to perform Glade exchanges or other factors. This description must fully assess not just the current, but the future C-BT ownership levels and municipal leasebacks in the Poudre River Basin, with particular emphasis on the projected reduction of agriculturally owned C-BT units in the Poudre River Basin (2008 NCWCD April Water Delivery Report).

The District's April 2008 Water Delivery Report also shows that just fewer than 60,000 C-BT units are owned by entities that have C-BT water delivered to the Poudre River. Of this, about 28,000 units are owned by municipalities through ownership of North Poudre Irrigation Company shares. This results in about 32,000 owned units available for delivery of water to the Poudre River. Based on annual delivery quotas from 50% to 100%, this translates into a range of 16,000 acre feet to 32,000 acre feet available for potential exchanges on the Poudre River. In addition to this, there may be a limited amount of municipally owned C-BT water available for rental to agricultural users and delivered to the Poudre River. There has been, however, a clear history of C-BT units being transferred from agricultural owners to municipal owners with less C-BT water becoming available for agricultural use. *See e.g.*, NCWCD, *NISP Phase II Alternative Evaluation* at ES-5 (Jan. 2004) (showing reduction in agricultural C-BT units by over 50% after 2020). Considering these factors, there will not be adequate C-BT water available in the Poudre River Basin to accomplish the exchange referred to in DEIS Section 2.3.3.1 to meet the 29,500 acre feet of demand by the NISP Southern Participants. Further analysis in an SDEIS is required to determine the exchange potential available on the River in the future. As this exchange potential decreases, the amount of NISP water that needs to be transferred directly from Glade facilities to either Carter Lake or Horsetooth Reservoir will increase. The potential Glade-to-Horsetooth pipeline delivery values may be significantly underestimated and more flow through this pipeline could further degrade water quality in Horsetooth Reservoir.

The statement "*Given that the average inflow would be about 2 percent of the average total storage volume during delivery, or about 6 percent during maximum delivery,..*" emphasizes the fact that the DEIS analysis assumed that Glade water delivered to Horsetooth Reservoir will be completely mixed with the entire volume of water stored in Horsetooth Reservoir. This analysis underestimates the impact to Horsetooth water quality at the Soldier Canyon outlet, because short-circuiting and incomplete mixing will likely occur. This analysis also does not consider the combined impact on water quality that may occur if changes are made in the amount of water delivered to Horsetooth Reservoir from the Hansen Feeder Canal. If flows from the Hansen Feeder Canal are decreased, the diluting effects of this water will be diminished.

The statement "*... and that the expected Glade Reservoir nutrient, dissolved solids, total organic carbon and chlorophyll concentrations are lower or only slightly higher than Horsetooth concentrations,*" is inaccurate with respect to TOC. The Horsetooth Reservoir TOC

concentration (as measured at the FCWTF) is about 3 mg/L. A long-term average TOC concentration of 2.9 mg/L for Horsetooth Reservoir is shown in Table 8 (pg 33) of the NISP Water Quality Technical Report (ERO and HDR, March 2008).

In comparison, a long-term equilibrium mean TOC concentration of 4.5 mg/L has been predicted by the Corps' consultants for Glade Reservoir water (ERO and HDR, March 2008, Table 16, pg 49). However, more detailed analysis conducted by INTERA and CH2MHill (2006b) for the City of Fort Collins Utilities indicated that Poudre River water diverted into Glade Reservoir will have annual average TOC concentrations ranging between 4 and 7 mg/L, with a long-term annual average of about 5.5 mg/L. The analysis conducted by INTERA and CH2MHill (2006b) also estimated that the monthly average TOC concentration for water delivered from Glade Reservoir would be above 5 mg/L most of the time and could be as high as 9 mg/L depending on the specific operation plans. Although the operational plans used in the analyses by INTERA and CH2MHill (2006b) were not the final operational plans (since those have not been provided or described by the Corps or the District), they are consistent with what was available for the Lewis (2003) analysis.

A Glade Reservoir TOC greater than 5 mg/L (with monthly average values that can exceed 9 mg/L) is significantly higher than a Horsetooth Reservoir TOC of 2.9 mg/L.

The above analysis is based on one key assumption - that future conditions will be within the range of historic flows and TOC concentrations. However, as is discussed below in Section IV.6 of these Comments, climate change impacts are likely to result in more extreme hydrologic conditions, which are known to be associated with poorer water quality conditions, including elevated TOC concentrations in the Poudre River. Even if accurate quantitative predictions are not available at this time, synthetic flow records with associated water quality parameters should be used to evaluate the possible future range of expected water quality conditions in any proposed reservoir.

The FCWTF water supply from Horsetooth Reservoir historically represents a lower concentration of TOC that can be used to supplement the Poudre River supply during the spring runoff when treatability is impaired by high TOC. Other water quality parameters of concern (including pathogens such as *Giardia* and *Cryptosporidium*, taste and odor compounds such as geosmin, turbidity, and dissolved manganese) are also generally present at seasonally high concentrations in one source water and not the other. Hence, a tactical treatment strategy practiced at the FCWTF is to adjust the raw water blend to increase the amount of water from the higher quality source. This operational flexibility is critical both for ensuring regulatory compliance and for meeting the water quality standards established by the City in order to meet the expectations of Fort Collins water customers and major industries in Fort Collins. If the Glade-to-Horsetooth pipeline were constructed, the water quality in Horsetooth Reservoir would be degraded, and this operational flexibility would be severely compromised and resulting water treatment costs for Fort Collins water customers would escalate.

Section 4.5.5 fails to discuss potential contamination of Glade with geosmin. That compound has been found in water samples from North Fork reservoirs at concentrations over 100 ng/L (Billica, Loftis, and Moore, 2008). Those levels are more than ten-times the offensive odor

threshold of the average person. Because of the close proximity and similarities of Glade, Halligan and Seaman Reservoirs, the Corps must analyze whether Glade may have similar geosmin issues and how introduction of geosmin-contaminated water into Horsetooth Reservoir would adversely affect municipal water supplies. It would be of significant concern to the City if blue green algal production in Glade Reservoir resulted in waters with high geosmin concentrations that were then delivered to Horsetooth Reservoir (and ultimately to the City's water treatment facility as part of their water supply). This concern relates not only to potential taste and odor issues for the Fort Collins community and major industries but to the significantly higher additional treatment costs required to remove geosmin back to "non-detect" odor threshold levels.

Glade or North Fork water containing geosmin must not be delivered to Horsetooth Reservoir. The Corps must evaluate and address the geosmin issue and fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard.

The FCWTF is a conventional treatment plant. The FCWTF and its improvements over the years were designed to provide removal of TOC, pathogens, turbidity, manganese, and geosmin at concentrations that have historically been present at the existing diversion/intake structures. The most recent major upgrade to the FCWTF was completed in 2000 at a cost of $22.7 million. If the water quality in Horsetooth Reservoir is degraded, annual treatment costs will increase and advanced treatment processes, with associated capital and annual operation and maintenance (O&M) costs, may be required.

An analysis of costs associated with treating Horsetooth Reservoir water that has been degraded as a result of the Glade-to-Horsetooth pipeline was conducted by CH2MHill (2006). The opinion of probable cost was made based on assumptions about operational scenarios and the quality of water in Glade Reservoir. Although these cost estimates will require refinement after more thorough and rigorous modeling of Glade and Horsetooth Reservoirs has been conducted, they provide insight into the significant potential adverse economic impacts to water treatment at the FCWTF.

TOC removal and disinfection byproducts (DBP) formation during water treatment are complex processes. Both depend on the nature, composition, structure, and reactivity of the various organic compounds that make up the TOC as well as the alkalinity, temperature and other chemical-physical characteristics of the raw water. The conventional treatment processes currently present at the FCWTF can remove TOC (at current concentration ranges and characteristics) to meet the City's regulatory requirements, adopted treatment goals, and customer expectations for both TOC removal and DPB levels. If the City's conventional treatment processes can remove the increased TOC levels due to NISP, the added operational costs to the City due to NISP will be to pay the costs of higher chemical doses (alum and lime) plus the higher cost for increased solids handling due to the corresponding higher level of solids production. For this case, CH2MHill (2006) estimated that the additional annual operating costs associated with treating water with higher TOC concentrations is approximately $40,000 (annual additional alum, lime, and solids handling costs). Note that this value is in 2006 dollars and alum costs have increased by 33% in 2008 alone. Fuel costs have also increased significantly in

2008 which, in turn, also adversely impact chemical delivery and solids handling costs. Thus, actual costs will almost certainly be higher. Unfortunately, the precise costs are uncertain because there is not sufficient operational data or modeling information provided in the DEIS to evaluate the ultimate impacts of NISP on TOC levels delivered to the FCWTF.

It must be emphasized that the FCWTF was designed to operate within the constraint of existing raw water quality conditions observed in both Horsetooth Reservoir and the Cache la Poudre River. However there is not sufficient operational data provided in the DEIS or accompanying technical reports to determine just how high the long-term transport of high TOC water from Glade Reservoir to Horsetooth would increase TOC levels in Horsetooth beyond current plant design and operational constraints.

Should higher TOC concentrations in Horsetooth Reservoir due to NISP (or major changes in the Poudre watershed like catastrophic fires) reach levels where the City's existing conventional treatment processes would not meet existing or future Federal and State Safe Drinking Water regulatory requirements for both TOC removal and reduced DBP Maximum Contaminant Levels (MCLs), then an advanced treatment process such as granular activated carbon (GAC) filtration will need to be designed, constructed, operated and maintained to remove the DBP precursors -- TOC. GAC filtration is one method of effectively removing the TOC precursors that form DBPs. The cost estimate for a GAC system at the FCWTF (including GAC contactors and associated pump stations) includes a capital cost of $56.3 million and an annual O&M cost of $1.9 million, both in 2006 dollars (CH2MHill, 2006). However, as noted above, the DEIS does not provide sufficient operational data or modeling information provided in the DEIS to establish this likelihood

Cost estimates were also developed by CH2MHill (2006) for ultra-violet (UV) disinfection and ozone/advanced oxidation if the required additional modeling and monitoring indicate that other potential water quality issues (potential MCL violations, pathogens, geosmin, and algal toxins) must also be addressed by the FCWTF as a result of the Glade-to-Horsetooth pipeline. Capital costs for a UV disinfection system were estimated at $12.9 million with an annual O&M cost estimate of $ 448,000. Capital costs for an ozone/advanced oxidation system were estimated at $20.8 million with an annual O&M cost estimate of $544,000 (all costs expressed in 2006 dollars). In summary, advanced treatment capital costs could exceed $90 million with additional annual O&M costs of nearly $3 million). And once again there is there is not sufficient operational data or modeling information provided in the DEIS to evaluate the likelihood of these expenses.

The Corps must evaluate and address the cumulative adverse impacts associated with high TOC water and related water treatment impacts and must fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard. *See also* Summary of TOC-Related Impacts to Fort Collins Drinking Water Quality in Section III.1c, below.

DEIS Section: 4.5.6 Glade Reservoir, page 4-35

Statement: *"No specific water quality problems are anticipated for the reservoir with the possible exception of manganese release under low dissolved oxygen conditions."*

Comment: As discussed in comments for Section 4.5.1 and Section 4.5.5, the TOC concentrations in Glade Reservoir are expected to be above 5 mg/L most of the time. Concentrations above 5 mg/L are high compared to the average TOC concentration in Horsetooth Reservoir of 2.9 mg/L. In addition, considering the geosmin concentrations that have been measured in nearby North Fork Poudre River reservoirs (as discussed in comments for Section 3.5.2.1), there is concern that geosmin concentrations could also be elevated in Glade Reservoir. Therefore, the existing analysis does not support the DEIS's statement regarding the effect of the project on water quality in Horsetooth. Additional analysis is needed in an SDEIS to fully and adequately assess the effects of the proposed project on TOC and geosmin levels.

Because of the cumulative adverse impacts associated with treating high TOC water or geosmin-contaminated water, Glade water should not be delivered to Horsetooth Reservoir. The Corps must evaluate and address the cumulative adverse impacts associated with high TOC water or geosmin-contaminated water, and must fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard.

DEIS Section: 4.28.2.1 Water-Based Actions, page 4-104
Statement: *"Although climatic change is considered reasonably foreseeable, there is no accepted science for transforming the general concept of variations in global temperature into incremental changes in streamflow at particular locations. Hydrologic changes attributable to global climate change are a possibility; however, potential impacts have not been quantitatively estimated in the EIS because of the uncertainties associated with predicting change and the effects."*

And;

DEIS Executive Summary, page ES-14
Statement: *"Climate change may affect precipitation, Poudre River streamflows, and the amount of water available for diversion by NISP, which could alter how the action alternatives operate and, in combination with the action alternatives, could further alter flows in the Poudre River."*

Comment: While accurate quantitative analysis of climate change impacts on the Poudre River has not been undertaken in the DEIS, it is widely accepted that one of these impacts will be a wider range of fluctuations between wet and dry years. That is, more extreme dry and wet years are more likely in the future. Refer to AWWA (2006), among many other studies. While the assessment of these impacts on the available water supplies is beyond the scope of this comment, it must be stated that within the Poudre River system, wetter-than-average years are typically characterized by poor water quality, especially when they are preceded by dry years. For example, the two years with the highest recorded annual average TOC at the Bellvue gauge (USGS 06752000) are 1995 and 1983. Both years are preceded by 2 or 3 years of dry weather

(1981, 1982, 1992, 1993, and 1994). This suggests that TOC levels are likely to go higher in the future for most of the years in which NISP water is delivered to Glade (or Cactus Hill) Reservoir. This means that TOC estimates based on the historic records will likely be inaccurate by significantly underestimating the actual levels in either proposed reservoir.

DEIS Section: 5.8.1 Total Organic Carbon, page 5-16
Statement: *"If TOC is not regulated by the Colorado water quality program, then 5 years prior to constructing the Glade-to-Horsetooth pipeline, the District will develop a plan for monitoring TOC in Horsetooth and Glade Reservoirs. This plan will be submitted to the Corps and Reclamation for their review and approval."*

Comment: The only way to address the impacts of the proposed project on the municipal drinking water supplies of the City is to avoid placing Glade water into Horsetooth Reservoir or the Pleasant Valley Pipeline (PVP). However, if the NISP water may be conveyed to Horsetooth or in the PVP, water quality monitoring will be essential for further evaluation of the potential impact of the Glade-to-Horsetooth pipeline on the quality of water in Horsetooth Reservoir. Any monitoring plan must provide for the evaluation of TOC concentrations as well as detailed TOC characteristics. Knowledge of TOC characteristics is important because TOC removal and DBP formation both depend on the nature, composition, structure, and reactivity of the various organic compounds that make up the TOC in the raw water.

Further, if the Corps does not fulfill its duty to avoid or minimize these impacts, it is essential that the Corps develop and evaluate a mitigation plan in an SDEIS and include it as a condition in any permit. As discussed above at the DEIS Section 4.5.5 comments, it is very unlikely that adequate Colorado-Big Thompson (C-BT) exchange units will be available in the future to meet participant demand for NISP water by Poudre River exchanges alone. Further, the District's April 24, 2008, Application for Department of the Army Permit includes the Glade to Horsetooth Pipeline as part of the project to be permitted. Thus, the effects of the proposed pipeline must be evaluated and addressed as part of the review of NISP under NEPA and Section 404. The Corps must evaluate and fully address the impacts associated with conveyance of Glade water to Horsetooth or via the PVP in an SDEIS in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard.

Statement: *"If monitoring indicates that the delivery of water from Glade Reservoir to Horsetooth Reservoir will increase the levels of TOC in Horsetooth Reservoir to levels determined by Reclamation to be unacceptable ……."*

Comment: The Corps cannot legally defer its analysis, avoidance, minimization and mitigation of any impacts to municipal drinking water supplies to the Bureau of Reclamation or to a future time, as discussed above in Section II.7. The District has included the Glade-Horsetooth Pipeline in its application and the facts indicate that some physical connection between Glade and Horsetooth Reservoir, Carter Lake or one of the pipelines will be necessary. Thus, the Corps must fully assess the potential impacts of such a reasonably foreseeable connection in an SDEIS and ensure that it complies with its obligation to fully address those impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard. The Bureau of Reclamation cannot make these findings in the

future. At a future date, the project will have been built and the alternatives to a Glade-Horsetooth pipeline will be diminished or unavailable. Leaving analysis of the pipeline to later constitutes impermissible segmentation under NEPA Existing TOC, geosmin and other pollutant levels in Horsetooth serve as the standard that must not be degraded. *See* Section II.7 of these Comments.

While water quality monitoring would be very important if a connection to Horsetooth Reservoir were allowed, the Corps must do more now to fully assess the impacts to municipal drinking water supplies. In order to fully understand the potential impacts to TOC concentrations at the Soldier Canyon outlet, more rigorous mathematical modeling must be conducted in an SDEIS to account for the specific operational and physical characteristics of Horsetooth Reservoir and to provide for the evaluation of the significance of short-circuiting and mixing on water quality. Effective drinking water treatment design and operation requires the evaluation of worse case scenarios for raw water quality. This requires mathematical modeling that is more rigorous than that presented in the DEIS.

The Bureau of Reclamation has no track record in providing municipal water treatment services, complying with safe drinking water regulations, or the specific needs of Fort Collins water customers such as brewers or chip manufacturers. The City should be included as an active participant in the process of setting the criteria for "acceptability" and "unacceptability".

Statement: *"……the District will develop a TOC mitigation plan for review and approval by the Corps and Reclamation."*

Comment: As noted above, the Corps cannot defer its analysis of the effects of the project on municipal water supplies or its consideration of avoidance, minimization and mitigation. Since neither the District nor the Bureau of Reclamation has any experience or track record in providing municipal water treatment services or complying with safe drinking water regulations, the City must be included as an active participant in the development, design, review, and approval of any Total Organic Carbon (TOC) mitigation plan. TOC mitigation measures that must be considered include: 1) NISP without the Glade-to-Horsetooth pipeline, 2) locating the pipeline such that it delivers water to the south end of Horsetooth Reservoir instead of the north end, 3) implementation of operational scenarios that minimize the delivery of the highest TOC water to Horsetooth Reservoir, 4) structural provisions for the option to selectively divert lower TOC Poudre River water directly from the Glade Reservoir forebay to Horsetooth Reservoir, and 5) compensation to the City for increased water treatment costs.

In order to evaluate and fully address the TOC issue and related impacts in accordance with Section 404(b)(1) will require detailed analysis and mathematical modeling that has not been attempted in the DEIS and must be described and presented for public comment in an SDEIS. All appropriate steps must be implemented to protect the City's municipal drinking water supplies. *See* Section II.1a of these Comments for further discussion in this regard.

DEIS Section: 5.8.2 Manganese and Nutrients, page 5-16
Statement: *"To prevent adverse impacts to the water quality of Horsetooth Reservoir due to delivery of water from either Glade or Cactus Hill reservoir, Glade or Cactus Hill reservoir could be operated to avoid manganese or nutrient releases from the lake bottom or by avoiding the release of deeper waters when the lake is drawn down by using a multiple outlet withdrawal structure."*

Comment: A water quality monitoring program must be designed and implemented for Glade Reservoir when reservoir filling commences. However, it will take a number of years of water quality data collection to fully determine the magnitude and extent of water quality issues in Glade Reservoir. The design and construction of Glade Reservoir must anticipate water quality issues and provide for their probable occurrence with appropriate water management strategies. A multi-level outlet structure should be installed for any proposed reservoir. Combined with an active water quality monitoring program, this design will allow significantly better management of the reservoir for water supply operations.

The Corps must evaluate the issue of water quality in Glade, and particularly the manganese and nutrient levels in Glade and must fully address the expected impacts from this issue in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard. The City should be included as an active participant in the development, design, and approval of any water quality monitoring plans and in the definition of unacceptable water quality parameter/contaminant levels.

1b. Comments on Supplemental Information

Department of the Army, Corps of Engineers (Corps), Omaha District letter of 11 July 2008 from Chandler Peter in response to the 04 June 2007 letter from Ms. Lori Potter of Kaplan Kirsch & Rockwell, LLP. "Re: Second Request for Additional Information – Northern Integrated Supply Project Draft Environmental Impact Statement"
Statement: "**Bullet 3: Request for background calculations on TOC for Cactus Hill Reservoir.** *For Total Organic Carbon, there were 15 measurements at the Poudre Canyon Mouth site collected in April through July in 1993, 1994 and 1995.* ***The median value is 0.4 mg/L and the mean value is 0.7 mg/L.*** **[emphasis added]** *For Lonetree Creek, there are 27 measurements with a median value of 3.1 mg/L and a mean value of 3.5 mg/L. Using the median values, the weighted concentration for TOC would be 0.45 mg/L and using the mean values, the weighted concentration would be 0.75 mg/L."*

Comment: As shown below, the incorrect chemical-physical form of USGS Total Organic Carbon (TOC) was selected from the USGS database and used to develop the results presented in Table 5, page 24 of the Water Quality Technical Report (WQTR). The data in Table 5 of the WQTR states that the range of TOC values for Poudre River water at the mouth of the canyon (USGS Site 06752000) was 0.1 to 2.1 mg/L with a mean value of 0.44 mg/L. **Those results are for "Organic Carbon, suspended sediment" and not the "Organic carbon, water, filtered" form given in the USGS database.** Measured on samples taken at USGS site 06752000 from the Poudre at the mouth of the canyon, the **range of observed TOC values was in reality from**

2.1 to 8.4 mg/L with a median value of 3.8 mg/L and a mean value of 4.6 mg/L and not the incorrect low values presented in Table 5, page 24 of the WQTR or in Bullet 3 of the 11 July 2008 Corps letter.

The correct data and methods descriptions taken from the USGS Web Site are as follows:

USGS Measured forms of TOC April through July 1993, 1994, and 1995:
1. USGS 06752000: 1972-05-18 to 2002-08-07 Poudre River at Mouth of Canyon, **Organic carbon, water, filtered, milligrams per liter, parameter code "p00681"**

2. USGS 06752000: 1993-04-06 to 1995-08-10 Poudre River at Mouth of Canyon, **Organic carbon, suspended sediment, total, milligrams per liter, parameter code "p00689"**

Data table derived from the USGS Web Site for site 06752000 with all samples collected and tested by the USGS:

USGS 06752000, Poudre at Mouth of Canyon	**Organic carbon, water, filtered, milligrams per liter**	**Organic carbon, suspended sediment, total, milligrams per liter**
Date	**Test Code p00681**	**Test Code p00689**
4/6/1993	2.9	0.7
5/4/1993	4.5	0.4
6/10/1993	6.0	0.5
6/18/1993	8.1	1.8
7/8/1993	3.6	0.3
4/20/1994	2.1	0.3
5/3/1994	3.7	0.3
6/7/1994	4.2	0.3
6/14/1994	3.4	0.2
7/6/1994	2.4	0.4
4/10/1995	2.2	0.3
5/11/1995	3.8	1.4
6/13/1995	8.4	2.1
6/20/1995	7.8	0.9
6/30/1995	6.3	0.6

Descriptive Statistics on the TOC Data Table (above) for USGS Site 06752000, Poudre River at mouth of canyon:

Column	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
p00681	15	0	**4.627**	2.164	0.559	1.198
p00689	15	0	**0.700**	0.596	0.154	0.330

Column	Range	Max	Min	Median	25%	75%
p00681	**6.300**	**8.400**	**2.100**	**3.800**	3.025	6.225
p00689	**1.900**	**2.100**	**0.200**	**0.400**	0.300	0.850

1c. Summary of TOC-Related Impacts to Fort Collins Drinking Water Quality

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Summary of TOC -Related Impacts of NISP Operations on City of Fort Collins Drinking Water Quality

Water Quality Parameter	Regulatory Requirement or MCL	Current Regulatory Compliance Status	Impact of NISP	Adversely Affected Waterbody
Total Organic Carbon (TOC) removal requirement	Must meet independent, monthly- adjusted, alkalinity-dependent percent removal requirement.	Currently in compliance; City is able to use low TOC Horsetooth water during high TOC Poudre spring runoff.	(1) Strong probability that high TOC Poudre water pumped to Glade & then transferred to Horsetooth will degrade City's source water supply (2) NISP use of CBT water by exchange can be expected independently to lower water quality in Horsetooth due to less opportunity for dilution.	Horsetooth Reservoir raw water supply
Disinfection By-Products (DBPs): Total Trihalomethanes (TTHMs) Maximum Contaminant Level	0.080 mg/L or parts per million	Currently in compliance; City is able to use low TOC Horsetooth water during high TOC Poudre spring runoff.	(1) Strong probability that high TOC Poudre water pumped to Glade & then transferred to Horsetooth will degrade City's source water supply (2) NISP use of CBT water by exchange can be expected independently to lower water quality in Horsetooth due to less opportunity for dilution.	Horsetooth Reservoir raw water supply

Summary of TOC-Related Impacts of NISP Operations on City of Fort Collins Drinking Water Quality (*continued*)

Water Quality Parameter	MCL or Regulatory Requirement	Current Regulatory Compliance Status	Impact of NISP	Adversely Affected Waterbody
DBPs: Total Halo-Acetic Acids (HAA5) Maximum Contaminant Level	0.060 mg/L or parts per million	Currently in compliance; City is able to use low TOC Horsetooth water during high TOC Poudre spring runoff.	(1) Strong probability that high TOC Poudre water pumped to Glade & then transferred to Horsetooth will degrade City's source water supply (2) NISP use of CBT water by exchange can be expected independently to lower water quality in Horsetooth due to less opportunity for dilution.	Horsetooth Reservoir raw water supply
DBPs: Chlorite Maximum Contaminant Level	1 mg/L monthly average	Currently in compliance; chlorite is a byproduct of the chlorine dioxide used for manganese removal; current doses of chlorine dioxide result in chorite levels below the MCL.	NISP may result in increased levels of dissolved manganese at the City's Horsetooth intake that would result in the need for a higher chlorine dioxide dose. In order to stay below the chlorite MCL, the City may have to install and operate additional chemical feed systems to add other oxidants for effective manganese removal.	Horsetooth Reservoir raw water supply

2. Water Quality Impacts on the Poudre River Due to Deliveries from the NISP project

2a. Comments on DEIS

DEIS Section: 3.23 Hazardous Sites, page 3-124
Statement: *"A review of the Colorado Department of Public Health and Environment (CDPHE) database indicates that several hazardous materials sites are known in the region (Table 3-33 and Figure 3-20)."*

Comment: Table 3-33, and Figure 3-20 do not include three potential hazardous materials sites in the Glade Reservoir inundation area. These include:

1) The Forks Lumber Company located at 7800 US Highway 287 in Laporte, CO 80535. Pentachlorophenol or other hazardous wood preservatives may have been used at this site,
2) The Larimer County Sheriff's pistol range located north of the Forks Lumber Co. The pistol range site is expected to contain heavy concentrations of lead from spent ammunition.
3) The Highway 287 right-of-way is expected to contain unknown but potentially heavy concentrations of oil, gas, antifreeze and other hazardous vehicle fluids.

These hazardous materials sites and their potential impacts on water quality in Glade Reservoir must be thoroughly evaluated in an SDEIS and effective steps taken to avoid, minimize the harm, or otherwise effectively mitigate the potential health risks or environmental damage from these sites.

DEIS Section: 4.5.9 Surface Water Quality Mitigation
Statement (Page 4-36): *"To mitigate water quality effects that may occur from Fort Collins to the mouth of the Poudre River, advance wastewater treatment may be required to meet effluent limits at lower flows and warmer stream temperatures."*

And;

Statement (Page 3-25): *"The Cache la Poudre River from Boxelder Creek to the South Platte River is on the 2006 303(d) list for selenium and E. coli."*

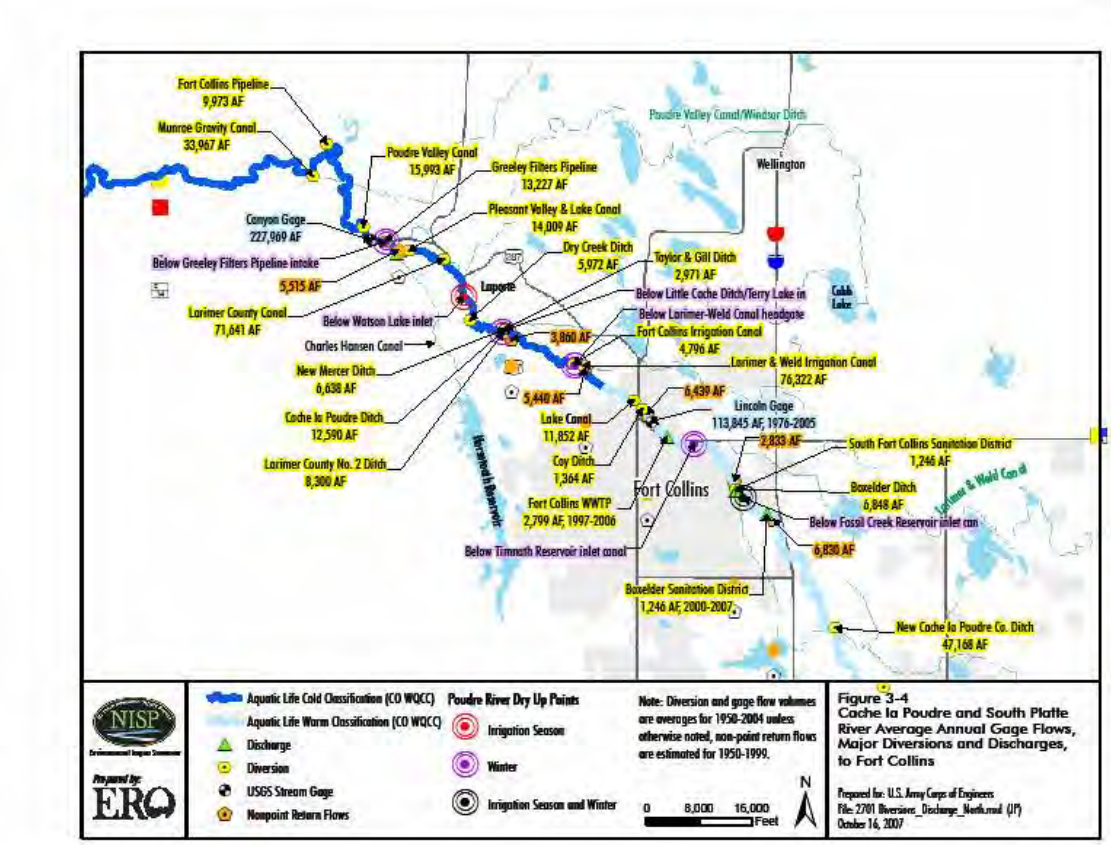
Comment: Bacterial pathogens in river water can cause a variety of intestinal infections including dysentery, hepatitis, typhoid fever, and cholera. Water-borne pathogens are difficult to quickly recover and identify in the laboratory. However, *E. coli* is abundant in human and animal fecal material and relatively easy to cultivate. Hence, detecting the presence of *E. coli* in water is the traditional key indicator of fecal contamination and possible presence of water-borne human pathogens (EPA 1978, Geldrich 1990).

The Poudre River is already listed as impaired under Section 303(d) for violations of the *E. coli* stream standard downstream of Boxelder Creek. Boxelder Creek at the Poudre River is located just below the City's Natural Areas south of Prospect Road. Decreased river flows from NISP operations will further aggravate this impairment since there will be less dilution water for all potential pollutants in the River including water-borne human pathogens. Consequently, lack of sufficient dilution water will further degrade the human-health safety and aesthetic quality of the Poudre River through Fort Collins. Reduced river flows will likely result in higher concentrations of *E. coli* and pathogens downstream of the City's stormwater discharges as well as the City's two water reclamation facilities. If *E. coli* populations surpass the State of Colorado's standards for natural swimming areas, the Poudre River within the City limits may need to be posted as a "no body contact" and "no swimming" zone.

Furthermore, the Poudre River upstream of Boxelder Creek, essentially in the heart of the City, may also become 303(d)-listed as threatened and impaired for *E. coli* contamination. This would seriously impair water-based recreation and the use of parks within the City.

The DEIS states that the City may be forced to implement advanced wastewater treatment (AWT), but does not analyze the obligation of the Corps to fully evaluate and address the issue of elevated concentrations of *E. coli* and associated water-borne pathogens due to reduced river flows through Fort Collins, and the related impacts, pursuant to the Section 404(b)(1) Guidelines. The Corps must consider the known health risks associated with elevated *E. coli* counts in water, and the potential for reduced river flows from NISP to result in higher *E. coli* levels. The City should be included as an active participant in the development, approval, and implementation of any monitoring program. At a minimum, the project proponents should bear all costs associated with monitoring, reporting, and removing elevated populations of water-borne *E. coli* and associated pathogens in the Poudre River through the City due to reduced river flows.

DEIS Figure: 3-14, page 149
Statement: *"Cache la Poudre and South Platte River Average Annual Gage Flows, Major Diversions and Discharges, to Fort Collins...."*



Comment: The diagrammatic representation of "... Major Diversions & Discharges ..." in Figure 3-4 is not correct. The diagram depicts Boxelder Sanitation District (BSD) discharging to the Poudre River below South Fort Collins Sanitation District (SFCSD); this is not correct. The BSD discharges to the Poudre River just below Boxelder Creek. The diagram shows the SFCSD discharging to the Poudre River in the vicinity of east Prospect Street in Fort Collins; this is not correct. The SFCSD discharges directly into Fossil Creek Reservoir.

There is also no depiction of the City of Fort Collins Drake Water Reclamation Facility (DWRF) in Figure 3-4. Furthermore, there is no indication in the diagram of where the average of 10 million gallons of treated effluent is being discharged every day. The DWRF, rated at 23 million gallons per day (mgd), has three permitted discharge points: to the Rawhide Power Plant, to Fossil Creek Reservoir Inlet Ditch, and to the Poudre River. All of the DWRF discharge points are located upstream of the BSD discharge point. In addition, the depiction of Fossil Creek Reservoir at the bottom of the diagram does not show the true location of the SFCSD at the west end of the Reservoir.

Both the Water Quality Technical Report (WQTR) and the DEIS Figure 3-4 proceed in their presentations, analyses and discussions as if the SFCSD discharges are above the BSD and, furthermore, that the City of Fort Collins' DWRF does not exist. These errors and omissions cast serious doubt on the accuracy of both flow and water quality-related information presented not only in Figure 3-4 but throughout both the WQTR and the DEIS regarding the Poudre River

in the Fort Collins area. Potential adverse impacts of NISP on the Poudre River through Fort Collins cannot be adequately evaluated because of incorrect locations of the water reclamation facilities in the area and incorrect information regarding both specific treated wastewater discharge points and discharge volumes. These are fundamental errors and omissions, and the analyses must be corrected and presented for public review in an SDEIS to allow the public a reasonable opportunity to comment on the impacts of NISP at and below these facilities.

DEIS Section: 3.5.1 Water Quality Standards, page 3-24
Statement: *"The Cache la Poudre River from Boxelder Creek to the South Platte River is on the 2006 303(d) list for selenium and E. coli. Horsetooth Reservoir is on the 2006 303(d) list for dissolved oxygen. The Cache la Poudre River from the confluence with the North Fork of the Cache la Poudre River to Shields Street is on the M&E list for aquatic life use."*

Comment: The Colorado Water Quality Control Commission (WQCC) adopted the 2008 303(d) list on March 11, 2008. Section 303(d) of the Clean Water Act requires States to identify waters that do not or are not expected to meet applicable water quality standards with technology-based controls alone. The Poudre River from the Monroe Canal to Shields Street is on the 2008 303(d) list for pH and copper**.** The Poudre River from Boxelder to the South Platte River remains on the 2008 303(d) list for selenium and E. coli. The Poudre River from the confluence with the North Fork of the Poudre River to Shields Street remains on the M&E list for aquatic life use. Horsetooth Reservoir is on the 2008 303(d) list for dissolved oxygen and aquatic life use (5 CCR 1002-93). It is important for an SDEIS and subsequent documents to note the 2008 303(d) listings on the Poudre River and Horsetooth Reservoir as these water-bodies are already not expected to meet applicable water quality standards. The action alternatives listed in the DEIS will contribute to and exacerbate non-attainment of water quality standards by reducing dilution flows, increasing water temperature and pH, decreasing dissolved oxygen, and degrading overall water quality (see water quality section of DEIS and the Water Quality Technical Report). *See* Section 404(b)(1) Guidelines Section 230.22 (water).

The DEIS's analysis of these issues is inadequate. The Corps must evaluate and address the adverse water quality impacts from the substantial reductions in flow from NISP and must fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard. This must be done in an SDEIS, Revised Section 404(b)(1) Analysis and subsequent documents.

DEIS Section: 3.5.2 Potentially Affected Environment, page 3-26 and 3-27; and Water Quality Technical Report (WQTR) Table 1, page 18 and Table 2, page 19
Statement: *"The water quality standard for temperature is listed in Table 3-9 as 30ºC and in Table 3-10 as 20ºC. The same temperature standard information is repeated in Tables 1 and 2 of the WQTR."*

Comment: The water quality standards for temperature listed in Table 3-9 and Table 3-10 of the DEIS and Tables 1 and 2 of the WQTR does not recognize the adoption of new temperature criteria in January 2007, by the Colorado Water Quality Control Commission (WQCC). The

new temperature criteria for Colorado's surface waters (Regulation No. 31, Basic Standards and Methodologies for Surface Water, 5 CCR 1002-31) are more stringent (lower) than the temperature standards reported in the DEIS and WQTR Tables. Although the WQCC adopted an interim temperature standard of 20ºC for cold water Segment 10 of the Poudre River, it appears that the intention of the WQCC is to adopt the more stringent standard in the June 2009 South Platte Basin Rulemaking Hearing. Due to these more stringent water temperature standards, the Corps should further model and evaluate the potential for the proposed action to violate these new standards. Without water temperature modeling, the nature and extent of potential adverse impacts of higher temperatures on the Poudre River cannot be accurately assessed or evaluated. Furthermore, the Corps must fully address these impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.7 of these Comments. *See also* Summary of Regulatory Impacts to Poudre River Water Quality in Section III.2c, below.

DEIS Section: 4.2.1.1 Changes to Poudre River Flows, page 4-5
Statement: *"The District's Proposed Action (Glade Reservoir and SPWCP) would reduce average monthly streamflow at the Lincoln Avenue gage in most months in most years…"*

Comment: Low flows aggravate the effects of water pollution. Dilution is the primary mechanism by which the concentrations of pollutants are reduced. During low flow, there is less water available to dilute loadings to the River, resulting in higher in-stream concentration of pollutants. Stream water temperatures also increase during low-flow periods, which add stress on aquatic ecosystems by reducing the ability of water to hold dissolved oxygen. See Section 404(b)(1) Guidelines Section 230.22 and 230.31.

The DEIS's analysis of these issues is inadequate. The Corps must evaluate and address the adverse water quality impacts from the substantial reductions in flow from NISP and must fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard. This must be done in an SDEIS, Revised Section 404(b)(1) Analysis and subsequent documents.

DEIS Section: 4.5 Surface Water Quality, page 3.34
Statement: "*The uppermost wastewater treatment plant on the Poudre River is the City of Fort Collins WWTP near Lincoln Street and the lowest is City of Greeley's WWTP east of Greeley. With streamflow reductions, total ammonia concentrations in the river would increase below all of the WWTPs; however, ammonia concentrations up to a certain concentration are efficiently removed or transformed as the water moves downstream.* ***Stream temperatures would likely increase due to decreased flows*** *[emphasis added], which would increase unionized ammonia concentrations and could* ***reduce oxygen diffusion*** *[emphasis added] to the water column,* ***potentially enhancing biological activity in the river*** *[emphasis added]. While this could result in decreased nutrient concentrations in the river, it could create problems associated with* ***increased algal biomass in the river****." [Emphasis added].*

Comment: The DEIS does not provide any data or modeling regarding the nature or extent of projected water temperature increases or subsequent reduced dissolved oxygen levels in the

Poudre River through Fort Collins. To accurately evaluate the effects of warmer water temperatures on the aquatic species present in the River through the City, data and modeling are needed that define the aquatic species present, their life stage and whether the anticipated temperature increases would exceed either or both the acute or chronic stream standards. It should be noted that application of any "warm water" standard to address the temperature impacts ignores the fact that cold water species currently exist in the River in Fort Collins. Cold water species have higher dissolved oxygen requirements and less tolerance of increased water temperatures than warm water species. The potential adverse impacts to the River and aquatic species of warmer water temperatures and reduced dissolved oxygen levels are significant. However, those effects cannot be defined because of a lack of quantifiable data in the DEIS.

Increasing algal biomass in the River violates the central core of the narrative nutrient standard (A)(7) in the Clean Water Act §305(b) water quality assessment and §303(d). The narrative nutrient standard states:

> *"A surface water shall be free from pollutants in amounts or combination that…cause the growth of algae or aquatic plants that inhibit or prohibit the habitation, growth, or propagation of other aquatic life or that impair recreational uses…"*

Furthermore, "…increased algal biomass…" is a core concern under Sections 230.22 (water), 230.31 (fish and other aquatic organisms), 230.40 (sanctuaries and refuges), 230.51 (recreational fisheries), 230.52 (water-based recreation) and 230.54 (parks and similar preserves) of the Section 404(b)(1) Guidelines.

The inconsistent, undetailed and non-quantitative analysis of these important water quality issues fails to pass muster under either the Clean Water Act or NEPA and necessitates a fuller analysis in an SDEIS and revised Section 404(b)(1) Analysis. Increased algal biomass and other serious water quality impacts would impair the City's parks, Natural Areas, recreational use of the River and aesthetics and public enjoyment of the River. The Corps must evaluate and address these adverse impacts from the substantial reductions in flow from NISP and must fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard.

The language cited above from Section 4.5 of the DEIS appears at least twice again in Appendix D (see the following two excerpts from the DEIS below). However, in one instance, a projected temperature "increase" becomes a "decrease". It is implausible that reducing stream flows would result in a decrease in stream temperatures during the summer months of greatest concern.

DEIS Appendix D – Section 404(b)(1) Analysis, Section 2.3.1. Direct and Indirect Effects to Water, page D-5

General Comment: The 404(b)(1) analysis fails to provide a clear water depletion analysis that address handling, absorption, and evaporation losses from the various alternatives. Given the location of the facilities, these losses are likely very large and could influence the ability of the alternatives to meet demands without creating larger impacts down stream.

DEIS Appendix D -- Section 404(b)(1) Analysis, Section 2.3.2. Water Quality Effects Common to All Action Alternatives, page D-7
Statement: *"The uppermost wastewater treatment plant on the Poudre River is the City of Fort Collins WWTP near Lincoln Street, and the lowest is Greeley's WWTP east of town. With streamflow reductions, total ammonia concentrations in the river would increase below all of the WWTPs; however, ammonia concentrations up to a certain concentration are efficiently removed or transformed as the water moves downstream. Stream temperatures would likely increase due to decreased flows, which would increase unionized ammonia concentrations and could reduce oxygen diffusion to the water column,* ***potentially enhancing biological activity in the river*** *[emphasis added].* ***While this reduction in temperatures could result in decreased nutrient concentrations in the river*** [emphasis added], *it could also create problems associated with increased algal biomass in the river. Total organic carbon concentrations would be expected to decrease due to reduced streamflows, while selenium concentrations may increase. Predicted changes in metal concentrations (increases and decreases) in the Poudre River due to NISP are expected to be small and may not be measurable."[Emphasis added].*

And;

DEIS Appendix D – Section 404(b)(1) Analysis, Alternatives 2 and 4 – Glade Reservoir and the SPWCP, pages D-9 and D-10
Statement: *"The uppermost wastewater treatment plant on the Poudre River is the City of Fort Collins WWTP near Lincoln Street, and the lowest is Greeley's WWTP east of town. With streamflow reductions, total ammonia concentrations in the river would increase below all of the WWTPs; however, ammonia concentrations up to a certain concentration are efficiently removed or transformed as the water moves downstream. Stream temperatures would likely increase due to decreased flows, which would increase unionized ammonia concentrations and could reduce oxygen diffusion to the water column,* ***potentially enhancing biological activity in the river. While this increase in stream temperature and reduction in oxygen diffusion could result in decreased nutrient concentrations in the river*** *[emphasis added],* ***it*** *could also create problems associated with increased algal biomass in the river. Total organic carbon concentrations would be expected to decrease due to reduced streamflows, while selenium concentrations may increase. Predicted changes in metal concentrations (increases and decreases) in the Poudre River due to NISP are expected to be small and may not be measurable." [Emphasis added].*

Comment: As noted above, it is implausible that reducing stream flows would result in a decrease in stream temperatures during the summer months of greatest concern. Real-world experience would indicate that reduced river flows will result in <u>increased</u> water temperatures during the summer and fall seasons. Conclusions drawn on the basis of decreased temperatures with reduced flows are incorrect.

DEIS Section: 4.5.6 Glade Reservoir, page 4-35
Statement: *"…water would be supplied through runoff in the watershed (Lewis 2003; HDR 2007c)?"*

Comment: The report "HDR 2007c" does not appear on page 7-7 of the References and that phrase does not appear anywhere else in the document. The report is not posted at the Corps

website. It appears to be an important water quality report related to NISP that should have been made available to the public as part of DEIS record.

DEIS Section: 4.5.9 Mitigation, page 4-36
Statement: *"From the mouth of Poudre Canyon to the west side of Fort Collins, where the Poudre River is cold enough throughout the year to support trout populations and cold water invertebrates, water quality impacts and impacts to aquatic life that would occur during the winter months could be mitigated by increasing winter flows by 10 cfs or more. Diversions of water from the Poudre River could be timed, reduced or avoided during periods of hot weather and/or when the river temperature is chronically above a temperature at or above 20ºC at key locations for cold water aquatic life. This would likely be during July, August, and the first week of September. River diversions for the Project could be taken only during the coolest part of the day, from approximately midnight to mid-morning."*

*"To mitigate water quality effects that may occur from Fort Collins to the mouth of the Poudre River, **advanced wastewater treatment** (emphasis added) may be required to meet effluent limits at lower flows and warmer stream temperatures. In addition, agricultural return flows could be treated prior to discharge to the Poudre and South Platte rivers."*

Comment: The Corps' permitting decision cannot rely upon and assume mitigation supplied by third parties that are injured by the effects of the proposed project on the aquatic ecosystem. Further, the Corps must first fully evaluate adverse water quality impacts from the substantial reductions in flow from NISP and must fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard. This must be done in an SDEIS, Revised Section 404(b)(1) Analysis and subsequent documents.

If, because of reduced river flows (less dilution water) and subsequent higher water temperatures in the Poudre River due to any NISP operations, Fort Collins' NPDES wastewater discharge permits should require implementation of advanced wastewater treatment (AWT) to meet more stringent effluent discharge limits, the associated costs would be significant. Current professional engineering estimates for design and construction of AWT in Fort Collins range from $75 million to $125 million, plus significant additional annual operation and maintenance costs (Fort Collins WWTP Design Team 2008 Conceptual Estimate).

2b. Comments on Water Quality Technical Report

(Northern Integrated Supply Project Environmental Impact Statement. Water Quality Technical Report (WQTR). March 2008. ERO Resources & HDR Engineering, Inc.)

WQTR Section: Table of Contents, Page ii
Statement: *"Table 5. Cache la Poudre River water quality values, 1980 to 2004. ..... page 23"* is transformed on page 23 into *"Table 5. Cache la Poudre River water quality values, 1980-2004. Cache la Poudre above North Fork (USGS gage 06749500)."*

Comment: The title of Table 5 was changed between Table of Contents and the title text on page 23 in the WQTR. The title in the Table of Contents gives an incorrect description of the contents of the Table 5 on page 23; it is not water quality data from above the North Fork of the Poudre River. In addition, the period of record stated in both the table of contents and the title of Table 5 for USGS site 06749500 is not correct. The period of record is 24 October 1979 through 21 September 1984, approximately five years of data, and not an extensive 24-year record of data collection (1980 through 2004) as suggested in the WQTR.

WQTR Section 7.2.1.1 Poudre River at the Canyon Mouth, page 36
Statement: *"The quality of the river at this location is very good (Table 5, USGS gage 06752000)."*

Comment: Table 5 page 23 of the WQTR presents data from USGS site 06749500 from the North Fork of the Poudre River just before its confluence with the main-stem of the Poudre River. The data depicted in Table 5 are not data for USGS gage site 06752000 for the Poudre River at the mouth of the canyon. The intent of the authors is not known but possibly they were referring to the un-numbered table on page 24 of the WQTR, "Cache la Poudre at Mouth of Canyon (USGS gage 06752000)" which is not identified in the Table of Contents.

WQTR Section: 7.2.1.2 Poudre River at Shields Street, page 37
Statement: *"The largest percent decreases [in flow] would occur in an average year at LINCGAGE in May (-71 percent), June (-54 percent), July (-47 percent) and August (-30) percent). During low flow months, the largest percent flow decrease in an average year at LINCGAGE would occur in January (-20 percent or -3.3 cfs)."*

Comment: Decreases in flow at the LINCGAGE (USGS Lincoln Street Gage) during low flow months have the potential to impact the Fort Collins Wastewater Treatment Plant (WWTP) at Mulberry Street. Because discharge permit limitations are based on low flow conditions, the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division determines the discharge permit limitations for WWTPs using a defined critical low-flow condition. The critical low-flow condition is calculated using a 30-day average low flow with an average 1-in-3 year recurrence interval (30E3) for chronic standards, (except for temperature limitations, which use the empirically based 7-day average low flow with an average 1-in-3 year recurrence interval (7E3)), and the empirically based 1-day low flow with an average 1-in-3 year recurrence interval (1E3) for acute standards, or the equivalent statistically-based flow. For some pollutants, including ammonia, the low flow exceptions are based on periodic or seasonal flows (5 CCR 1002-31). A reduction in flow during low flow months will result in more stringent permit limitations for the Fort Collins WWTP, which will result in the need for advanced wastewater treatment (AWT) technologies to meet those permit limitations.

The table below depicts the river flow basis for specific treated wastewater effluent limits potentially affected by NISP. The table demonstrates that the majority of the parameters affected by NISP are either low-flow based, or are dependent upon a parameter that is low-flow based.

River Flow and/or River Water Quality Basis for Regulated NPDES Permit Limitation Calculations for Treated Wastewater Effluent Limits Potentially Affected by NISP:

NPDES Parameter	River Annual Low Flow-based Limit	River Monthly Low Flow-based Limit	Other River Flow-Based Limit	River Water Quality-based Limit	River Water Temperature-based Limit	River pH-based Limit	Limit based on Set Standard
pH[6]							X
Water Temperature[7]	X			X			
Dissolved Oxygen[8]			X	X	X		
E. coli[9]	X			X			
Ammonia[10]		X		X	X	X	
Metals[11]	X			X			

[6] pH limitations are based on a water quality standard of 6.5 – 9 pH units and are applied as instantaneous limits.
[7] Water temperature limitations are based on 7 day average low flow with an average 1-in-3 year recurrence (7E3).
[8] Dissolved Oxygen limitations are based on average conditions of temperature and flow for the worst case time period.
[9] E. Coli limitations are based on 30 day avg low flow with an average 1-in-3 year recurrence (30E3).
[10] Ammonia limitations are calculated as monthly limits and are dependent on the pH, temperature, and quality of the receiving stream.
[11] Metals limitations are calculated as acute limits, based on 1 day low with an average 1-in-3 year recurrence (1E3); and as chronic limits, based on 30 day average low flow with an average 1-in-3 year recurrence (30E3).

The Corps must evaluate and address the adverse water quality impacts from the substantial reductions in flow from NISP and must fully address the expected impacts, including the increased wastewater treatment systems required as a result, in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard. This must be done in an SDEIS, Revised Section 404(b)(1) Analysis and subsequent documents.

Current professional engineering estimates for design and construction of AWT in Fort Collins range from $75 million to $125 million, plus significant additional annual operation and maintenance costs (Fort Collins WRF Design Team 2008 Conceptual Estimate).

WQTR: Table 9 Cache la Poudre River water quality analysis locations page 36
Statement: The 4th row states *"Prospect Street east of Fort Collins – South Fort Collins Sanitation District WWTP discharge point"*.

Comment: The statement in the table is incorrect. The South Fort Collins Sanitation District (SFCSD) effluent is discharged into Fossil Creek Reservoir. Waters from Fossil Creek Reservoir, in turn, are discharged to the Poudre River downstream of the Boxelder Sanitation District (BSD) at a location east of Interstate 25. As a result of that error in discharge point location shown in Table 9, any reported modeling, mass balance equations, etc., as well as any subsequent narrative or conclusions included in either the WQTR or DEIS that are derived from that error of fact may be incorrect. The City cannot adequately assess, evaluate or discuss this and related portions of the DEIS because of these errors of fact in the WQTR. The Corps must correct these errors and provide updated analyses in an SDEIS and Revised 404(b)(1) Analysis for this project.

WQTR Section: 7.2.1.3 Poudre River at Fort Collins WWTP, page 38
Statement: *"Based on previous sampling results, reduced flows would likely increase stream temperature during the spring and summer months, increase unionized ammonia concentrations, decrease DO concentrations…"*

Comment: Water quality is an important component of the physical environment for aquatic species. Small changes in some chemical constituents can result in changes to the biological community. The WQTR used existing data from USGS and other sources to describe the baseline conditions. Most of the analysis relied on professional judgment and did not present quantified information regarding changes in key water quality parameters that are biologically meaningful. Water temperature impacts on aquatic resources was identified and listed as a key issue during scoping; however, no water temperature simulations were conducted to determine the biological effects to the aquatic fauna in the study area.

The impacts of reduced flows described all result in a degradation of water quality and will most likely impair or prevent the ability of this section of the Poudre River to remain suitable for its beneficial uses as determined by the Colorado Department of Public Health and Environment

(CDPHE) for recreation and aquatic life use. Increases in stream temperature, and a reduction in dissolved oxygen concentrations can affect the survival of aquatic life and reduce recreational opportunities. See Section 404(b)(1) Guidelines Sections 230.22 and 230.31. Due to the seriousness of the potential effects and their critical role in the analysis of effects under the Section 404(b)(1) Guidelines, the Corps must provide more detailed and quantitative analysis of these water quality impacts in an SDEIS, Revised 404(b)(1) Analysis and subsequent documents.

WQTR: Cache la Poudre at Lincoln Street (USGS gage 06752260), page 26
Statement: The table presented for water quality on the Cache la Poudre at the Lincoln Street Gage shows existing nitrate and nitrite concentrations ranging from 0.005 to 1.8 mg/l with a mean of 0.4 mg/l, with an observation that highest values occur at low flow and lowest values at high flow. In addition, total phosphorus concentrations are reported to range from 0 to 0.7 mg/l with a mean of 0.02, with highest values from July – September.

And;

WQTR Section 7.2.1.2, Poudre River at Shields Street, page 38
Statement: *"A dissolved oxygen concentration less than the spawning standard of 7 mg/l has occurred in the past; with reduced flows and water stream temperatures, the dissolved oxygen standards could be more frequently exceeded during the summer months. Nitrite and pH concentrations could exceed standards more frequently due to reduced streamflows."*

Comment: Data from the chart on page 26 of the WQTR state that high nutrient values are linked to low flow conditions. However, page 38 of the technical report, which discusses in detail other water quality impacts, does not discuss expected increases in nutrient concentrations associated with low flows. The Colorado Water Quality Control Commission (WQCC) will adopt numeric criteria for nutrients in rivers and streams in June 2010. Increased nutrient concentrations in the Poudre River resulting from NISP would cause the development and enforcement of more stringent limits in the City's wastewater discharge permits. In turn, this would likely require the added expense of designing, operating and maintaining advanced wastewater treatment (AWT) systems at the City's two water reclamation facilities to meet the more stringent limits. In fact, the operation of AWT in Fort Collins is already stated as a likely outcome of NISP (Section 4.5.9 Mitigation, p. 4-36).

Current professional engineering estimates for design and construction of AWT in Fort Collins range from $75 million to $125 million, plus significant additional annual operation and maintenance costs. The Corps must fully address these expected impacts from NISP in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard. This must be done in an SDEIS, Revised Section 404(b)(1) Analysis and subsequent documents.

WQTR Section: 7.2.1.3. Poudre River at Fort Collins WWTP, page 39
Statement: *"…total ammonia and dissolved copper concentrations are available for the Fort Collins WWTP and for the Poudre River below the WWTP (at Mulberry Street), a mass balance*

analysis was completed for May, June, July, and August ***(water quality data for other parameters are not available for both the WWTP and the river at Mulberry Street).*** *"* [Emphasis added]

Comment: The emphasized portion of the statement is incorrect. Over ten years of detailed multi-parameter water quality data through the Spring of 2008 is available for both the Mulberry Wastewater Treatment Plant (WWTP) and for the Poudre River below Mulberry Street and above Prospect Street. The data includes dissolved selenium, arsenic, silver, cadmium, chromium, copper, lead and zinc; total recoverable iron and manganese, hardness, temperature, pH, ammonia-nitrogen, nitrite-nitrogen, and nitrate-nitrogen. Much of this data is available via the Colorado Data-Sharing Network on EPA's STORET internet database under the organization ID of "CITYFTCO" and station ID of "PBRY". Due to these omissions of analysis from the WQTR, the mass loading calculations, narrative, and conclusions drawn in the WQTR report for Poudre River at the Mulberry WWTP are incomplete and inaccurate. The City cannot adequately assess, evaluate or discuss this and related portions of the DEIS because of these errors of fact and omission in the WQTR. These data must be incorporated in updated analyses in an SDEIS and subsequent documents to address these important water quality questions.

WQTR Section: 7.2.1.4., page 40
Statement: Poudre River at South Fort Collins Sanitation District. *"…at the nearest USGS water quality monitoring site (USGS gage 06752270), …".*

Comment: This statement is incorrect. Site 06752270 is not the nearest USGS site to the South Fort Collins Sanitation District (SFCSD). USGS site 06752270 is the water quality site on the Poudre River just above East Prospect Street in Fort Collins. This USGS site is above the discharge points for both City of Fort Collins Drake Water Reclamation Facility (DWRF) and the Boxelder Sanitation District (BSD) plant. Site 06752270 at Prospect is several miles above the discharge point for the SFCSD plant into Fossil Creek Reservoir. Site 06752270 has never had a flow gage. However, there is a USGS water quality monitoring continuous flow gage station (06752280) on the Poudre River downstream of the DWRF and just above the confluence of the Poudre River with Boxelder Creek. It is located on the Poudre River just upstream of discharge point for BSD. Site 06752280 has over 25 years of continuous flow and monthly water quality data. All of the USGS data for site 06752280 is available via the USGS website on the Internet. However, the WQTR authors failed to use any of this flow or water quality data for their modeling, analysis, discussion or conclusions.

Furthermore and in addition to the USGS dataset at station 06752280, the City of Fort Collins has also collected weekly and monthly water quality data on the Poudre River at the USGS Boxelder gage site for over ten years. The data includes values for dissolved arsenic, selenium, silver, cadmium, chromium, copper, lead and zinc; total recoverable iron, mercury, and manganese, as well as hardness, temperature, pH, ammonia-nitrogen, nitrite-nitrogen, and nitrate-nitrogen. Much of this data is posted on EPA's STORET database.

A table from the USGS on the extensive water quality and flow datasets available for the Boxelder Gage site (06752280) is given below:

USGS 06752280 Cache la Poudre River Above Boxelder Creek, Near Timnath, CO			
6752280	Latitude 40°33'07", Longitude 105°00'39"	Larimer County, Colorado, Hydrologic Unit 10190007	
AVAILABLE DATA FROM USGS:			
Data Type	**Begin Date**	**End Date**	**Count**
Real-time	**This is a real-time site**		
Daily Data			
Discharge, cubic feet per second	10/1/1979	5/15/2008	10455
Daily Statistics			
Discharge, cubic feet per second	10/1/1979	10/10/2007	10237
Monthly Statistics			
Discharge, cubic feet per second	1979-10	2007-10	
Annual Statistics			
Discharge, cubic feet per second	1980	2008	
Peak streamflow	5/25/1980	10/31/2005	26
Field measurements	6/3/1983	4/6/2008	295
Field/Lab water-quality samples	10/24/1979	5/14/2008	379

Compared to the instantaneous flow and monthly water quality records available at the Prospect Street site (06752270) used for developing the WQTR:

6752270	Cache la Poudre River Below Fort Collins at Prospect Street	Latitude 40°34'01", Longitude 105°01'36"	Larimer County, Colorado, Hydrologic Unit 10190007
DESCRIPTION			
Drainage area: 1,238 square miles			
Datum of gage: 4,890.00 feet above sea level NGVD29.			
AVAILABLE DATA FROM USGS:			
Data Type	**Begin Date**	**End Date**	**Count**
Field/Lab water-quality samples	5/22/1972	9/20/2005	467

The City cannot adequately assess, evaluate or discuss this and related portions of the DEIS because of these errors and omissions of fact in the WQTR. The use of less representative data from farther-away sites renders the analysis and conclusions unreliable. The most representative

data must be incorporated in updated analyses in an SDEIS and subsequent documents to address these important water quality questions.

WQTR Section: 7.2.1.4. Poudre River at Fort Collins WWTP, pages 38-39
Statement: Entire section.

Comment: The WQTR never mentions either the existence of or potential impacts associated with the City of Fort Collins' Drake Water Reclamation Facility (DWRF) on the Cache la Poudre River in relation to NISP. The DWRF is a National Pollutant Discharge and Elimination System- (NPDES-) permitted 23 million gallons per day (mgd) wastewater treatment plant located at 3036 Environmental Drive, Fort Collins Colorado.

The WQTR does not mention any modeling or analysis of DWRF discharge to the Cache la Poudre from its NPDES-permitted discharge point 002A described for permit number CO-0047627. At build-out, the DWRF is expected to have a rated flow capacity of 31.3 million gallons per day (mgd). The failure to include a thorough analysis and discussion of the DWRF discharge, the single largest potential treated wastewater discharger on the Poudre River, makes the WQTR modeling results incomplete, unreliable and inaccurate. Furthermore, the subsequent written discussion, comments, justifications, recommendations, and conclusions drawn from the WQTR for this portion of Segment 12 of the Cache la Poudre River may, in turn, also be incomplete, unreliable and inaccurate.

The City cannot adequately assess, evaluate or discuss this and related portions of the DEIS because of these errors of fact and omissions in the WQTR. Data regarding the DWRF must be incorporated in updated analyses in an SDEIS and subsequent documents to address these important water quality questions.

WQTR Section: 7.2.1.4 Table 10, page 39
Statement: Poudre River at Fort Collins WWTP, *"… a mass balance analysis for May, June, July, August (water quality data for other parameters are not available for both the WWTP and the river at Mulberry Street)."*

Comments: The modeling results described in the Table 10 of the WQTR and the resulting discussion, comments and conclusions are incomplete. A critical month, September, for which data is available, was omitted from the analysis. September is critical because of the combination of low river flows in that stretch of the Poudre River and end-of-summer warm water temperatures. This omission underestimates the modeled and potentially adverse water quality impacts. In addition, the phrase, "…(water quality data for other parameters are not available for both the WWTP and the River at Mulberry Street)" is not correct; several years of corresponding effluent and river data are available. Furthermore, there is no documentation in the WQTR of the river flows (Q1, below) or wastewater discharge flows (Q2), or combined flows (Q3) used in the mass balance calculations. The formula for mass balance equations (taken from CDPHE Water Quality Assessment, Cache la Poudre River, Ft. Collins WWTF'S, 18 December 2007) is:

$$M_2 = \frac{M_3 Q_3 - M_1 Q_1}{Q_2}$$

Where,
Q1 = Upstream low flow (1E3 or 30E3)
Q2 = Average daily effluent flow (design capacity)
Q3 = Downstream flow (Q1 + Q2)
M1 = In-stream background pollutant concentrations at the existing quality
M2 = Calculated maximum allowable effluent pollutant concentration
M3 = Maximum allowable in-stream pollutant concentration (water quality standards)

The critical flow values used to create all of the mass balance results reported in Tables 10, 11, 12 13,14,15,16,17,18,19,20,21, and 22 are not reported. It is not clear whether the full rated maximum treatment capacities of all NPDES-permitted discharges were used in the modeling. Furthermore, no information is provided regarding the wasteload allocation assumptions that were used for nearby dischargers.

To only report wasteload allocation calculations in the WQTR is of no value in analyzing potential adverse impacts of NISP on NPDES dischargers to Segments 11 and 12 (COSPCP11 and COSPCP12) of the Poudre River. To derive meaningful information regarding potential adverse impacts, three modeling tasks must be completed together. These modeling tasks are: Total Maximum Daily Load (TMDL) calculations, wasteload allocation modeling, and mass balance calculations. These modeling tools are used routinely to develop, apply, meet and enforce NPDES discharge permit limits for the key point-source dischargers that operate on the Poudre River.

With reduced flows in the River proposed by NISP, the roles of pollutant mixing, dilution, and assimilative capacity of the River become ever more critical. Allocating wastewater discharge volumes and strength (or wasteloads) between nearby dischargers on a waterway is now a tool being routinely applied by the Colorado Department of Public Health and Environment (CDPHE) to develop NPDES discharge permits. Wasteload allocation is used in addition to modeling "mass balance" calculations. The WQTR report includes mass balance results for selected parameters for just some pollutants discharged to the Cache la Poudre River. However, no wasteload allocation modeling was done. Wasteload allocation modeling should be completed and reported for all NISP alternatives to also include all key point-source NPDES dischargers to the Cache la Poudre River. Permitted dischargers include the City of Fort Collins, Boxelder Sanitation District, South Fort Collins Sanitation District, Town of Windsor, Kodak Colorado Division, and the City of Greeley. Failure to perform these modeling tasks may underestimate potential adverse impacts of NISP on these permitted dischargers and the Cache la Poudre River.

There is no mention in the WQTR of either "acute" or "chronic" total ammonia discharge limits that are common to all the NPDES discharge permits for all of the major municipal water reclamation and sanitation districts that discharge to the Poudre River. These are the same communities and sanitation districts that will bear the burdens of operating and maintaining

treatment systems to meet ever more stringent wastewater discharge limits resulting from NISP. Both acute and chronic total ammonia limits should be calculated using both the Colorado Ammonia Model (CAM) and the Colorado AMMTOX model for these key point-source dischargers under the various reduced flow regimens resulting from NISP and presented in an SDEIS and subsequent documents..

The DEIS fails to provide adequate data, modeling and analysis of these critical wastewater pollutant discharge and river water quality issues. The Corps must evaluate and address these issues and must fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard. This must be done in an SDEIS, Revised Section 404(b)(1) Analysis and subsequent documents.

Deteriorating water quality in the Poudre River resulting from NISP-caused reductions in flows would cause the development and enforcement of more stringent limits in the City's wastewater discharge permits, whether or not new "nutrient standards" (discussed below) are adopted. In turn, this would likely require the added expense of designing, operating and maintaining advanced wastewater treatment (AWT) systems at the City's two water reclamation facilities to meet the more stringent limits. In fact, the construction and operation of AWT systems in Fort Collins is already identified as a likely outcome of NISP (DEIS Section 4.5.9 Mitigation, p. 4-36).

The "nutrient standards" currently being developed by CDPHE will likely result in extreme reductions in allowed levels of pollutants such as phosphates and nitrogen that can be discharged to the River. The City and other permitted dischargers to the River are generally aware that nutrient standards are on the regulatory horizon. As a consequence, the nutrient standards and subsequent discharge regulations place AWT on the 20-year strategic planning, design, construction, operation and maintenance horizon for NPDES-permitted dischargers to the River. Current professional engineering estimates for design and construction of AWT in Fort Collins range from $75 million to $125 million (net present value), plus significant additional annual operation and maintenance costs. A 20- year planning horizon gives the City time to incorporate these projected costs into its Wastewater Utility rate structure. However, the projected river flow reductions and corresponding deterioration of Poudre River water quality resulting from NISP turn that long-term planning horizon on its head: under its proposed schedule, NISP would be on-line and nutrient standards enforced in the City's discharge permits on or shortly after 2014 – requiring massive wastewater treatment upgrades more than a dozen years sooner than would otherwise be necessary. This time squeeze would place an extreme financial burden on Fort Collins wastewater ratepayers.

2c. Summary of Regulatory Impacts to Poudre River Water Quality

Summary of Regulatory Impacts of NISP Operations on the Poudre River from the foothills through the City of Fort Collins.

Water Quality Parameter	Affected Stretch of River	Stream Standard	Current Status	Impact of NISP
pH	Poudre from Monroe Canal to Shields St.	6.5 – 9.0 pH units	Impaired; Listed on the CO 303(d) list of impaired waters	Increases in pH; further water quality impairment
Copper[d]	Poudre from Monroe Canal to Shields St.	7 µg/l (acute, dissolved) 5 µg/l (chronic, dissolved)	Impaired; Listed on the CO 303(d) list of impaired waters	Higher concentrations of Cu, further water quality impairment and impairment of aquatic life and recreational use
Water Temperature	Poudre from Monroe Canal to Shields St.	17°C (June – Sept) 9°C (Oct – May) Interim Std of 20°C[i]	Currently meets water quality standards	Increases in water temperature; further water quality impairment and impairment of aquatic life and recreational use
Aquatic Life Use	Poudre from North Fork to Shields St.	Aquatic Life Cold 2[e]	Listed on the CO Monitoring and Evaluation List	Further impairment of aquatic life use
E. coli	Poudre upstream of Boxelder Cr.	126 cfu/ 100 ml[a]	meets water quality standards	Higher concentrations ***of E. coli***, water quality impairment and impairment of water-based recreation
E. coli	Poudre downstream of Boxelder Cr to So Platte	126 cfu/ 100 ml[a]	Impaired; Listed on the 2008 CO 303(d) list of impaired waters	Higher concentrations ***of E. coli***, further water quality impairment and impairment of water-based recreation

Summary of Regulatory Impacts of NISP Operations on the Poudre River from the foothills through the City of Fort Collins (*continued*):

Water Quality Parameter	Affected Stretch of River	Stream Standard	Current Status	Impact of NISP
Selenium	Poudre downstream of Boxelder Cr to So. Platte	18.4 µg/l (acute[b]) 4.6 µg/l (chronic[c])	Impaired; Listed on the 2008 CO 303(d) list of impaired waters	Higher concentrations of Se, further water quality impairment and impairment of aquatic life use
Dissolved Oxygen	Horsetooth	6.0 mg/l 7.0 mg/l (sp[f])	Impaired; Listed on the CO 303(d) list of impaired waters	Impact unknown; NCWCD Study Group
Aquatic Life Use	Horsetooth	Aquatic Life Cold 1[g]	Impaired; listed on the Colorado 303(d) list for Mercury FCA[h]	Unknown impact on 303(d) listing or Hg

a/ Geometric mean of a representative sample set.
b/ Acute Standard means the level not to be exceeded by the concentration for either a single sample or calculated as an average of all samples collected during a one-day period.
c/ Chronic Standard means the level not to be exceeded by the concentration for either a single representative sample or calculated as an average of all samples collected during a thirty-day period.
d/ Copper water quality standards are hardness dependent; values listed assume a hardness of 50 mg/L, based on USGS data (USGS 2006) (See NISP Water Quality Technical Report).
e/ Aquatic Life Cold 2 means surface waters currently not capable of sustaining a wide variety of cold water biota, including sensitive species, due to physical habitat, flows, or water quality conditions.
f/ Sp = spawning season. Spawning criteria are to be applied on a seasonal basis where the Division determines that the habitat that will be affected by the physical mixing zone is suitable for spawning by fish species that are expected to be present.
g/ Aquatic Life Cold 1 means surface waters currently capable of sustaining a wide variety of cold water biota, including sensitive species.
h/ FCA = Fish Consumption Advisory.
i/ An interim standard of 20ºC was adopted for cold water segments in the South Platte River Basin until the June 2009 South Platte Basin Rulemaking Hearing.

3. Trichloroethylene (TCE)

DEIS Executive Summary: page ES-8
Statement: *"TCE contaminated ground water located in the vicinity of the forebay will require mitigation efforts associated with forebay construction activities."*

And;

DEIS Section: 3.23.3 Glade Reservoir Forebay, page 3-126
Statement: *"The forebay is planned to be isolated from the ground water table by installation of perimeter slurry walls keyed into unweathered bedrock."*

Comment: The Lyons Formation will be extensively exposed within the footprint of the proposed forebay. Therefore, attempting to isolate the forebay from the water table with perimeter slurry walls will not isolate it from the underlying TCE plume in water-bearing zones within the Lyons Sandstone. Furthermore, if the forebay is completely lined (sides and bottom) with an impermeable liner as described in DEIS Section 5.10, the potential for offsite movement of the trichloroethylene (TCE) plume must be evaluated. Additional seasonal monitoring and subsequent groundwater modeling is required to accurately assess the potential for groundwater interaction with and migration of the TCE plume under NISP project conditions. Potential adverse impacts of the TCE contaminated groundwater can not be adequately assessed or accurately evaluated because of this lack of monitoring and modeling. An SDEIS must be prepared that includes this information. This information is essential for the Corps to discharge its obligations under Section 230.22 of the Section 404(b)(1) Guidelines relating to the effects of a proposed permitted activity on water quality.

DEIS Section: 3.23.3.1 TCE Plume, page 3-126
Statement: *"The second water-bearing zone was encountered at an elevation depth of about 5,230 feet (~40 to 50 feet below ground surface (bgs)) in the western and northern portions of the northwest area of the proposed forebay. The second water-bearing zone was encountered at an elevation depth of 5,225 feet (~25 feet bgs) in the southeast corner of the proposed forebay at monitoring well NCWCD and at about 5,218 feet (~30 feet bgs) in the southwest corner of the proposed forebay at monitoring well 13-MW22. Ground water concentrations ranged from nondetect to 74.6 µg/L for TCE within the second water-bearing zone."*

And;

DEIS Section: 3.23.3.1 TCE Plume, page 3-126
Statement: *"The third water-bearing zone was encountered at an approximate elevation depth of 5,220 feet (~50 feet bgs) in the western portion of the northwest area of the proposed forebay. Groundwater concentrations ranged from nondetect to 42.7 µg/L for TCE within the third water-bearing zone."*

And;

DEIS Section: 3.23.3.1 TCE Plume, page 3-126
Statement: *"The second, third, and fourth water-bearing zones are semi-confined and have an upward vertical gradient."*

And;

DEIS Section: 3.23.3.1 TCE Plume, page 3-127
Statement: *"Seasonal monitoring was not performed as part of the Corps Remediation Investigation and, as a result, seasonal fluctuations in TCE concentrations and groundwater elevations have not been assessed. Based on methods reported by the Corps, ground water elevation measurements and sampling were not conducted for all wells during one sampling event. Instead, reported ground water elevations and sampling results were either conducted in December 2003, January 2004, or May 2004, and represent data collected over a range of seasonal conditions."*

And;

DEIS Section: 3.23.3.1 TCE Plume, page 3-127
Statement: *"TCE concentrations in ground water above the Colorado standard of 5 µg/L have not been detected beneath the proposed forebay within the second or third water-bearing units."*

And;

DEIS Section: 3.23.3.1 TCE Plume, page 3-127
Statement: *"Ground water from the second water-bearing unit is expected to be encountered during excavation activities within the southern half of the forebay."*

And;

DEIS Section: 3.23.3.1 TCE Plume, page 3-127
Statement: *"TCE concentrations in ground water beneath the northwest corner of the proposed forebay are anticipated to be just below the Colorado standard."*

And;

DEIS Section: 3.23.3.1 TCE Plume, page 3-127
Statement: *"Although TCE contaminated ground water above the Colorado standards is not anticipated, potential seasonal variations in TCE concentrations and ground water depth were not evaluated during the Corps' site characterization and as a result, the exact TCE concentration and depth of ground water within the proposed forebay is unknown. The proposed forebay location and depth is subject to change based on potential pilot boreholes and initial excavation activities."*

And;

DEIS Section: 4.7.2 Glade Reservoir, page 4-38
Statement: *"If seepage enters the Lyons Formation, there would be additional dilution of the already low TCE concentrations. Because seepage from the reservoir would either follow topography downstream of the dam and/or move down a structural dip in the bedrock units, the source area for the TCE plume would not likely be affected by the reservoir."*

And;

TCE Technical Memorandum – Glade Forebay, page 3
Statement: *"… the MWH design would require the forebay to be constructed to a lower depth so that the forebay will be filled by gravity…, the MWH design is currently proposed to avoid the use of a pump station."*

Comment (applies to all above Statements): The DEIS conclusion that trichloroethylene (TCE) concentrations above the Colorado standard of 5 µg/L have not been detected beneath the proposed forebay for Glade Reservoir within the second or third water-bearing units is based on very limited sampling in late 2003 and early to mid-2004. Only 3 monitoring wells were located in the area of the proposed forebay footprint itself. Significantly higher TCE concentrations (74.6 and 42.7 µg/L in the second and third water-bearing formations, respectively) were found approximately ¼ mile northwest (upgradient) from the northwest portion of the proposed forebay (ERO, November 22, 2006).

Review of the DEIS, supporting documents and technical reports does not reveal any potentiometric mapping of hydraulic heads in the water-bearing units that have been impacted by past TCE releases. Therefore, accurate delineation of ground water flow direction and rate of movement are lacking. Considering that groundwater flow in the Lyons Formation is described as upward in the area of the proposed forebay, and that the water-bearing units are semi-confined (i.e., "leaky"), the potential for future migration of TCE-contaminated groundwater, including potential offsite movement caused by project-related changes in hydraulic heads, has not been adequately assessed by the DEIS. Additional monitoring and subsequent groundwater modeling is required to accurately assess the potential for groundwater interaction with and migration of the plume under NISP project conditions. This information must be presented in an SDEIS for the project and in any subsequent documents.

Although an impermeable lining is proposed for the forebay to "*eliminate seepage losses/gains during operation of the forebay – page 5*", additional data must be gathered about the seasonality in groundwater levels and TCE concentrations. If seasonal groundwater levels are significantly higher than the forebay bottom elevation, there will be an ongoing potential for TCE to seep into the forebay, Glade Reservoir, and any connected water supply source including the Poudre River and Horsetooth Reservoir.

This situation will necessitate the treatment of the existing TCE plume(s) prior to the operation of Glade Reservoir. Treatment of TCE-contaminated aquifers is challenging and is the subject of ongoing research.

We have reviewed the "DRAFT FINAL - FEASIBILITY STUDY REPORT - F.E. WARREN AIR FORCE BASE FORMER ATLAS "E" MISSILE SITE 13, LAPORTE, COLORADO" Report prepared by the U.S. Army Corps of Engineers, Omaha District in January 2007 (the 2007 Feasibility Study Report). In this Report, page ES-2 states: "The discharge point of the regional aquifer is interpreted from groundwater flow direction to be the Cache la Poudre River located south of the site."

Simply put, not treated, TCE-contaminated groundwater will eventually reach the Poudre River. Impacts from Glade Reservoir will: (1) increase groundwater levels at the vicinity of the Reservoir, including the TCE plume area; and, (2) lower the groundwater levels near the Poudre River as the flows in the River are reduced. *The net effect will likely be to speed TCE migration into the Poudre River.* This is a significant impact to the aquatic ecosystem that would not happen but for the proposed placement of the Glade Reservoir. This impact requires detailed consideration in an SDEIS, *See* Section 230.22 of the Section 404(b)(1) Guidelines.

On Page ES-2, the 2007 Feasibility Study Report notes that the maximum detected TCE concentration was 140 µg/L. This is about twice the value listed in the August 18, 2006, ERO TCE Tech Memo (Page 2). Furthermore, both values are substantially above the Maximum Contaminant Level (MCL) of 5 µg/L for TCE. It must also be noted that the MCL Goal (MCLG) for TCE is zero. The MCLG is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals. In general, the EPA sets MCLs as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration.

The estimated groundwater velocity at 131.4 ft/year (page ES-2) is not based on pump tests as none have been performed at the site. It is well established that pump tests are the only means through which a reasonable estimate could be derived for groundwater aquifer properties and estimated velocities. Calibrated numerical models used in preparing the technical reports regarding the TCE plume and subsequently reflected in the DEIS will also suffer the same handicap as their parameters are not based on pump tests. In addition, more data are required to understand the existing seasonality in water levels and, perhaps, TCE concentrations at the site. Significant additional effort will be required to accurately monitor and evaluate the properties and movement of the groundwater TCE plume.

For risk assessment purposes, only the occupational worker and resident were identified as potential receptors of TCE. However, if the additional hydraulic gradient created by seepage from the proposed Glade reservoir results in faster groundwater migration towards the Poudre River, another important exposure pathway is thereby identified. This pathway could result in significant human and wildlife exposure to TCE and

requires extensive, detailed consideration in an SDEIS. This potential exposure pathway could prove to be significantly worse if an easier or preferential flow path is intercepted by the TCE plume toward the Poudre River.

It is noteworthy that the 2007 Feasibility Study Report states that groundwater flow is contained in the bedrock water-bearing zones and appears to be dependent on secondary porosity along fractures. Fractured flow at the site has not been reasonably characterized yet, but needs to be evaluated in light of the new possible groundwater exposure pathways due to Glade Reservoir.

The 2007 Feasibility Study Report identified five remediation alternatives for the TCE-contaminated groundwater: No Action, Monitoring and Aquifer Use Restrictions, Augmented Extraction and Treatment, Enhanced Reductive Dechlorination, and Chemical Oxidation. However, the evaluation of these alternatives was based on plume dimensions and configurations derived from groundwater modeling. As stated before, we find the data used to construct the model to be highly insufficient, especially with the possible increased hydraulic gradients due to reservoir seepage. This lack of data covers aquifer hydraulic parameters as well as the range of fluctuation over the seasons for water levels and TCE concentrations.

There are numerous potential environmental and public health risks associated with the TCE-contaminated groundwater plume located below and adjacent to the proposed forebay at the face of the Glade Reservoir dam. However, the DEIS essentially ignores all remediation proposals identified in the 2007 Feasibility Study Report. Rather than assess, evaluate, and address the contamination problem, the DEIS attempts to avoid the issue by following the tenuous path of adaptive management. However, adaptive management is a means of implementing mitigation – it is not a substitute for complete assessment and for consideration of significant impacts and how to address them..

Furthermore, the groundwater monitoring studies cited and used to develop the DEIS for the site were poorly designed and poorly executed. For example, no groundwater depths were measured at any of the monitoring wells during one sampling mission to the site. Yet seasonal real-world depth to groundwater data at the site's monitoring wells is essential to identify and then model the nature and extent of TCE contamination and plume movement in the area. No seasonal groundwater depth data were collected. No groundwater modeling craft for a project of this magnitude can withstand the burden of inadequate seasonal data; modeling forecasts become simply guesswork. Proposed steps identified in the DEIS to avoid, minimize the harm, or mitigate TCE groundwater contamination in the area are crippled by a lack of adequate monitoring data in the supporting documents used to develop the DEIS and therefore cannot be effectively evaluated at this time.

The failure of the DEIS to address this issue, including the complete failure to consider the effects of placing a large reservoir upgradient of the contamination, is a fundamental deficiency that requires an SDEIS and Revised Section 404(b)(1) Analysis.

4. NISP Operations

The following comments address a number of ways in which the DEIS is deficient due to its failure to provide sufficient information about how NISP will be operated. Without this information it is not possible to understand the potential impacts associated with NISP and for the Corps to adequately assess these impacts or address them in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments

4a. Comments on DEIS

DEIS Section: 2.3.1 Diversions from the Cache la Poudre River, page 2-25 (similar reference in DEIS Section 2.4.1.7, page 2-33 and elsewhere)
Statement: *"The proposed Glade Reservoir would also divert from the existing Munroe Canal diversion (Section 2.4.1.7)."*

Comment: The City, both as a North Poudre Irrigation Company shareholder and as a participant in the Pleasant Valley Pipeline (which diverts from the Munroe Canal), has considerable interest in how the Munroe Canal is used. Operational criteria and/or limitations need to be established that will avoid injury to any of the current users of the Munroe Canal.

DEIS Section: 2.3.3.1 Reclamation Contract Subalternative, page 2-27
Statement: *"The proposed exchange involves the annual delivery of 29,500 AF from Carter Lake to the NISP southern Participants, with equivalent replacement water to be released (1) from Glade Reservoir directly to the Poudre River to meet C-BT irrigation needs…"*

Comment: The City typically performs Colorado-Big Thompson (C-BT) exchanges with other water users in the Poudre River Basin that benefit the City. Since the District will be operating both the C-BT project and NISP, the District may impose conditions on C-BT uses that will favor the NISP/Glade exchanges over other exchanges such as those historically relied upon by the City. This additional potential impact to municipal water supplies must be assessed and addressed under the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments. Additional evaluation is needed to adequately address impacts that could be detrimental to the City and other water users in the Poudre River Basin because of the need to exchange 29,500 acre feet for use by the Southern Participants in NISP. NISP operations must avoid impacting the City's C-BT exchanges.

DEIS Section: 2.4.1.2 Participants' Ability to Purchase and Sell Participation in NISP, page 2-31
Statement: *"The ability to purchase and sell contracts in NISP would not alter the size or operation of NISP."*

Comment: Additional evaluation of the impact of transferring contracts is needed. Although transfer of NISP participation would likely not affect the way Glade Reservoir is filled, it could certainly affect the way Glade water is delivered. The delivery of NISP water from Glade Reservoir is split among Northern Participants and Southern Participants and will be performed in different ways, as discussed in DEIS Sections 2.3.3 and 2.3.4. If portions of NISP were transferred from the Northern Participants to the Southern Participants, it would require additional C-BT exchanges and/or would alter the amount of water that could be delivered through a Glade-to-Horsetooth pipeline, which could affect the water quality in Horsetooth. If portions of NISP were transferred from the Southern Participants to the Northern Participants (as those terms are defined in the DEIS), it could increase the amount of exchanges from Glade to the Munroe and into the Pleasant Valley Pipeline (PVP), reducing flows in those stretches of the River. These potential impacts need to be addressed.

DEIS Section: 2.4.1.3 Sources of Water for Initial Fill of Glade Reservoir, page 2-31 (also MEMORANDUM Northern Integrated Supply Project Environmental Impact Statement Impacts Due to Glade Reservoir Start-Up Diversions, October 16, 2007, page 7 of 15)
Statement: *"At the time of project start-up, NISP Participants will need approximately 10,000 to 15,000 AF of yield. If water is not available from the Grey Mountain water right, then other water sources could be considered by NISP Participants as interim supplies."*

Comment: These sections discuss using water rights as sources for the initial fill of Glade Reservoir other than those identified and modeled with the preferred alternative. The City has utilized some of these water sources in the past and may need to do so in the future, which may create competition for these sources. The use of these Poudre River Basin sources is not covered under the District's water rights for the NISP project. Further, the impacts of using Poudre River Basin sources (other than the NISP water rights) for this purpose have not been adequately evaluated. These potential impacts must be identified and analyzed in the SDEIS. To avoid potential impacts, Southern Participants should use Windy Gap water and/or Colorado-Big Thompson (C-BT) water rather than renting or buying water from Poudre River Basin irrigation companies (i.e., Grand River Ditch and/or Tunnel Water Company). If the use of non-NISP Poudre River Basin water rights is allowed, then appropriate limitations (such as volumetric and/or number of years) should be imposed on the use of these sources. In addition, the District must commit to a timeframe for bringing Galeton Reservoir on-line and minimize the need to use any additional start-up diversions from the Poudre River Basin.

DEIS Section: 2.4.1.4 Sources of Water for Drought Conditions, page 2-32
Statement: *"The District desires the ability to provide water to NISP in years when the annual divertible flows from the Poudre River fall below 20,000 AF."*

Comment: This section discusses using other water rights than those identified and modeled in the proposed alternative during drought years more severe than those modeled in the DEIS. The utilization of sources other than the NISP decreed flows (Grey Mountain right and the SPWCP rights and exchanges) to supply NISP participants could have a greater impact on river conditions through Fort Collins than that currently predicted and described in the analysis or these Comments. As discussed in Part IV of these Comments, the impacts from NISP to aquatic resources in and through Fort Collins are expected to be extensive and severe. In addition, to allow the utilization of NISP for non-NISP flows would open the door to the possibility of moving additional Poudre River Basin water rights (such as converted agricultural rights) through the NISP facilities and/or exchanges, and this would have an even greater impact to river conditions through Fort Collins. These potential impacts must be evaluated and factored throughout relevant sections of an SDEIS.

The District may be relying upon water provided by Poudre River Basin agricultural producers to supply water to NISP participants in the long-term, rather than relying on NISP decree water rights. To address the potential impacts associated with possible use of these Poudre River Basin sources, NISP participants must be required to reduce use, enter into dry-year leases, or acquire supplies within their own river basins. NISP must not be used to facilitate the transfer of water from Poudre River Basin agricultural lands to other basins, especially during severe drought events. Appropriate limitations must be imposed on the total amount of non-NISP decreed water that can be used via NISP facilities, both in volume and in number of years.

4b. Comments on Water Resources Technical Report (WRTR)

WRTR Section: 7.1 Summary of simulated NISP diversions, page 83
Statement: *"NISP would divert water into the primary storage facility (either Glade Reservoir or Cactus Hill Reservoir) through three pathways: …*

- *SPWCP storage exchanges with Timnath Reservoir, Big Windsor Reservoir, and Terry Lake."*

Comment: The use of Terry Lake, Big Windsor Reservoir, and Timnath Reservoir to perform SPWCP exchanges needs to be described in more detail. According to State of Colorado Water Diversion reports, these reservoirs typically fill during the winter months. However, Tables 22, 23, and 24 of the WRTR show that the majority of SPWCP exchanges into Glade Reservoir that are associated with these reservoirs occur primarily in April, May, and June. The impacts related to these exchanges, which could potentially be negative or positive, cannot be evaluated due to a lack of adequate information. An SDEIS must be prepared to analyze and consider these impacts.

5. Cumulative Effects

5a. Comments on DEIS

DEIS Section: 4.28.2.1 Water –Based Actions page, page 4-98 (also WRTR Section 8.1.6 Conclusions regarding HSWMP cumulative effects, page 156)
Statement: *"Based on the currently available information for the HSWMPs, it is not possible to accurately determine the effects to Poudre River flows associated with the transfer and/or exchange of irrigation water from existing ditch headgates to the new proposed HSWMPs storage facilities. As a result of the transfer of nearly 36,000 AF of agricultural water, it is likely that there will be substantial changes in flow on the Poudre River between the points of diversion for the HSWMPs and the current points of diversion."*

Comment: In order to appropriately assess impacts to the stream system, including the cumulative effects of the Halligan-Seaman Water Management Project (HSWMP), there should be more definitive modeling done which includes all reasonably foreseeable actions. The City has recently been working with the Corps of Engineers on the permitting process for the HSWMP. The Corps should incorporate new modeling efforts for the HSWMP into the cumulative effects analysis for NISP. More accurate modeling results are essential to properly define and distribute mitigation requirements between the various projects under consideration in the Poudre Basin. For example, the later part of this statement implies that the HSWMP might deplete the River by up to 36,000 acre feet, since that is the estimated increase in firm yield needed by its participants. Unlike NISP, the HSWMP depletions to the River are not highly correlated with the increased firm yield of the project. Thus, HSWMP will result in much smaller reductions in flow in the affected River stretches since the use of the proposed reservoir enlargements allows additional use of other sources controlled by the HSWMP participants (such as Colorado-Big Thompson (C-BT) units). In addition, much of the converted agricultural water rights can be used by HSWMP participants directly without the reservoir enlargements. The storage of some of these rights allows the water to be used more efficiently, particularly during drought periods. These considerations as evidenced by additional modeling should be discussed in this section in an SDEIS, to more accurately describe the cumulative impacts of NISP given the projected operations of the HSWMP. Failure to use this more accurate approach would deny decision makers critical information and violate both NEPA and Section 404.

DEIS Section: 4.28.3.1 Actions Not Considered Reasonably Foreseeable (Water-Based Activities - Water Rights Acquisition and Transfer), page 4-106
Statement: *"Water rights transfers from agricultural to municipal and industrial uses in the South Platte River and the Cache la Poudre River watersheds are likely. The transfers and timing of the transfers that would take place are impossible to predict, as they would take place in the free market."*

Comment: The viability of the South Platte Water Conservation Project (SPWCP) exchanges relies on the Larimer and Weld and the New Cache companies' water rights

remaining within those two irrigation systems. If enough water in those systems is transferred out of the ditches, this would seriously affect the District's ability to deliver sufficient water to Glade Reservoir. The transfer of shares from these systems to municipal uses should be considered a foreseeable action and an SDEIS must address how water would be delivered from Galeton to Glade in the event that the SPWCP exchanges cannot be implemented due to these transfers. Alternatively, the District must produce contracts and conservation easements to support the position that the SPWCP exchanges will remain a viable means of delivering water to NISP. The NISP project should not be used to facilitate the transfer of water from Poudre River Basin agricultural lands to other basins.

5b. Comments on the Water Resources Technical Report (WRTR)

WRTR Section: 8.1.2.2 Proposed agricultural transfers for storage in Halligan, pages 144 and 146
Statement: *"For example, the combined June flow rate limitation in any single year is 139.09 cfs. Figure 8 shows that average monthly synthesized natural flows at the Canyon Mouth exceed 1,800 cfs in June. This suggests that diversion of Fort Collins' South Side Ditch water at the Halligan and/or Seaman alternate places of storage could have the effect of reducing native flows in the Poudre River reach that includes the Canyon Mouth by over 7.5 percent."*

And;

Statement: *"If the same average annual diversion (14,169 AF) is assumed from the 80CW103 decree, Fort Collins' average annual allotment of PVLC water would be approximately 10,910 AF."*

Comment: These statements overstate the amount of water that the City can move to Halligan (and/or Seaman) Reservoir. These values do not include considerations for ditch losses and the use of these water rights to meet raw water needs within the City. In addition, the City's use of these rights has been and will continue to be made without the Halligan-Seaman Water Management Project (HSWMP) reservoir enlargements. For the water that is stored, the HSWMP will allow these rights to be used more efficiently. These considerations must be addressed in an SDEIS in order to more accurately describe the cumulative effects of the HSWMP.

6. References for Part III

1. Source Water and Drinking Water Treatment

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Loftis, J. and J. Moore, 2007a. Retrospective Analysis of Upper Cache la Poudre River Water Quality 1988-2006. Prepared for City of Fort Collins Utilities, CO: 136 p.

Loftis, J. and J. Moore, 2007b. Retrospective Analysis of Upper Cache la Poudre River and North Fork Water Quality 2000-2006. Prepared for City of Greeley, CO: 100 p.

2. Water Quality Impacts to the Cache la Poudre River

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3. Trichloroethylene (TCE)

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Part IV - Environmental Impacts

1. Natural Resources General Comments

The City owns 19 Natural Areas comprising 1,423 acres, four parks and over 27 miles of trail associated with the Cache la Poudre River. These facilities have an estimated value of well over $30 million. In addition, the City has made substantial investments in, and bears significant responsibilities for, the planning and management of the Poudre River floodplain and related stormwater matters. In addition, the City's center and Downtown redevelopment efforts are built upon a healthy and sound Poudre River flowing through the heart of Fort Collins. Thus, the City has a substantial interest in the environmental consequences of the proposed action (*See* Table at the end of this Section IV.1 and Table in Section V.1a of these Comments).

Both the DEIS and Vegetation Technical Report acknowledge certain riparian areas to be sensitive through Fort Collins. (Figure 3-14 of the DEIS lists several of Fort Collins' Natural Areas as "Sensitive Riparian Areas along the Poudre River. These include: #3 Butterfly Woods, #4 North Shield Pond, Magpie Meander, McMurry, Salyer, Lee Martinez, Rivers Edge; #5 Williams, Springer; and #6 Cattail Chorus and Riverbend Ponds). These areas were acquired by the City to protect their ecological, recreational, social, aesthetic and economic values in perpetuity for the benefit of the citizens of Fort Collins. For these reasons, these areas qualify for review and protection under Sections 230.40, 230.51, 230.52 and 230.54 of the Section 404(b)(1) Guidelines. The riparian corridor provides ecological services such as flood control, river bank stability, filtration of nutrients and contaminants from agricultural and urban runoff, and critical wildlife habitat within a semi-arid landscape.

Under Clean Water Act Section 404(b), the potential adverse impacts to City Natural Areas must be carefully evaluated to ensure that the integrity of the natural values and "ecological services" of these areas are maintained or improved. *See* 73 Fed. Reg. 19,594 (April 10, 2008). *See e.g.*, Sections 230.40, 230.51, 230.52 and 230.54 of the Section 404(b)(1) Guidelines. The DEIS fails to fully analyze the adverse effects to the natural environment of the Poudre River, and the related impacts to City Natural Areas and other facilities in the vicinity of the River.

The Corps must evaluate and address the adverse impacts from the substantial reductions in flow from NISP and must fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard. This must be done in an SDEIS, Revised Section 404(b)(1) Analysis and subsequent documents.

It is important to note that three Natural Areas (McMurry Natural Area, Cattail Chorus Natural Area, and Running Deer Natural Area), are encumbered by legally-binding conservation easements held by Legacy Land Trust for the State Board of the Great Outdoors Colorado Trust Fund. These legally-binding documents require the City of Fort Collins "*to prevent the significant impairment or interference with conservation values*" which include natural habitat, open space and scenic values of these properties. The City

is legally bound to the citizens and to the State of Colorado to preserve and protect the conservation values of these properties.

With respect to mitigation, the adaptive management approach suggested in the DEIS is inadequate. As proposed in the DEIS, the adaptive management approach generally results in segmentation of the review and analysis of the impacts from NISP, rather than a meaningful and recognizable mitigation strategy. An adaptive management program must first be based on a detailed mitigation plan.

Development of a detailed mitigation plan would need to fully involve the City and other stakeholders and should follow the process developed by The Nature Conservancy and the Army Corps of Engineers and outlined in Richter et al. (2006) and would include and address the following:

- A series of workshops attended by stakeholders to determine an environmental flow plan similar to that described by Richter et al. (2006). An environmental flow plan should be pursued that is based on the best available science developed by river scientists, water managers, and other important stakeholders.
- The magnitude, frequency and duration of flows required for maintaining each specific element of river health should be determined. The key elements include (but are not limited to); river morphology and sediment transport, water quality, fisheries and aquatic biota, recharge of alluvial water table, overbank flooding of specific riparian areas.
- A commitment with binding, enforceable assurances from the Corps and project proponent on the long-term funding, monitoring, and maintenance to meet desired outcomes.
- A commitment to maintain recreation flows as related to the city's substantial recreation and economic interests.

Finally, although each of the mitigation measures proposed (including management of in-channel and riparian vegetation, installation of in-stream structures to control sediment movement, and flow regulation/exchanges, etc.) may be useful and promote desired effects, they will not reduce the impacts of the proposed project to the level of non-significance. The mitigation measures are localized, whereas the potential impacts from the proposed action are systemic. To further reduce the annual peak flows that structure and maintain all aspects of the river system implicates several Section 404(b)(1) Guidelines criteria that have not been addressed in the DEIS. The City is not aware of any way to reduce this to a level of non-significance or to satisfy Section 404(b)(1) based on the current record.

City of Fort Collins Natural Areas along the Poudre River.

Property	Site Acres	Total Cost	Year of purchase	Management Purpose	Miles of Trail	Recreational Uses	Impact by NISP
Arapaho Bend	278	$ 1,601,240	1995	Natural area	2	walk, wildlife, bike, equestrian, dogs, fishing, boating	Fishing, boating, aesthetics, possible wildlife impacts
Butterfly Woods	24	$ 191,208	1996	Natural area	0.4	walk, wildlife, bike, equestrain, dogs, handicap accessible	Fishing, boating, aesthetics, possible wildlife impacts
Cattail Chorus	40	$ 589,901	1997	Natural area	0.25	walk, wildlife, bike, dogs, handicap accessible	Fishing, boating, aesthetics, possible wildlife impacts
Cottonwood Hollow	93	$ 255,241	1995	Natural area	0.4	walk, wildlife viewing	Fishing, boating, aesthetics, possible wildlife impacts
Gustav Swanson	12	$ 18,735	1955	Natural area	0.3	walk, wildlife, bike, dogs, handicap accessible, fishing, boating	Fishing, boating, aesthetics, possible wildlife impacts
Kingfisher Point	134	$ 1,214,691	1997	Natural area	0.8	walk, wildlife, bike, equestrian, dogs, handicap accessible, fishing, boating	Fishing, boating, aesthetics, possible wildlife impacts
Magpie Meander	11	$ 62,878	1995	Natural area	0.2	walk, wildlife, dogs, handicap accessible, fishing	Fishing, boating, aesthetics, possible wildlife impacts
McMurry	45	$ 249,905	1998	Natural area	1.5	walk, wildlife, bike, equestrian, dogs, fishing, boating	Fishing, boating, aesthetics, possible wildlife impacts
North Shields Pond	10	$ -	1962	Natural area	0.6	walk, wildlife, bike, equestrian, dogs, handicap accessible, fishing, boating	Fishing, boating, aesthetics, possible wildlife impacts
Nix	34	$ 762,125	1979	Natural area	0.3	walk, wildlife, bike, equestrain, dogs, handicap accessible	Fishing, boating, aesthetics, possible wildlife impacts
Prospect Ponds	25	$ -	1974	Stormwater / Natural area	1.3	walk, wildlife, bike, equestrian, dogs, handicap accessible, fishing, boating	Fishing, boating, aesthetics, possible wildlife impacts
Riverbend Ponds	223	$ 259,861	1977	Natural area	4	walk, wildlife, bike, equestrian, dogs, handicap accessible, fishing, boating	Fishing, boating, aesthetics, possible wildlife impacts
River's Edge	8	$ 31,810	1994	Natural area	0.1	walk, wildlife, bike, equestiran, dogs	Fishing, boating, aesthetics, possible wildlife impacts
Running Deer	370	$ 2,850,449	1998	Natural area	2.4	walk, wildlife, handicap accessible	Fishing, boating, aesthetics, possible wildlife impacts
Salyer	24	$ -	1985	Natural area	0.6	walk, wildlife, bike, equestrian, dogs, fishing	Fishing, boating, aesthetics, possible wildlife impacts
Springer	24	$ 10	1990	Natural area	0.5	walk, wildlife, bike, equestrian, dogs, fishing	Fishing, boating, aesthetics, possible wildlife impacts
Sterling	44	$ 1	2007	Natural area	1	walk, wildlife, bike, equestrian, dogs, fishing, boating	Fishing, boating, aesthetics, possible wildlife impacts
Udall	25	$ 335,592	1994	Stormwater/ Natural area	0	not open to public	Fishing, boating, aesthetics, possible wildlife impacts
Williams	1	$ -	1990	Natural area	0.1	walk, wildlife, bike, equestrian, dogs, handicap accessible	Fishing, boating, aesthetics, possible wildlife impacts

2. River Morphology

2a. General Comments

The impacts to stream morphology are identified in the DEIS as:

- channel narrowing
- greater sediment deposition and less sediment flushing
- vegetation encroachment into the channel
- increase in size of in-channel islands
- flow obstruction and flooding
- reducing scouring and channel rejuvenation
- bank erosion

Among the shortcomings of the DEIS geomorphic analysis is a lack of any serious discussion regarding the potential for decreased flood conveyance capacity and increased flood depths associated with channel aggradation, narrowing, and vegetation encroachment in the City of Fort Collins segment. Although Alternative 2 is very likely to increase vegetation encroachment and reduce channel conveyance capacity in the absence of periodic channel maintenance flows, it would not reduce the magnitude of the most extreme flow events delivered to the Fort Collins river segment (e.g., exceedance p = 0.01-0.02 in the annual maximum series). This is a point that must be addressed with regard to public safety and as well as potential costs to the City.

Additional impacts not specifically discussed in the DEIS include

1. Fining of bed sediment and lack of scouring of coarse, immobile sediment;
2. loss of channel complexity;
3. Potential for a threshold in-channel response to altered flows.

At the heart of these three additional impacts is the central role of seasonal snowmelt floods in structuring and maintaining the type of cobble- to boulder-bed, pool-riffle channels represented by the Poudre River between the canyon mouth and Interstate 25. This portion of the Poudre is subject to rainfall-generated flash floods that generate tremendous hydraulic forces and strongly influence channel planform, bedforms, and the diversity of aquatic and riparian habitat. These storms have a recurrence interval of decades to centuries (Shroba et al., 1979; Jarrett, 1989; Grimm et al., 1995). Although they recur infrequently with respect to the lifespan of most aquatic and riparian organisms, the very large rainfall floods set the large-scale physical template of the river system (Shroba et al., 1979), as explained in the DEIS.

In addition to potential decreased flood conveyance and increased flood depths, sediment deposition can change the size distribution of bed sediment. Reduced flows can result in a shift toward finer grained bed sediment that can alter periphyton and macroinvertebrate communities and spawning habitat for fish. Reduced flows can also fail to mobilize sand and gravel size sediment. Under larger, more natural snowmelt peak flows, sand and gravel in transport scours or abrades periphyton from larger, relatively stable cobbles and boulders. The absence of this annual scouring can change periphyton and macroinvertebrate communities (Bunn and Arthington, 2002).

Working on a portion of the Poudre River above Boxelder Creek and just downstream from Fort Collins, Milhous (2007) identified a threshold discharge of 2,050 cfs as necessary to flush sand and finer sediment from the streambed. While this study did not measure or model the duration required for 2,050 cubic feet per second (cfs) to flush sand and sediment, a span of seven days has been estimated by the author of the study (Milhous, 2008). Under the present conditions of regulated flow on the Poudre River, such flushing has occurred during 12 of the past 32 years, with no flow reaching this threshold during the past 7 years (Milhous, 2007). The changes in flow along this portion of the Poudre that are proposed as part of NISP would further reduce the frequency and magnitude of flows capable of flushing sand and fine sediment from the streambed. The frequency of flows above 2,050 cfs under NISP conditions is not known since stream stage was modeled at a monthly time-step. The Spells analysis developed in the River Morphology and Sediment Transport Technical Report provides some daily flow data, however, the results do not indicate the frequency of flows at 2,050 cfs.

The loss of channel complexity refers to reduced physical diversity in the form of bedform sequences (e.g., pools and riffles), secondary or overflow channels, and irregularities in the channel margin that typically result in enhanced age and species diversity of riparian vegetation (Poff et al., 1997). Annual flood peaks of varying magnitude, at least some of which are capable of mobilizing gravel- to cobble-size material, are critical to maintaining channel complexity (Stanford et al., 1996; Poff et al., 1997; Hohensinner et al., 2004). When this complexity is reduced, age and species diversity of aquatic and riparian communities declines (Poff et al., 1997; Galat and Lipkin, 2000; Baron et al., 2002; Bunn and Arthington, 2002). Statements such as that on page 4-30 of the DEIS, "… *this reach is well armored and is stable except during very large flood flows,*" although correct, overlook the importance of annual floods that do not necessarily mobilize the coarsest bed sediment but do produce bed scouring and maintain or enhance channel complexity.

Similarly, statements such as those on page 4-32 of the DEIS *("Impacts from NISP would likely be progressive rather than sudden, could occur over decades, and may be small compared to changes that are already occurring"*) and page 5-15 of the DEIS *("… the response of and changes to the Poudre River associated with the action alternatives are anticipated to be less than the historical morphologic changes that have occurred and continue to occur"*) ignore the possibility of non-linear change in the Poudre River in response to reduced flows. Complex systems, including physical and ecological processes in rivers, are inherently non-linear (Stanford et al. 1996; Ward et al., 2001). Numerous investigators have demonstrated that rivers commonly exhibit complex responses to single external changes such as reduced flow or sediment supply (Schumm, 1974; Merritt and Wohl, 2003).

The DEIS makes no mention of the possibility that further reducing the critically important annual snowmelt peak could cause the Poudre River in the study area to cross a threshold and respond in a non-linear manner that would result in much greater loss of channel complexity and physical and ecological function. Although it is appropriate to start with the simplest scenario and assume continued linear change in a river as annual peak flow is progressively reduced, the potential significant adverse impacts that could result from crossing a geomorphic threshold must be addressed in an SDEIS.

Due to the failure to address critical issues regarding sedimentation and river morphology, the DEIS fails to comply with its obligations under both NEPA and the Section 404(b)(1) Guidelines. *See e.g.*, Section 404(b)(1) Guidelines §§ 230.20 (substrate), 230.23 current patterns), 230.24 (normal water fluctuations), and 230.45 (riffle and pool complexes). These issues must be adequately addressed in an SDEIS.

2b. Specific Comments on DEIS

DEIS Section 1.9.1 Key Issues Identified for Analysis in the EIS, page 1-48
Statement: *"This section identifies the significant issues to be addressed in the EIS. During scoping, comments were submitted, then categorized into several specific areas (ERO 2005a). Based on the issues and recommendations identified in the scoping comments, as well as guidance from NEPA, the following general categories of significant issues will be the focus of the EIS:*

1. Surface Water
2. Stream Morphology
3. Water Quality
4. Water Rights
5. Ground Water
6. Geology
7. Soils
8. Vegetation
9. Noxious Weeds
10. Wetlands and Other Waters
11. Riparian Resources
12. Wildlife
13. Fish and Other Aquatic Life
14. Species of Concern
15. Recreation Resources
16. Cultural Resources
17. Aesthetics and Visual Quality
18. Traffic and Transportation
19. Land Use
20. Socioeconomic Resources
21. Hazardous Sites
22. Noise
23. Air Quality
24. Energy

Comment: The deposition of fine sediments as a result of significantly reduced peak flows is cause for concern under any of the action alternatives. The Scoping Report identified sedimentation as a *"major category"* related to comments received. Sedimentation is a major issue for 404(b)(1) analysis, specifically particulate deposition (see Part 230.21(b)) and changes in current patterns and water circulation related to deposition of suspended particulates (Part 230.23). However, sedimentation was not directly called out in the above list of "significant issues" for the DEIS, but rather was incompletely incorporated into other categories, most notably stream morphology, aquatic habitat and vegetation encroachment. Given the importance of sedimentation in scoping and the Guidelines, this topic should have been directly addressed as an independent topic. Regardless, the Section 404(b)(1) Analysis (Appendix D) does not adequately address this issue**.**

DEIS Section 3.4 Stream Morphology, page 3-22
Statement: *"Most of the Poudre River in the study area is slightly entrenched. The Fort Collins, Greeley Channelized and Greeley Downstream reaches have been channelized due to past human activities such as gravel mining and levee construction, which has resulted in entrenchment of the channel. These areas are unstable, continually working toward the reestablishment of functional floodplains inside the confines of a continually widening channel."*

Comment: First, this statement is partly contradicted by the next paragraph on the same page which states that: *"The streambed through the Laporte and Fort Collins reaches is armored and will remain stable during all but large flood events. During large floods, some channel adjustment would be expected and the armor layer could be disturbed or breached in places, resulting in some instability and bank erosion."* Such contradictory statements in the DEIS make it difficult to understand whether this channel is considered stable or unstable.

Second, the statement that the Fort Collins Reach of the River (defined in the DEIS as the reach extending from the Larimer and Weld Canal to the Fort Collins Wastewater Treatment Plant #2) is unstable and that the channel is continuing to widen is unsupported and is based on the unreliable Rosgen methodology for stream classification. These statements are from the Level 1 Classification Results on page 2.14 of the River Morphology and Sediment Transport Technical Report (ACE, 2008) (RMSTTR), which states that: *"The bankfull width was taken from hydraulic models of top width at "bankfull" flow in the Poudre River…This range encompasses values for both stream types "C" and "F". The bias in the range is toward stream type "C"…The difference between type "C" and type "F" channels is essentially the level of entrenchment, which can be difficult to visually discern in marginal channels (i.e., those stream channels that may be transitioning from one stream type to another)…Entrenched type "F" channels are characteristically unstable and continually work towards the re-establishment of functional floodplains inside the confines of a continually widening channel, which eventually results in the re-establishment of a type "C" stream. This appears to be the case along much of the Fort Collins, Greeley Channelized and Greeley Downstream reaches."*

Roper et al. (2008) has shown that there can be considerable variation in determining Rosgen stream types because of major discrepancies in the determination of bankfull depth which can lead to potentially large differences in determination of flood prone width and consequent values of entrenchment. In addition, Rosgen found that "…the Rosgen method can yield nonunique solutions (multiple channel types), with no clear guidance for resolving these situations" and found that "…some assigned stream types did not match the appearance of the evaluated stream." Based on current conditions, this appears to be the case for the Fort Collins Reach. Existing conditions in this reach, which include extensive bank revetment in many areas, stable banks in the unrevetted areas, and confinement through man-made and bedrock controls in other areas, indicate that the River is "locked in place" and is no longer adjusting laterally. Existing conditions also indicate that the River has developed or re-established an inset floodplain in places. This demonstrates that the DEIS has not accurately characterized the Fort Collins Reach, undermining the analyses of stream morphology in the DEIS.

Finally, the classification of the Fort Collins Reach in the DEIS as being unstable and continuing to widen is also based on the Level II Classification Results on page 2.14 of the River Morphology and Sediment Transport Technical Report which states that: *"The "reference reach" approach was not utilized in the Level II effort, as the purpose is to classify the channel as it currently exists. Channel cross sections were identified that were considered representative of the conditions that were present within each study reach."* However, the description for the Fort Collins Reach from the RMSTTR, in contrast, states on page 2.21 that: "*The combined effect of the natural transitional location and the range of anthropogenic impacts is a highly variable river character in this reach. Channel geometry varies significantly from station to station as is evidenced by the wide variability in bankfull flow characteristics."* Yet, the DEIS characterizes this highly variable reach with 2 cross sections that are supposed to be "representative" of the reach.

Since the Fort Collins Reach is not accurately characterized by the DEIS, then it must be concluded that the DEIS analyses of the impacts of the project on stream morphology and sediment transport/deposition are flawed and inadequate.

DEIS Section 4.2.1.2 Stream Morphology, page 4-8
Statement: *"From the canyon mouth to Fort Collins, the action alternatives would be expected to increase bed and bank stability, but episodic erosion would still occur in response to large flood events. Some channel contraction would be expected in deposition zones."*

Comment: The DEIS does not accurately portray the severity of the impacts on the stream morphology of the Poudre River through Fort Collins. The DEIS discussion regarding this reach focuses on increased channel stability resulting from reduced stream flow. This same conclusion is found in discussion of the effects of the alternatives by resource, in Section 4.4.2.2, Stream Morphology, Fort Collins Reach (DEIS page 4-30). The DEIS primarily relies on the River Morphology and Sediment Transport Technical

Report (Corps, 2008) (RMSTTR) for this conclusion (e.g. see page 4-14 of the RMSTTR).

However, there are many potential adverse impacts to the channel from the significantly reduced flow that are not properly identified or analyzed in the DEIS. The Biological Assessment provided as Appendix B to the DEIS (BA) correctly identified potential adverse impacts stating *"…potential changes include channel narrowing, greater sediment deposition and less sediment flushing, vegetation encroachment into the channel, increase in the size of the in-channel islands, flow obstruction and bank erosion."* (BA, page 29). These concerns are repeated on page 34 of the BA in a discussion of the Poudre River upstream of Interstate 25.

The presentation of potential impacts in the DEIS is also not consistent with the field observations described in the RMSTTR. On page 2.21 of the RMSTTR, based on field observations, it is concluded that throughout the Fort Collins Reach: *"Deposition of fine sediments and subsequent growth of stabilizing vegetation on the channel margins and bars is a common process…"* Specifically, upstream of Shields they observe that *"Bed material is typically cobbles overlain by a veneer of fine sediment…"* From Shields to College the RMSTTR observes: *"…fine material continues to deposit and supports vegetation on channel margins and mid-channel bars*." Finally, below College RMSTTR observes: *"…deposits of fine material support encroaching vegetation…"*

Adding to the confusion, DEIS Table 4-20 (page 4-120), Summary of Estimated Effects for the Alternatives, seems to highlight the BA conclusions, not the DEIS conclusions. Under item 2, Stream Morphology, Table 4-20 indicates that the impacts of reduced peak season flows include channel narrowing, greater sediment deposition and less sediment flushing, vegetation encroachment, larger in-channel islands, flow obstruction, flooding and bank erosion. Yet DEIS Table 4-1 (page 4-4) states that these *"effects would be greatest below Fort Collins to above Greeley"* even though the greatest impact of the project on average monthly flows (e.g., 71% reduction in May for average year) will be in the Fort Collins Reach (see DEIS Table 4-2, pg. 4-5).

The increased deposition of fine sediments under the action alternatives was also not properly addressed in the Section 404(b)(1) Analysis. The Guidelines require that this issue be addressed. *See* Sections 230.21 and 230.24. The DEIS considers only potential changes in suspended sediment concentrations, and not issues related to particulate deposition (DEIS Appendix D, pgs. D-3 and D-4). The Guidelines also address sediment deposition related to changes in current patterns and water circulation. *See* Section 230.23. However, the Section 404(B)(1) Analysis related to this section of the Guidelines does not include any discussion of sediment deposition issues in the Poudre River (DEIS pgs D-11 to D12).

Finally, the Guidelines require addressing changes to riffle and pool complexes (*see* Section 230.45), and cite loss of value related to sedimentation induced through hydrologic modification that can clog riffle and pool areas and destroy habitats. The Section 404(B)(1) Analysis in the DEIS incorrectly concludes, based on a reference to the

RMSTTR, that the *"Impacts to riffle and pool complexes are expected to be minor"* (DEIS Appendix D, pg. D-19). As discussed throughout this section of the Comments, the overwhelming weight of evidence suggests that there will be significant impacts associated with increased sedimentation from NISP that would have serious impacts on riffle and pool complexes - - diminishing some and eliminating many.

The potential adverse impacts related to increased sedimentation of the channel through Fort Collins, as identified in the BA, are of great concern, and the discrepancy between the BA and the DEIS/RMSTTR regarding the range and severity of potential impacts must be resolved in an SDEIS. A Revised Section 404(B)(1) Analysis must also properly analyze the sediment deposition issue in the Poudre River.

DEIS Section 4.2.1.2 Stream Morphology, page 4-9
Statement: *"The most significant impacts of the action alternatives on stream morphology and sediment transport would be expected to occur between Fort Collins and Greeley. The existing process of channel contraction via sediment deposition and vegetation encroachment would be expected to accelerate."*

Comment: This same conclusion is found in the River Morphology and Sediment Transport Technical Report (Corps, 2008) (RMSTTR) on page 4.14, specifically: *"Through Fort Collins and upstream to the canyon, the Project is expected to increase bed and bank stability…"* However, the analysis completed for the RMSTTR does not support this conclusion. For example, the "Spells Analysis" found that the number of significant overbank flows at two stations in the Fort Collins Reach goes from 4 or 5 under baseline conditions to zero with the project, and concludes that this will influence colonization of vegetation and sediment movement and morphology of the channel (RMSTTR, pg. 4.6). The discussion further points out that the longer time between scouring events and the shorter duration of those events will promote vegetation encroachment. This suggests that the Fort Collins reach will also experience widespread deposition and vegetation encroachment, a finding which is more consistent with the field observations reported on page 2.21 of the RMSTTR.

Similarly, the stream power frequency analysis found that the biggest difference in stream power distribution between baseline and project conditions is actually upstream of Fort Collins in the Laporte Reach. Between 2,800 and 800 cubic feet per second (cfs) there is a 48% reduction in flow energy to do work such as moving bed sediments, eroding banks, cleaning out pools, and controlling vegetation (RMSTTR, pgs. 4.6-4.7). This discussion goes on to say that a similar impact will occur in the Fort Collins and Timnath Reaches, but the effect progressively decreases in the downstream direction. The discussion on page 4.8 concludes that the stream power results *"…represent significant decreases in available flow energy, sufficient to lead to noticeable changes in sediment accumulation, reduced scouring of pools, increased vegetative encroachment and decreased bank erosion."* This analysis also seems to suggest more significant changes will occur in the Fort Collins Reach and upstream, rather than the other way round.

The conclusions regarding potential stream morphology impacts in the Fort Collins Reach need to be revised in light of the supporting analysis that was completed. Based on the technical analysis completed for the DEIS, major changes to the channel through Fort Collins (with regard to fine grained sedimentation and vegetation encroachment) would result from the action alternatives. This is a great concern to the City of Fort Collins. As previously discussed, the 404(B)(1) Analysis does not adequately address the sediment deposition issue in the Poudre River under project conditions with regard to Sections 230.20 (substrate), 230.23 current patterns), 230.24 (normal water fluctuations), and 230.45 (riffle and pool complexes). The Corps must evaluate and address the sediment deposition issue and fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard.

DEIS Section 4.4.2 Stream Morphology – Cache la Poudre River, page 4-30
Statement: *"The overall effect of the action alternatives throughout the study area would be that morphologic and sediment transport processes that depend on moderately high flows would become less dominant."*

Comment: It is well established in the scientific literature that western rivers are not only dependent on large flood events, but are equally dependent on the pulse of annual peak flows for maintaining physical and ecological diversity. The Poudre River is not exceptional in this regard.

Although snowmelt floods are of lower magnitude and generate less hydraulic force per unit area of the channel than rainfall flash floods (Jarrett, 1989), these floods occur every year at differing magnitudes and transport the majority of sediment moved each year, govern the annual pattern of floodplain inundation, deposition and erosion, maintain the bedform sequence and grain-size distribution of the bed sediment, and control the movement of aquatic and riparian organisms and propagules longitudinally and laterally within the river system (Andrews, 1984; Andrews and Erman, 1986; Merritt and Wohl, 2006; Rathburn et al., in press). An assumption underlying much of the DEIS seems to be that, because the River in the study area has coarse bed sediment that is not mobilized annually, infrequent rainfall flash floods not affected by NISP or other flow regulation projects will maintain channel complexity and function. Past changes along the Poudre River in the study area and changes along other, similar river systems, however, indicate that further reducing the annual peak flow will reduce channel complexity and function in a manner that is not adequately recognized by the piecemeal list of expected impacts in the DEIS.

The City has a vested interest in maintaining a healthy and functional river system which retains an open channel capable of transporting flood flows. The process of sediment deposition without the process of sediment flushing through scouring and erosion will lead to vegetation encroachment and subsequent channel constriction. These changes will significantly change the River's function as a conveyor of flood water and result in

flow obstruction, increased flood stages and possibly greater flood damage in the future. The DEIS and 404(b)(1) Analysis are inadequate in their treatment of this issue.

DEIS Section 4.4.2.2 Fort Collins Reach
General Comment: Secondary impacts (modification) from NISP related to channel contraction and reduced capacity could significantly impact how the City manages the Poudre's floodplain and related stormwater protection.

DEIS Section 4.4.2.2 Fort Collins Reach, page 4-30
Statement: *"In these depositional areas such as upstream of Mulberry St, acceleration in channel contraction would be expected and channel capacity reduced."*

Comment: Flood control and stormwater management has been a significant issue since the settlement of Fort Collins. In modern times, the City has experienced a number of flood events (1983, 1997, 1999, etc.) and over the last twenty plus years, the City has adopted a stormwater master plan for the Poudre River (Ayres, 2001) and has invested over $3 million on river stormwater modeling, planning, and construction of flood protection projects. For example, levees to protect the City's Drake Water Reclamation Facility (DWRF) and the residences in the Buckingham neighborhood have been constructed. The river bank has been stabilized in a number of locations through town. Furthermore, the acquisition and relocation of structures from the floodplain have also taken place. With the potential for increased base flood elevations due to sedimentation, these flood protection structures may become inadequate and the properties they are protecting would be at risk of loss and destruction again. The DEIS ignores this vital issue of public safety.

The floodplain along the Poudre River is federally designated by the Federal Emergency Management Agency (FEMA) (Larimer County Flood Insurance Study, 2006). This Flood Insurance Study establishes flood elevations and floodplain limits which are used to administer the floodplain. Channel contraction and vegetation encroachment from NISP would likely have significant adverse effects on base flood elevations (BFEs) and the resulting extent of flood inundations during large recurrence interval floods such as, the 100- and 500-year flood events. Reduced channel conveyance in the Poudre River would likely increase BFEs through the City. In turn, this would widen the limits of the floodplain and potentially add structures and properties into the floodplain and /or floodway that were not previously at risk of flooding. Addition of any new structures or properties to the floodplain would deviate from the City's goal of promoting the public health, safety and general welfare by minimizing future public and private flood losses. Flood risks could affect property values and business relocations, and, therefore, tax revenues. As remapping of the floodplain occurs, additional properties included in the floodplain by FEMA will be subject to the City's floodplain regulations and the mandatory flood insurance purchase requirements of the National Flood Insurance Program. The DEIS does not adequately address these impacts, or the related costs or cumulative adverse impacts to the City.

If the capacity of the Poudre River channel to convey floodwater is materially reduced, new river modeling, planning and prevention measures would need to be put in place to ensure the safety of the citizens of Fort Collins. Unless addressed in the DEIS, subsequent costs of designing, constructing and maintaining additional flood protection facilities or modifying existing structures would be borne by the citizens of Fort Collins. Additional multi-million dollar investments may be necessary. The DEIS does not adequately address these potential cumulative adverse impacts and the related costs to the City of Fort Collins and its Stormwater Utility rate payers, and is particularly deficient in meeting the criteria of Section 230.10(c)(1) and Section 230.11(b) promulgated under Section 404(b)(1).

DEIS Section 4.4.2.5 Summary of Effects to the Cache la Poudre River, page 4-31
Statement: *"Some channel contraction would be expected in depositional zones. The most significant impacts of the action alternatives on stream morphology and sediment transport would be expected to occur between Fort Collins and Greeley. The existing process of channel contraction via sediment deposition and vegetation encroachment would be expected to accelerate."*

Comment: This statement continues the DEIS premise that sediment deposition impacts through Fort Collins will be relatively insignificant. As discussed above, NISP will substantially reduce both river flows and associated channel flow velocities needed to maintain an open channel. Because of these diminished flows and flow velocities, deposition of fine sediments within the gravel and cobble bed of the Poudre River is likely to occur. A resulting cascade of adverse effects could follow, including increased vegetation encroachment into the channel causing the channel to narrow and constrict flows under normal conditions and subsequently obstruct flows under higher flow (flood) conditions.

The DEIS does not accurately define the severity or potential cumulative adverse impacts of fine sediment deposition impacts on the Poudre River through Fort Collins, nor does the Section 404(b)(1) Analysis adequately address the indirect impacts with regard to Section 230.11(b), Section 230.24(b), and Section 230.45(b). Instead, the DEIS concludes that the action alternatives would generally increase channel stability (see DEIS pg. 4-8 as discussed above). This conclusion contradicts the Biological Assessment (BA), which as part of the DEIS, correctly identified potential adverse impacts resulting from large flow reductions during spring runoff in wet and average years. The BA states: *"…potential changes include channel narrowing, greater sediment deposition and less sediment flushing, vegetation encroachment into the channel, increase in the size of the in-channel islands, flow obstruction and bank erosion…"* (Biological Assessment, DEIS Appendix B, page 29). This contradiction between the BA and the DEIS regarding the range and severity of potential impacts of sedimentation on the River through Fort Collins must be resolved in an SDEIS, Revised Section 404(b)(1) Analysis, and revised BA.

DEIS Section 4.4.3 Mitigation
General Comments:
A 25 % to 71% reduction in flows from NISP, as predicted in the DEIS, will result in major adverse impacts to the Poudre River Corridor through Fort Collins. The City's goal is to maintain existing flows and/or provide enhanced flows to support a healthy, functioning, and dynamic river system that is a solid foundation for recreation, pleasing aesthetics, economic benefits and values and diverse wildlife.

The DEIS proposes a few mitigation measures relevant to the Poudre River. While some of the mitigation proposed in the DEIS (including management of in-channel and riparian vegetation, installation of in-stream structures to control sediment movement, and flow regulation/exchanges, etc.) may be useful and promote local desired effects, they are not likely to reduce the impacts of the proposed project to the level of non-significance. In addition, any proposed mitigation strategies that require the installation of structural measures on the River to control sedimentation would have their own direct and indirect impacts on the River which have not been analyzed and must be addressed in an SDEIS.

The few proposed mitigation measures are localized, whereas the proposed alternative is systemic. The City has serious concerns about the proposed mitigation because restoration efforts that "target small reaches through artificial measures are very costly, may require perpetual effort, and often fail" (Rood et al, 2003b). The "adaptive management" proposal is fundamentally flawed as the assessment of the current resource condition is inadequate as is the assessment of environmental consequences associated with the proposed alternative. The Corps must evaluate and address the sedimentation impacts to the River and must fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard.

Any substantial reduction in future flows from present conditions will functionally eliminate the existing biological values of the Poudre River system. Spring flow reductions of 25% to 71% are expected to have severe impacts. The following excerpt from a feature article in *Environmental Management* emphasizes the importance of the flow regime to river ecosystems:

> "*Physical processes in streams and rivers largely are driven by the magnitude, intensity, duration, and frequency of water discharge in combination with the catchments lithology and streamside vegetation. Additionally, flow regularity as well as variations in amplitude, frequency, duration, base flow, and rate of change, is also ecologically significant…* ***These characteristics provide the template for the ecological processes and are the underpinning of every major theoretical and conceptual advance made about the ecology of rivers in the last three decades.*"** (Naiman et al., 2002) (emphasis added).

A suite of "overview" papers in the scientific literature have been written in the last decade to advance the science of river management, protection, mitigation, and restoration. The following technical publications written by several of the world's

leading river scientists should be considered in evaluating and addressing these river impacts in an SDEIS and Revised 404(b)(1) Analysis:

- Legitimizing Fluvial Ecosystem As Users of Water: An Overview (Naiman et al, 2002)
- The Natural Flow Regime; A Paradigm for River Conservation and Restoration (Poff et al., 1997)
- Meeting Ecological and Societal Needs for Freshwater (Baron et al., 2002)
- Entering an Area of Water Scarcity: The Challenges Ahead (Postel 2000)
- Process-Based Ecogical River Restoration: Visualizing Three-Dimensional Connectivity and Dynamic Vectors to Recover Lost Linkages (Kondolf et al., 2006)
- Ecology, Planning, and River Management in the United States: Some Historical Reflections (Reuss 2005)
- River Flows and Water Wars? Emerging Science for Environmental Decision-Making (Poff et al., 2003)
- Landscapes to Riverscapes: Bridging the Gap Between Research and Conservation of Stream Fishes (Fausch et al., 2002)

The evaluation of impacts to the River and consideration of ways to address those impacts should not operate in isolation from the world scientific and water resources communities. Currently, there are ongoing research and management efforts in Australia, South Africa, Europe and North America aimed at describing the quantity, quality, and timing of flows necessary for ecological functions to perform while also providing opportunities for human uses (Arthington et al., 1998, Arthington et al., 2000, Commonwealth of Australia; 1996, Bunn 1999; Kingsford, 2000; Pigram, 2000; Humphries and Lake, 2000; Patten et al., 2001). The DEIS ignores state-of-the-art research regarding flow regimes and ecological functions, focusing on a discredited and invalid static approach to river health.

As discussed above in Section IV.1 of these Comments, future river management planning should be made in a collaborative manner following the process developed by The Nature Conservancy and the Corps, and outlined in Richter et al. (2006).

DEIS Section 4.4.3 Mitigation, page 4-31
Statement: "*While it is likely that changes to stream morphology and sediment transport would occur in the Poudre River, there is uncertainty in the extent of change that would occur and in the timing of changes*."

Comment: The degree of uncertainty in the DEIS suggests the review of potential environmental impacts is inadequate.

Changes to the River through Fort Collins both in terms of river dynamics and vegetation response are poorly understood. Part of the statement made above acknowledges this, yet throughout the DEIS conclusions are drawn based on no or little data, and one deeply speculative in favor of the proposed action. The analysis in the DEIS of these changes and related impacts is insufficient. The Corps must evaluate and address the stream morphology and sedimentation impacts to the River and must fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard.

DEIS Section 4.4.3 Mitigation, page 4-32
Statement: *"Further impacts attributable to the chosen NISP action alternative would be additive to the impacts that already drive change. Impacts from NISP would likely be progressive rather than sudden, could occur over decades, and may be small compared to changes that are already occurring."*

Comment: This statement is highly conjectural. The overall tenor of the DEIS does not acknowledge the real potential for complex and threshold responses in the river system. The geomorphic and ecological literature provides countless examples of such responses. (Merritt and Wohl, 2003, Schumm, 1974, Stanford et al. 1996, Ward et al., 2001). For example, impacts associated with interactions between water quality/quantity are likely to be episodic and occur at time scales less than modeled monthly averages.

Planning and allocation of water resources involves choices among uses, users, and generations. Doing this wisely requires knowing the "bank balance" and having thoughtful projections of future "income" and "expenses.". The typical 20 to 30 year planning horizon of most NEPA studies does not account for the fact that many of the decisions being made have implications that extend well beyond this time horizon. A new reservoir is often assigned a useful life of 100 years and investments made to mitigate impacts to aquatic ecosystems seek to conserve the viability of ecosystem amenities in perpetuity, not just for a few decades (Purkey et al., 2007). In terms of this longer view, the DEIS analyzes the lowest level of possible impact rather than the average or worse-case level of possible impact. This is misleading and insufficient, and must be corrected in an SDEIS.

DEIS Section 4.4.3 Mitigation, page 4-32
Statement: *"These considerations do not lead to a recommendation for an immediate set of mitigation actions. Instead, they suggest that the optimum course of action is a detailed river monitoring program leading to a long-term adaptive management program…The adaptive management program should be considered a toolbox of mitigation measures that could be accessed depending on the monitoring efforts."*

Comment: The integration of adaptive management and NEPA is a relatively new concept that adds the "monitor and adapt" steps to the traditional NEPA "predict-mitigate-implement" model (Aligning National Environmental Policy Act Processes with Environmental Management Systems, CEQ, April 2007). The resulting adaptive management approach in a NEPA context can be described as "predict-mitigate-implement-monitor-adapt." In other words, the basic premise still requires starting with proposed outcomes and mitigation measures, and then by adaptive management adjusting as required in the future. However, the DEIS proposes use of adaptive management that jumps directly to the monitoring step, bypassing the predict-mitigate-implement steps. This violates both NEPA and Clean Water Act requirements to specifically list and describe the mitigation measures that will be implemented to achieve specific goals. *See* Section II.5 and Section II.7 of these Comments. The City of Fort Collins considers the definition of "mitigation" in the CEQ regulations, 40 C.F.R. § 1508.20, to be comprehensive and accurate and incorporates that definition for its references to mitigation throughout these Comments.

The concept of adaptive management, as contemplated in this DEIS, is not sufficient to mitigate potential NISP-related flood damage. The effects of channel contraction and vegetation encroachment must first be fully quantified and corresponding effective mitigation efforts identified in an SDEIS and Revised Section 404(b)(1) analysis. NISP participants should pay all costs for planning, design, construction, and ongoing maintenance of those mitigation efforts.

In addition, a sensitivity analysis should be performed and incorporated into an SDEIS to determine the range of effects the channel constriction will have on channel flood carrying capacity and resulting flood elevations. The results of this study could then proactively be used to determine effective mitigation efforts, if any exist, and their associated costs. The City should be included as an active participant in the development, design, and approval of any sensitivity analysis and any subsequent implementation efforts.

DEIS Section: 5.1.2.2 Enhancement of Streamflows through Fort Collins, page 5-4
Statement: *"To mitigate for impacts to aquatic resources associated with Alternative 2, the District commits to work with CDOW to enhance Poudre River winter flows primarily through Fort Collins for the purpose of enhancing a fishery on this reach of the Poudre River. The primary target reach starts at the Larimer-Weld Canal headgate just west of Shields Street and extends downstream to Mulberry Street, a distance of 3.7 miles."*

Comment: Any mitigation that compensates for flow depletions is of particular interest and concern to the City of Fort Collins. However, it is not possible to evaluate this mitigation proposal without more specific information. The District's commitment to work with DOW to establish a fishery in the river section between the headgate of the Larimer and Weld canal to Mulberry Street needs to be more specific, definite and enforceable to constitute minimization or mitigation under Section 404. There is no information as to the minimum target flow rates and the duration of such flows to which the District will commit to provide for the fishery. A specific plan must be developed and described in an SDEIS that will specify minimum wintertime flows, summertime flows, types of fish these flows will support, where the water will come from and how the District and the Corps will insure that the program be implemented. Without additional detail or commitments, these vague assertions do not suffice to address the serious harms to the aquatic ecosystem in the City.

DEIS Section: 5.1.2.2 Enhancement of Streamflows through Fort Collins, page 5-4
Statement: *"Release flow from Glade Reservoir for recapture at the SPWCP pump station."*

Comment: The District's commitment to release water from Glade Reservoir for recapture in Galeton Reservoir to improve flows through town needs to be more specific to constitute minimization or mitigation under Section 404. There is no information as to the minimum target flow rates and the duration of such flows to which the District will commit to provide for this purpose. A specific plan must be developed and described in an SDEIS that will specify minimum wintertime flows, summertime flows, where the water will come from and how the District and the Corps will insure that the program be implemented. Without additional detail or commitments, these vague assertions do not suffice to address the serious harms to the aquatic ecosystem in the City.

DEIS Section: 5.1.4 Environmental Streamflows, page 5-6
Statement: *"The District has stipulated the Grey Mountain water right to three streamflow requirements on the Poudre River used to benefit fishery, recreation, and other environmental purposes (Table 5-1). The District will curtail its diversions from the Poudre River for NISP when the streamflow requirements for each of the facilities listed in Table 5-1 occur and CDOW (Watson Lake Fish Hatchery) or Fort Collins (boat chute and nature center) places a call on the river for the streamflows."*

Comment: This statement is misleading. The District's commitment to subordinate the Grey Mountain decree to the City's two recreational in-channel diversion water rights (RICDs) and to the Watson Lake diversion does not guarantee minimum streamflows through Fort Collins. The RICDs (which are for flows ranging from 5 to 30 cubic feet per second) and the Watson Lake water rights (which are for flows ranging from 25 to 50 cubic feet per second) only apply to very short segments of the River and are for relatively low flow amounts, and because they are very junior water rights, they do not guarantee minimum streamflows through town for a healthy Poudre River riparian

corridor. A specific plan must be developed and implemented and described in an SDEIS that will specify minimum wintertime flows, summertime flows, where the water will come from and how the District and the Corps will insure that the program be implemented. Without additional detail or commitments, these vague assertions do not suffice to address the serious harms to the aquatic ecosystem in the City.

DEIS Section: 5.1.4 Environmental Streamflows, page 5-6
Statement: *"The District also will curtail its diversions from the Poudre River for NISP when the streamflow requirements for each of the facilities listed in Table 5-1 occur, provided the District can be assured that the passed water will reach the facilities and not be diverted by junior appropriators."*

Comment: The District's commitment to curtail diversions from the Poudre River does not guarantee minimum streamflows through town. A specific plan must be developed and implemented and described in an SDEIS that will specify minimum wintertime flows, summertime flows, where the water will come from and how the District and the Corps will insure that the program be implemented. The District and the Corps need to develop a legally defensible plan, conforming to Colorado water law, to ensure the maintenance of a minimum streamflow through town to protect the viability of the Poudre River riparian ecosystem. Without additional detail or commitments, these vague assertions do not suffice to address the serious harms to the aquatic ecosystem in the City.

DEIS Section: 5.16 Riparian Resources, page 5-7
Statement: *"Riparian resources along reaches of the Poudre River may be affected by reduced streamflows during the growing season."*

Comment: The stream habitat enhancement project (DEIS Section 5.1.2.2) is cited as one of the measures that will provide mitigation, however, that project will enhance winter flows, not flows during the growing season. The proposed plan to periodically curtail diversions during high flows has some promise, but without technical or legal specifics, its value and ability to reduce impacts to a level of non-significance cannot be determined and is insufficient for NEPA and Section 404 purposes. As discussed above, any mitigation that compensates for flow depletions is of great interest to the City of Fort Collins, and mitigation for lost peak flows is particularly significant, but without more information it is not possible to evaluate how this might impact flows through Fort Collins.

DEIS Section: 5.1.6 Riparian Resources, page 5-7
Statement*: "The District will also develop a plan to be approved by the Corps for periodically curtailing diversions from the Poudre River for at least 24 hours during high flows, which could provide the riparian areas with periodic disturbance and inundation. The diversion curtailment plan will be implemented provided the District and Corps can*

be assured that the passed water will flow to at least I-25 and not be diverted by junior appropriators."

Comment: The District's commitment to work with the Corps to develop a plan to periodically curtail diversions from the Poudre River for a minimum of 24 hours during the high flows to provide disturbance and inundation requires more detail. More information is needed about the target flow rates, the timing and the duration of these flows and the target reach over which they will occur. The District and the Corps need to develop a legally defensible and enforceable plan, conforming to Colorado water law, and describe it in an SDEIS to ensure that these flows will not be diverted by junior appropriators. Without additional detail or commitments, these vague assertions do not suffice to address the serious harms to the aquatic ecosystem in the City.

DEIS Section: 5.2.3 Enhance River Flows Through Fort Collins, page 5-8
Statement: *"The District will seek an agreement with the Lake Canal Company to move diversions from the Lake Canal intake…"*

Comment: The proposed addition of 50 cubic feet per second (cfs) to the River for about 6 weeks is inadequate to compensate for lost high flows. While this proposed flow enhancement is offered to mitigate impacts to recreational needs of the City's proposed water craft course, it is not adequate because the water craft course requires minimum flows of 250 cfs. *See* Section V.2 of these Comments. There is no information or analysis in the DEIS as to what the base flows would be during various times of the year to evaluate whether the additional 50 cfs would materially improve the prospects for a water craft course if NISP proceeds. Furthermore, high flows are critical to more than just recreation. Reduced high flows as part of the proposed action will negatively affect stream morphology, water quality, riparian resources, fisheries, and socioeconomic values in the Fort Collins river reach. More than 50 cfs will be required to reduce the impacts to river flows through Fort Collins to a level of non-significance (see comments related to hydrology, morphology, fisheries, vegetation, and wildlife**.**

DEIS Section: 5.2.3 Enhance River Flows through Fort Collins, page 5-8
Statement: *"The District will also explore agreements with other water providers to retime their direct flow rights by temporarily storing water in Glade Reservoir and/or its forebay for release during late July and August. Such agreements would add to the flows of the Poudre River through Fort Collins during the summer."*

Comment: The District's commitment to work with water providers to retime their direct flow rights requires more detail. More information is required to describe how the mitigation would improve the flows above those reported in the DEIS in this section of the River. The District and the Corps must develop a plan and describe it in an SDEIS that illustrates the location and magnitude of the improvements to summertime flows, how these will enhance recreational opportunities, and how the plan will be implemented

and enforced. Without additional detail or commitments, these vague assertions do not suffice to address the serious harms to the aquatic ecosystem in the City.

DEIS Section: 5.2.3 Modify Diversion Structures for Boat Passage, page 5-8
Statement: *"The District will explore the modifications of the…Fort Collins Water Treatment Plant diversion to facilitate boat passage."*

Comment: The Fort Collins water treatment plant diversion is a unique structure that allows direct diversion of Poudre River water while minimizing the amount of organic material (particularly pine needles) and inorganic (sediment) passing into the pipeline. While the City could support the idea of modifying the structure to open up more of the River for boating recreation, it is very concerned about any modifications to a structure that is critical to the water supply for the City. This concern is amplified given the potential for additional pine needle problems as the pine beetle epidemic moves east over the Continental Divide. Before the City would consider any modifications to its structure, extensive studies and investigations would be required, including but not limited to laboratory physical model studies of proposed changes to the structure. While not clearly stated, it must be assumed that any such modifications to the City's structure for the benefit of the NISP project would be paid for entirely by the NISP project. Even then, the City would proceed very cautiously and, should it allow structural modifications, it would require agreements for future remedial action in case the performance of the modified structure is not acceptable. It should also be noted that the DEIS and Section 404(b)(1) Analysis were deficient in that they did not address this issue.

DEIS Section: 5.7 Stream Morphology, page 5-15
Statement: *"Based on an evaluation of historic data (Anderson 2008), the response of and changes to the Poudre River associated with the action alternatives are anticipated to be less than the historical morphologic changes that have occurred and continue to occur. Distinguishing the effects of NISP from current trends in river changes will likely be challenging and most effectively determined through a monitoring and adaptive management program."*

Comment: Aside from a review of a limited number of previous studies, the River Morphology and Sediment Transport Technical Report (Corps, 2008) (RMSTTR) does not provide a comprehensive assessment of the historical geomorphologic changes that have occurred on the Fort Collins Reach of the River. A detailed historic aerial photo and map analysis could have been used to identify and document detailed, long-term changes in planform characteristics for specific segments of the Fort Collins Reach, which could then have been used to qualitatively predict what the potential impacts of the project would be to those segments. Instead, the RMSTTR only examined 1937/1941 and 2005 aerial photography and only compiled and provided limited data on 2005 average sinuosity, meander wavelength, and meander amplitude. The only comment regarding historical changes is provided on page 3.63 of the RMSTTR which states that: "*For example, the review of aerial photography indicated changes in the channel*

alignment and planform at the specific locations identified below…Within the Fort Collins Reach, channel planform changes have occurred at two locations; from Station 209,500 to Station 211,300 and from Station 221,600 to Station 223,600." However, the RMSTTR did not provide any details on what those changes were. A more detailed analysis of historic conditions and changes needs to be included in an SDEIS to identify specific problem areas for conditions under the proposed alternatives and to address related impacts.

DEIS Section: 5.7 Stream Morphology, page 5-15
Statement: *"For any of the action alternatives, the District will develop and initiate a monitoring and adaptive management program…"*

Comment: The District's commitment to develop an adaptive management plan to address the stream morphology impacts requires more detail and does not substitute for adequate analysis of project impacts and a detailed evaluation of how those impacts would be addressed. The Corps must evaluate and address impacts and must fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard. Without additional detail or commitments, the vague assertions about possible mitigation do not suffice to address the serious harms to the aquatic ecosystem in the City. *See also* discussion in this Section above related to DEIS Section 4.4.3 (DEIS page 4-32).

DEIS Section: 5.7 Stream Morphology, page 5-15
Statement: *"These mitigation measures may include, but are not limited to… accelerate establishment of channel forming by managing in-channel or riparian vegetation."*

Comment: This statement is confusing. If the proponents intend to accelerate the formation of an inset channel and floodplain based on the potentially flawed Rosgen classification of the river reach (as discussed above) the effort may be counterproductive. Without a firm understanding of the river hydrology (volume, sediment loading, grade, flood timing, etc.) which is the ultimate driver of the channel's physical condition (planform, depth, bank characteristics, etc.), channel modifications become an exercise in river aesthetics when not matched with the existing and future hydrology. While local channel modifications can create habitat, the proposed action is systemic, not localized, and the modified river hydrology is likely insufficient to perpetuate in-channel mitigation efforts.

DEIS Section: 5.7 Stream Morphology, page 5-15
Statement: *"These mitigation measures may include, but are not limited to… check structures or weirs to control the inundation of riparian vegetation."*

Comment: This would only encourage more sediment deposition and all the associated adverse impacts that the City of Fort Collins is concerned about, including channel narrowing, less sediment flushing, vegetation encroachment, larger in-channel islands,

flow obstruction, reduced conveyance and increased risk of flooding, and bank erosion. Also, as previously stated, the proposed mitigation strategies that require the installation of structural measures on the River to control sedimentation would also have direct and indirect impacts to the River that were not addressed in the DEIS Section 404(b)(1) Analysis.

DEIS Section: 5.7 Stream Morphology, page 5-15
Statement: *"These mitigation measures may include, but are not limited to… manage flows to provide flushing in selected river reaches."*

Comment: This is a valuable mitigation strategy, but it cannot be evaluated without more specific technical and legal information about how flows could and would be managed to provide flushing in selected reaches (including what reaches would be selected).

2c. Comments on River Morphology and Sediment Transport Technical Report (RMSTTR)

RMSTTR Section: 3.5.3 SIAM Analysis, page 3.54
Statement: *"The incipient motion analysis indicates that the armor layers will not be penetrated in the upper portion of the study reach from Laporte through Timnath for Baseline and Project conditions. In these upper reaches, the size of the bed material that composes the armor layer is large enough to withstand the hydraulic forces that would be necessary to transport the material…*

The results of the incipient motion analysis determined the bed gradation selected for the SIAM analysis. The bed gradations representing the armor layer were applied to SIAM in reaches where the armor layer was determined to be unbreakable for the flows represented by the annual flow duration curve…"

Comment: Bed mobility calculations are used to assess potential project impacts and to justify simplifying assumptions of sediment transport modeling. The general message seems to be that the armored riverbed through Fort Collins is already immobile except at the most extreme flows (DEIS pg. 3-22). Two implications the DEIS thereby relies on are that: 1) reductions in peak flows by the project would have a minimal effect with regard to scour processes that prevent vegetation encroachment; and 2) deposition of subsurface bed sediments released by armor breaching need not be accounted for in SIAM modeling aimed at assessing deposition potential.

Tables 3.13 and 3.14 (pg. 3.53) are interpreted by the authors to suggest that mean values of shear stress (averaged across entire cross-sections) estimated from hydraulic modeling are insufficient to mobilize median sizes of the existing surface armor layer. This interpretation is flawed. First, cross-section average values of shear stress were averaged throughout the entire segment. Solely using these values to make conclusions about pre-

and post-project bed mobility essentially ignores spatial heterogeneity in shear stress distributions at the cross-section scale and within the entire segment. The maximum values of shear stress reported are clearly sufficient to mobilize armor material. The highest values also occur with a greater frequency and *duration* in the baseline flow series.

Second, the analysis is based on critical dimensionless shear stress values averaging approximately 0.047 for most of the grain sizes examined. In the new edition of the ASCE Sedimentation Engineering Manuel, Parker (2008a) recommends a value of 0.03 for the initiation of significant bed mobility. Previous research on gravel bed rivers indicates that a large fraction of the long term sediment load is associated with "marginal" transport at critical shear stress values substantially less than 0.047 (*e.g.*, Andrews and Nankervis, 1995) report a measured value of 0.035 for the Poudre at Rustic). Indeed, if the simple average stress values for Fort Collins Reach B1 are reassessed using a critical dimensionless shear stress value of 0.035, one reaches the opposite result, i.e. baseline conditions of 0.037 and project conditions of 0.033. As such, the conclusions regarding potential changes in sediment transport and bed mobility should be reconsidered with an accounting of changes in frequencies and durations of flows exceeding incremental values of critical dimensionless shear stress down to 0.03 for the median bed material.

Magnitude-frequency analyses based on stream power and the SIAM model were also used to explore potential changes in sediment transport capacity. Like the incipient motion analysis described above, the analyses are inadequate for assessing pre- vs. post-project changes in sediment transport capacity. First, the magnitude frequency analyses are based on total stream power. Because bedload transport scales with stream power to exponents greater than one (much greater than one at lower transport rates), the pre- and post-project cumulative stream power distributions underestimate actual differences in bedload transport capacity. Second, the bedload transport analyses conducted with SIAM are based on the Meyer-Peter and Mueller (MPM, 1948) bedload relation. This equation was recently recalibrated and corrected by Wong and Parker (2006) and is applicable to high transport rates. Parker (2008b) states: "According to MPM, then, these [gravel] rivers can barely move sediment of the surface median size Ds50 at bankfull flow. Yet most such streams do move this size at bankfull flow, and often in significant quantities. There is nothing intrinsically "wrong" with MPM. In a dimensionless sense, however, the flume data used to define it correspond to the very high end of the transport events that normally occur during floods in alluvial gravel-bed streams. While the relation is important in a historical sense, it is not the best relation to use with gravel-bed streams."

Using this equation in the SIAM analyses basically means there is no transport of particles subjected to dimensionless shear stresses less than 0.047. The assumption described above, namely that there is no release of sediments from beneath the armor layer, also decreases the potential for deposition due to specification of the SIAM model. This is not physically correct. The SIAM analysis correctly indicates increased deposition of relatively fine sediments which can be transported according to the model parameterization.

The analyses described above do not provide what is needed to assess potential changes in bed mobility and bedload transport:

- Use of a range of critical shear stress values ranging from 0.03-0.047 to assess the frequency and duration of bed mobility, pre- and post-project, with better accounting for spatial variability;
- Use of a hydraulic parameter that actually scales with sediment transport capacity in the magnitude-frequency analyses; and
- Use of a continuous bedload function (e.g., Parker, Wilcock and Kenworthy, or Wilcock and Crowe as opposed to the outdated MPM threshold approach) to account for differences in cumulative sediment transport capacity and aggradation potential.

Reliable estimates of bed mobility and scouring potential are integral to predicting encroachment of vegetation, channel narrowing, and associated increases in flow resistance that diminish channel capacity during flood events. Bed scouring is also linked to preventing proliferation of algae and other periphyton along with other factors such as temperature and light. Bed mobility is also associated with reduced substrate embeddedness and rejuvenation of benthic habitat. Given that the SIAM analysis based on MPM probably underestimates deposition potential, the potential effects of substrate changes on benthic communities are more difficult to evaluate. A more robust scour analysis is an essential step toward assessing these potential responses and impacts.

RMSTTR Section: 4.1.8. Sediment Transport Analysis, page 4.9
Statement: *"In summary, the results of sediment transport analysis indicate that it is reasonable to represent the Laporte and Fort Collins reaches as transport reaches. That is, all sediment arriving in the reach is transported through the reach…"*

Comment: The sediment transport analysis in the RMSTTR was not adequate to address the potential deposition of fine sediments in the Poudre River channel through Fort Collins that could occur given the large flow reductions projected under the action alternatives. The sediment transport analysis was based on SIAM using a maximum wash load size of 8 mm in the upper Fort Collins Reach, and 4 mm in the lower Fort Collins Reach. As described on page 3.55, *"SIAM will pass all material equal to and smaller than the selected maximum grain size…"* Sediment particles in the 4-8 mm range are classified as medium gravels, and so the potential deposition of sand-sized materials, which is already occurring under existing conditions and embedding cobble-sized particles in the channel bottom, was ignored by this analysis. This is a significant oversight given that one of the most significant adverse impacts expected from the flow reductions that will occur under project conditions is deposition of fine sediments throughout the Fort Collins reach.

Additionally, even though the RMSTTR states that the Fort Collins Reach is a transport reach, Table 3.16 on page 3.56 indicates that the average annual sediment balance for

Reach B1 under Project conditions is more than 2.5 times greater than under Baseline conditions; in other words it would be significantly aggradational under Project conditions. Although the volume is not as large as downstream reaches, it is significant locally. Over time this could be problematic with regard to increased spawning gravel embeddedness, bed and bar siltation, and vegetation encroachment. For example, a quick calculation of what this balance would produce in terms of average annual sedimentation along the Fort Collins Reach B1 under Project conditions is about 0.6 inches per year or about 6 inches in 10 years, based on the SIAM results. This volume would likely be significantly greater if grain sizes used in the SIAM analysis accurately reflected the fine grained nature of current deposits along the river bed.

The hydrologic analysis conducted for the DEIS indicates that the average monthly streamflow at the Lincoln Avenue Stream Gage for the District's Proposed Action could be reduced by as much as 74.5% for an average year (DEIS Appendix A). Given this significant reduction in flows for May through August, this could have a significant impact on sediment distribution in the River, especially if major tributary sources of sediment remain uncontrolled. The RMSTTR does not adequately address this potential reduction in flow and the direct impacts on sediment transport nor does it adequately address the sources and potential contributions of tributary sources of sediment. Instead of conducting the SIAM analysis for a Wet, Average, and Dry year, the analysis is conducted using the mean annual hydrograph for the period of record. Conducting the SIAM analysis for a Wet, Average, and Dry year using more representative grain sizes for the Fort Collins Reach would yield more accurate and useful results.

RMSTTR Section: 4.2.3 Laporte and Fort Collins Reaches, page 4.12
Statement: *"…However, there are areas where the moderately high flows are contributing to channel maintenance by scouring of fine material and limiting vegetation encroachment. In these depositional areas (such as upstream of Mulberry Street), accelerated channel contraction can be expected. The sediment modeling supports this contention, indicating that small volumes of fine and medium gravels deposit in this reach and this trend is slightly increased with the Project.*

If deposition and vegetation lead to a reduction in channel capacity, this may have an impact on flood profiles and could lead to isolated instances of accelerated bank erosion during floods. This is already a trend in some areas, suggesting an active monitoring and adaptive management approach is required.

Bank erosion occurs sporadically within the reach. Other than the situation described above, changes due to the Project are more likely to contribute to bank stability than bank erosion. Elsewhere, minor vegetation encroachment would continue on channel margins and bars and may be slightly accelerated by the Project."

And;

RMSTTR Section: 4.2.3 Laporte and Fort Collins Reaches, page 4.14

Statement: *"The vegetation-sedimentation process is threshold dependent and it is not realistic to make quantitative predictions about this change.* ***It is reasonable, however, to predict that the rate of channel contraction will increase between Fort Collins and Greeley as a result of the Project.*** *The magnitude of this increase cannot be quantified but the increase could vary from minor to moderate in its impact on the river system. Reliable quantification of existing and future rate of channel contraction will require extensive monitoring."*

Comment: Although the authors of the RMSTTR assert that vegetation encroachment will be "minor" through the Fort Collins segment, no sound factual basis is provided for this conclusion. If the response is "threshold dependent", "accelerated," and complex, what is the basis for predicting it will be "minor"? In addition, the SIAM analysis is also the basis of the conclusion that deposition below canyon "is expected to be undetectable." No reference is made to time scale or degree of precision necessary for detection. The rationales for these conclusions should be reassessed and clearly articulated in an SDEIS based on corrections to the bed mobility and sediment transport analyses described above.

3. Riparian Vegetation and Wetlands

3a. General comments

The following comments focus specifically on impacts to the Poudre River riparian corridor through the City of Fort Collins between Overland Trail to Interstate 25. In general, the City has significant concerns with the information presented in the Vegetation Technical Report that lead to the conclusion presented in Section 4.2 and 4.12 of the DEIS. The conclusions presented in the Vegetation Technical Report (VTR) seem to rely on the judgment of the authors rather than data collection, literature review, and analysis.

Analysis related to vegetation and wetlands along the Poudre River is deficient in its review of the scientific literature and accepted principles of western river ecology as they relate to anthropogenic modification of flow regime. In one instance an analysis in the VTR uses an incorrect numerical data set which led to false conclusions (see comments regarding Section 6.2.5 in Section IV.4c of these Comments, below**)**. Similarly, analysis of existing conditions failed to identify jurisdictional wetlands along the riparian corridor through Fort Collins and evaluate the environmental consequences of the proposed action on those wetlands. Other specific concerns include:

- Failure to evaluate wetland resources according to Section 404(b)(1) guidelines;
- Use of single snapshot field observations to draw important conclusions related to surface and groundwater hydrology;
- Use of a monthly hydrologic time step in the modeling effort that fails to address short term changes (day to day) critical to vegetation and related limitations;

- Failure to assess impacts to the entire stretch of the River through Fort Collins and focusing on presumed "sensitive areas;"
- Failure to address anticipated vegetation encroachment into the channel (terrestrialization), the likelihood of non-native plant encroachment and its ecological and economical consequences;
- Failure to use groundwater well monitoring through several seasons and years to support significant assumptions on groundwater movement within a highly complex watershed;
- Failure to consider potential sub-lethal physiological and morphological stress to cottonwoods; and
- Failure to identify a long term effect as an "environmental consequence".

Conflicting conclusions presented in the DEIS regarding impacts to riparian vegetation represent a serious shortcoming. In several locations the DEIS states there will be adverse impacts to riparian vegetation. Yet the VTR and corresponding sections in the DEIS (4.2 and 4.12) state… *the proposed action will cause no loss of riparian/wetland vegetation.*

Because ecological systems work as a set of many interdependent components and interactions, the impacts to riparian vegetation are fundamental to terrestrial wildlife, invertebrate communities, water quality and aquatic wildlife. Potential changes to the riparian corridor must also be evaluated in the context of human services such as recreation, aesthetics, nutrient filtration, stormwater management, and economic development relative to downtown businesses.

Because of these significant issues highlighted above and described in detail below, a complete understanding or review of the proposed action and its consequences is not possible at this time. Thus, an SDEIS is needed to fully address the issues highlighted in this and other sections of these Comments.

3b. Specific comments on the DEIS

DEIS Section: 4.2.1.3 Wetlands, page 4-9
Statement: *"Reductions in streamflow may affect wetlands directly linked and supported by flows in the Poudre River."*

And;

Section 5.6 page 31 (Vegetation Technical Report)
Statement: "*Palustrine Persistent Emergent and Palustrine Scrub-Shrub Wetlands have established adjacent to the active channel and in depressions in the floodplain."*

Comment: The DEIS fails to identify jurisdictional wetlands along the Poudre River through Fort Collins. According to 404(b) Guidelines, it is necessary to delineate the jurisdictional wetlands along the Poudre River. Such secondary or indirect impacts of the project are clearly within the range of impacts that must be evaluated, and in this case an SDEIS and Revised 404(b)(1) Analysis are needed to do so. *See* Part II of these Comments. Use of the CDOW riparian maps coupled with single-day, field observations is insufficient to adequately evaluate the impacts of the proposed action on wetlands and wildlife habitat along the Poudre River. Additional investigation is required by the Clean Water Act:

> *The degradation or destruction of special aquatic sites,… is considered to be among the most severe environmental impacts covered by these Guidelines. The guiding principle should be that degradation or destruction of special aquatic sites may represent an irreversible loss of valuable aquatic resources.* Section 230.1(d) (Emphasis added).

Furthermore, the environmental consequences should be evaluated by treating Natural Areas as sanctuaries, wildlife refuges and parks (see Sections 230.40, 230.54 of the 404(b) Guidelines). *See also* Section II.2 of these Comments. The potential damage to human use characteristics in this habitat must also be evaluated for compliance and consistency with Section 404(b)(1) Guidelines Sections 230.51, 230.52, and 230.53.

Finally, the analysis presented in the Vegetation Technical Report (VTR) does not provide "*appropriate factual determinations, evaluations, and tests on the physical…*" for the riparian resource, in violation of Section 230.11 of the Section 404(b)(1) Guidelines.

> *For actions subject to NEPA the analysis of the alternatives… will in most cases provide the information for the evaluation of alternatives under these Guidelines. On occasion, these NEPA document…may not have considered the alternatives in sufficient detail to respond to the requirements of these Guidelines... In the latter case, it may be necessary to supplement these NEPA documents with additional information.* Section 230.10 (4)

Without proper delineation and biological evaluation of the riparian corridor it is not possible to properly evaluate and address the impacts to the riparian corridor, as required under the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments.

DEIS Section: 4.2.1.4 Riparian Resources, page 4-9
Statement: *"The reductions in stream flows on the Poudre River associated with the action alternatives are not anticipated to cause a loss of riparian and/or wetland vegetation…because this vegetation appears to be supported by the lower more frequently occurring flows."*

Comment: This is the major conclusion addressing impacts to riparian vegetation, yet it is unsupported by real data, case studies, or relevant scientific literature. Peer-reviewed scientific studies have concluded repeatedly that altered flow regimes can cause significant adverse impacts to riparian vegetation (Reily and Johnson, 1982, Rood and Mahoney, 1990, Tyree et al., 1995, Rood et al., 1995, Poff et al., 1997, Kranjcec et al., 1998, Lesica and Miles, 1999, Jansson et al., 2000, Nilsson and Berggren, 2000, Obedinski et al., 2001, Nilsson and Svedmark, 2002, Rood et al., 2003a, Rood et al., 2003b, Friedman et al., 2005, Stromberg et al., 2007). The conclusion that none of the action alternatives will impact the riparian vegetation is inconsistent with current science based on field data, peer-reviewed analysis, and valid ecological modeling, and is not based upon any credible, scientific or engineering evidence. *See* related comments in Section IV. 2.12 regarding Vegetation Technical Report. *See also* additional comments on this subject in comments on DEIS Sections 4.12.4 and 4.13, in these Comments, below.

DEIS Section: 4.2.1.4 Riparian Resources, page 4-9
Statement: "*The reductions in stream flows on the Poudre River associated with the action alternatives are not anticipated to cause a loss of riparian and/or wetland vegetation…because this vegetation appears to be supported by the lower more frequently occurring flows."*

Comment: The following four statements show the significant inconsistency within the DEIS and supporting documents to the statement immediately above.

Section: 7.2.1 page 65 (Wildlife Technical Report)
Statement: *"The action alternatives would likely result in changes to and losses of riparian and wetland vegetation, especially herbaceous vegetation, in sensitive riparian areas along the Poudre River corridor. Many species of birds, mammals, reptiles, and amphibians dependent on these habitats would in turn be affected by these changes."*

DEIS Section: 4.2.1.1 Changes to Poudre River Flows, page 4-6
Statement: *"Flow reductions are likely to have significant localized effects on water based recreation and recreation values, riparian resources, stream morphology."*

Section: 4.1.5 page 4.5 (River Morphology Report)
Statement: "The spells analysis further elaborates the likely impact of the project ….with a particular significance to geomorphology or colonization and survival of vegetation…"

Technical Memorandum: NISP Visual Impacts to Recreation Activities
Statement: *"Reduced water flows in the river would decrease the area of riparian vegetation communities and surface water."*

Comment: It is difficult, if not impossible, to evaluate the DEIS in this regard, because the document contains contradictory conclusions such as these, and provides inadequate support for any of them. The four preceding excerpts are representative of various contradictory conclusions within the DEIS regarding impacts to riparian vegetation.

DEIS Section: 4.2.1.4 Riparian Resources, page 4-9
Statement: *"However, a reduction in the infrequently occurring overbank flows in the reach above I-25 may affect the periodic disturbance of the riparian zone that can aid in creating new habitat for riparian vegetation establishment and rejuvenation of the riparian zone. Without this disturbance and a substantial reduction in the frequency of this occurrence of overbank flows, it is likely that the woody riparian vegetation will become increasingly decadent. This would be a slow process that would be difficult to separate from current trends in riparian vegetation along the Poudre River."*

Comment: Although in the previous paragraphs the DEIS anticipated no loss of riparian and/or wetland vegetation, the authors follow by predicting an effect on the long-term capacity for regeneration. The statements are in direct conflict with each other because a long-term effect is an effect. In sum, anticipated changes in vegetation under the proposed action are distinguishable from current conditions and an SDEIS must identify and analyze this long-term effect.

DEIS Section: 4.2.1.4 Riparian Resources, page 4-9
Statement: *"…reduced high flows on the Poudre River would likely contribute to or accelerate the trend of encroachment of riparian and wetland vegetation (primarily reed canarygrass and coyote willow) into the channel (Anderson 2008)."*

Comment: This is a reasonable conclusion and the magnitude and severity of this encroachment requires further examination. The Vegetation Technical Report omits this issue. It is anticipated that encroachment could have detrimental impacts to and costly management implications for City with regards to stormwater control, floodplain/FEMA compliance, mitigation of public flood hazard risks, and management of invasive species.

DEIS Section: 4.7.5 Ground Water Cache la Poudre River, page 4-40:

Statement: *"During periods of high river flow (spring runoff) for this reach of the Poudre River, the river likely recharges alluvium adjacent to the river…."*

Comment: Although the information provided here is in agreement with current scientific thought in the published literature, the Vegetation Technical Report (VTR) fails to include the role of "alluvial recharge" in supporting wetlands and riparian vegetation. *See* comments on VTR Section 6.1.2 (page 36) in Section IV.3c of these Comments.

DEIS Section: 4.10 Vegetation, page 4-44

General Comment: This section fails to address changes to, or loss of, riparian vegetation. The City has significant concerns about the future health of the riparian vegetation if the proposed action is implemented. There is a large body of scientific literature indicating reduction of spring flows result in major adverse impacts to riparian vegetation in riverine systems (Reily and Johnson, 1982, Rood and Mahoney, 1990, Tyree et al., 1995, Rood et al., 1995, Poff et al., 1997, Kranjcec et al., 1998, Lesica and Mile, 1999, Jansson et al., 2000, Nilsson and Berggren, 2000, Obedinski et al., 2001, Nilsson and Svedmark, 2002, Rood et al., 2003a, Rood et al., 2003b, Friedman et al., 2005, Stromberg et al., 2007). Failure to address riparian vegetation in this section renders the DEIS inadequate in its analysis. *See* related comments on DEIS Section 4.2.1.4, Section 4.12, and Section 4.13 in these Comments, below, and on the Vegetation Technical Report (VTR) in Section IV.3c of these Comments.

DEIS Section: 4.11 Noxious Weeds, page 4-46

General Comment: The likely increase in invasive species is a significant concern to the City. This section fails to address this issue despite a large body of scientific literature indicating how a significant reduction of spring flows would have adverse impacts to riparian vegetation and contribute or accelerate encroachment of non-native and noxious weeds into the river channel and riparian area (e.g., Lesica and Miles, 1999, Friedman et al., 2005, Stromberg et al., 2007). The City has the following specific concerns:

1. An expected reduction in native vegetation due to unprecedented drought stress and loss of opportunity for regeneration and native plant restoration. In the short term an expected loss of remnant populations of herbaceous species and of willows inhabiting higher elevations. Cottonwoods that are currently drought stressed will be affected in the near future, and healthy cottonwoods will decline in health and become increasingly disposed to disease and premature death.

2. The replacement of existing native species by non-natives with habitat needs that are distinct (different) from the native riparian species.

3. Russian olive is expected to become a significant problem under flow conditions predicted to result from NISP. This species is very difficult to eradicate once it establishes. Russian olive inhabits wetted soils but does not rely on higher spring

flow nor does it need bare areas to germinate. Russian olive has a large seed that can sprout through existing stands of grass. The City has gone to considerable expense to work to eradicate Russian olive through the Poudre River riparian corridor.

4. Tamarisk (salt cedar) invasion has been well documented in western river systems following flow modification alterations (Stromberg et al., 2007). Tamarisk seeds are available all summer long and can therefore establish as the new bare sediment becomes available anytime throughout the summer (as opposed to the short availability of cottonwoods seeds in the spring). The City has gone to considerable expense to work to eradicate Tamarisk through the Poudre River riparian corridor.

5. Reed canarygrass will continue to invade the riparian corridor because overbank events will occur much less frequently. The scouring that accompanies an overbank event tends to clear away the monoculture stands. Reed canarygrass will also be opportunistic invader of new bare sediment as the channel narrows.

6. As the soils in the current riparian forests becomes drier under project conditions, upland species would be expected to establish closer to the River, reducing the width and homogenizing the riparian habitat (terrestrialization), reducing channel capacity to convey floods.

Under the Colorado Noxious Weed Act, land owners are required to manage and eradicate noxious weeds. *See* Section 35-5-101, et seq., Colorado Revised Statutes. Therefore, if this shift towards non-native occurs as expected, the proposed action will produce injury to the integrity of City-owned properties adjacent to the Poudre River and will burden the City (and other property owners along the Poudre River) with significant additional weed control costs on these lands. The City already has made a long-term commitment to weed eradication along the Poudre River and has spent hundreds of hours per year and tens of thousands of dollars eradicating salt cedar and Russian olive. *See* related comments on DEIS Section 4.2.1.4, Section 4.12, and Section 4.13 in these Comments, below, and on the Vegetation Technical Report (VTR) in Section IV.3c of these Comments.

Finally, mitigation strategies could not be discussed in a meaningful fashion until the threat of noxious weeds along the Poudre River riparian corridor has been fully evaluated in an SDEIS and Revised Section 404(b)(1) Analysis for the proposed action, including analysis called for under Subpart H of the Section 404(b)(1) Guidelines. This further analysis is necessary to properly evaluate and address the impacts to the riparian corridor, as required under the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments.

DEIS Section: 4.12 Wetlands and Other Waters, page 4-51
Statement: *"Changes in streamflows are not anticipated to cause a loss in wetland and riparian vegetation for the following reasons."*

Comment: There are conflicting conclusions within the DEIS and supporting documents regarding impacts to riparian vegetation. These contradictions make it difficult to evaluate the consequences of the proposed action to riparian vegetation. *See also* comments on DEIS Section 4.2.1.3 and Section 4.2.1.4, in these Comments, above.

DEIS Section: 4.12, page 4-51
Statement: *"The greatest change in flow will occur on the Poudre River during high flows. These higher flows and their associated stream stages occur infrequently (a few days over the 50 year hydrologic record) and are unlikely to support wetland vegetation which typically occurs at lower elevations closer to the river."*

Comment: This statement originates from the Vegetation Technical Report. Numerous mistakes or inadequacies (such as incorrect data transfer, lack of site specific data and improper application of ecological concepts) undermine the conclusion stated above. Consequently the argument is fundamentally flawed and final conclusions are not supported or proven. *See* detailed comments on Section 6.2.6 (page 55) of the Vegetation Technical Report (VTR) in Section IV.3c of these Comments.

DEIS Section: 4.13.4 Riparian Resources Mitigation, page 4-53
Comment: Due to the conflicts within the DEIS and supporting documents, and due to lack of baseline inventory data for this resource, it is impossible to evaluate mitigation strategies. As a result, the Corps has not met its obligation to address impacts under NEPA and the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments.

DEIS Section: 5.1.6 Mitigation of Riparian Resources, page 5-7
Statement: *"Riparian resources along reaches of the Poudre River may be affected by reduced streamflows during the growing season."*

Comment: The City agrees that the proposed action may have serious consequences on riparian resources on the Poudre River through Fort Collins. These consequences have not been adequately evaluated. As a result, the Corps has not met its obligation to address impacts under NEPA and the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments.

Final comments about DEIS analysis of Vegetation within the City of Fort Collins
The City is concerned that a 25% to 71% reduction in Poudre River flows from NISP will cause unprecedented drought stress to all riparian plant species. There is a significant lack of systematic data collection and analysis, and of consistent findings within the

DEIS and between the DEIS and the supporting technical documents to evaluate these impacts. It is difficult in some areas, and impossible in others, to evaluate the environmental consequences of the proposed action on riparian resources. Again, a rigorous, objective and scientifically based assessment is necessary to properly understand the relationship between altered flow regime, changes in stream morphology, stream stage, alluvial groundwater levels and consequent changes to vegetation is necessary to evaluate these impacts and is required. The Section 404(b)(1) Guidelines call for "*appropriate factual determinations, evaluations, and tests including determination of secondary effects on the aquatic ecosystem."* Section 404(b)(1) Guidelines Section 230.10 and Section 230.11(h).

3c. Comments on the Vegetation Technical Report (VTR)

VTR Section: 5.6 Cache la Poudre River and South Platte River Study Areas, page 31
Statement: *"Palustrine Persistent Emergent and Palustrine Scrub-Shrub Wetlands have established adjacent to the active channel and in depressions in the floodplain."*

Comment: The VTR acknowledges the existence of the specified wetlands along the impacted segments of the Cache la Poudre River. Wetlands in this study area were identified using the Colorado Division of Wildlife (CDOW) riparian mapping project which is based on satellite imagery. This is not sufficient for a DEIS-level analysis. Many small wetlands may be overlooked or wrongly characterized. *See* comments on DEIS Section 4.2.1.3 in Section IV.3b of these Comments.

It is important to note that similar types of wetlands identified in the proposed Glade Reservoir site and in the U.S. Highway 287 realignment study area were rated high or moderate for the following values:.

- general wildlife habitat
- sediment/shoreline stabilization
- production export/food chain support
- ground water discharge/recharge
- sediment/nutrient/toxicant removal
- dynamic surface water storage.

Wetlands along the Poudre River would probably rate moderate to high for most of these categories. In addition, Poudre wetlands might rate high for recreation and educational potential as well. *See* generally Part V of these Comments.

VTR Section: 6.1.2 Effects to Riparian Vegetation, page 35
Statement: *"The assessment of potential effects to riparian and wetland vegetation in the Cache la Poudre River and South Platte River study areas was based primarily on*

estimated changes in average monthly flows and stream stage associated with each alternative."

Comment: Riparian vegetation responds to extreme river flows (highs and lows) that are not best represented by monthly averages. For example, an average reduction of flows for the month of June of 1.77 feet may mean a range of daily reductions from 1 foot to 6 feet. If during a period of seven days the water table is 6 feet lower than current conditions, the riparian vegetation will be significantly impacted. Even though the average reduction seems modest, the consequences of the extremes are what truly matters to the vegetation. Daily flows were modeled for the Spells analysis, and this daily flow data should have been, but was not, used throughout the VTR.

Furthermore, in its scoping letter, EPA (EPA Scoping Comments Letter, page 2) recommended the following: "*The hydrologic analysis should be sufficiently detailed to provide the necessary information for the assessment of biological impacts. Monthly average discharge is usually insufficient for such analysis. At a minimum, wet, average, and dry year analysis should also be included*." The City concurs with this assessment. Analysis consistent with EPA's recommendation should be included as part of an SDEIS and Revised Section 404(b)(1) Analysis.

VTR Section: 6.1.2 Effects to Riparian Vegetation, page 35
Statement: *"Key considerations were potential changes in stream morphology, changes in stream stage or reservoir elevation, and changes in alluvial ground water elevation associated with changes in stream stage…."*

Comment: It is unclear how the analysis considers future changes to stream morphology. The issue of fine sediment deposition is omitted from this discussion despite its having been identified as an issue in the scoping process for the DEIS, and regardless of any other potential short or long term changes in stream morphology. The issue of encroachment, mentioned elsewhere in the DEIS, is not included in the VTR. "*Changes in reservoir elevation…"* is not mentioned anywhere in the analysis, nor is the specific reservoir identified. Measurements of alluvial groundwater elevations were not made. Thus, the City finds the analysis inadequate to support the findings of the VTR or DEIS and inconsistent with the Section 404(b)(1) Guidelines.

VTR Section: 6.1.2 Effects to Riparian Vegetation, page 37
Statement: *"Field visits along the Cache la Poudre River and South Platte River study areas from the Munroe diversion to the Kersey gage were used to verify aerial photos and field check: the location of riparian and wetland vegetation, the influence of flood irrigation, other land use practices, and tributary streams or ditches on riparian and wetland vegetation…."*

And;

VTR Section: 6.1.2 Effects to Riparian Vegetation, page 43
Statement: *"On August 23, September 8, and October 31, 2006 and November 5 and 6, 2007, ERO conducted field reviews along the Cache la Poudre and South Platte rivers."*

Comment: Only 5 field days over a period of 2 years were allocated to visit 12 sites that spanned a distance along the River of approximately 50 miles. It is unclear how these scattered snapshot site visits and qualitative observations provided sufficient data to assess "*the influence of flood irrigation, other land use practices, and tributary streams or ditches on riparian and wetland vegetation*."

Observation of wet soils and of "*water moving towards the river"* (page 54) is cited as key evidence for the major conclusion of this VTR section that "*the riparian vegetation appears to be supported by lower more frequently occurring flows and supplemental sources of hydrology*."

The Section 404(b)(1) Guidelines clearly indicate "*appropriate factual determinations, evaluations, and tests are necessary to assess impacts to the aquatic resources" See* Section 230.10. Five site visits to various river reaches is wholly inadequate to make a quantitative scientific assessment of these factors.

VTR Section: 6.1.2 page 36
Statement: *"Much of the Cache la Poudre River has been physically altered… These activities have limited the development of riparian vegetation by decoupling the historical floodplain from the dynamics of the river and alluvial ground water… Therefore, the evaluation of riparian resources and the potential effects of changes in streamflow focused on river reaches with riparian resources that appear to still be linked to some degree to the dynamics of river flows and shallow alluvial ground water levels that provide a supportive hydrology for riparian and wetland vegetation…. These reaches for the riparian resources appear to be linked to the river to some degree are referred to as sensitive reaches, because of their potential to be sensitive to changes in streamflows."*

Comment: While it is true that anthropogenic practices have altered the River and floodplain and that specific areas are more linked physically to River flows, there is no evidence to back the assertion that other reaches (those not identified as sensitive) have no relationship to the flows in the River due to *decoupling* of the floodplain from the River and alluvial groundwater. This "decoupling" is purely speculative and there is no scientific basis for asserting that less sensitive reaches are not influenced by the flows in the River in a significant way.

It is more likely that there is a complex groundwater flow pattern in this area where the entire Reach receives significant fluvial "recharge" in the spring via the rising stream stage and the probable corresponding rise in the alluvium. Therefore, the majority of the river segments are probably "losing reaches" during spring flows. Return flows from agriculture and other human activities make these gaining reaches in the autumn. The

many gravel pit ponds (lined and unlined), further complicate groundwater movement patterns. The connectivity of the River to adjacent groundwater tables is undoubtedly complex and deserves a quantitative evaluation.

In another example of internal contradictions within the DEIS, the following statement from DEIS Section 4.7.5 appears to contradict the findings made in VTR Section 6.1.2 (page 36) and to more closely align with the City's perspective on this issue:

> **DEIS Section: 4.7.5 Ground Water Cache la Poudre River, page 4-40**
> *"During periods of high river flow (spring runoff) for this reach of the Poudre River, the river likely recharges alluvium adjacent to the river. As high flows decrease and irrigation of adjacent fields increases during the summer months, ground water probably flows toward the river. There is insufficient information to determine whether the river is gaining or losing during the winter months. It is probable that certain portions of the river receive ground water due to the delay in ground water flow from irrigated fields some distance from the river, and there may be neither recharge nor discharge to the alluvium in other portions of the river."*

As discussed throughout these Comments, there are potential negative effects from the altered flow regime predicted to result from NISP along the entire course of the River. Although the channel through the City is heavily affected, and the connection with high flows may not be *obvious*, the varying magnitudes of streamflow under current conditions still perform important ecological functions through the entire Reach and, in particular, exercise substantial influence over riparian and riverine vegetation.

VTR Section: 6.1.2 page 37
Statement: *"The assessment of potential effects to riparian resources focused on the potential for changes in channel maintenance flow to affect the channel and in turn the conditions necessary to support riparian vegetation. The magnitude, duration, timing, and frequency of channel maintenance flows can affect riparian vegetation, which in turn affects channel dynamics (Schmidt and Potyondy 2004)… These relationships may vary substantially in highly altered channels. Schmidt and Potyondy (2004); however, noted that although bankfull elevation is related to vegetation along the channel, a range of channel maintenance flows is necessary to keep vegetation from encroaching on the channel."*

Comment: Although the ecological background provided in the cited paragraph is consistent with ecological theory, this statement indicates that the VTR applies these concepts, but it does not. The VTR does not adequately address the "*range of maintenance flows*." The analysis of magnitude, duration, timing and frequency was incomplete and inadequate. Final conclusions ignored the moderately high flow. The role of scouring is not discussed and vegetation encroachment is omitted in the VTR. The analysis in the VTR considered only impacts to overbank flows and omitted any discussion on the important role of the range of flows.

VTR Section: 6.1.2 page 38
Statement: *"Stream stage (the elevation of water in the channel) can affect the elevation of the alluvial ground water, and may in turn affect riparian vegetation."*

Comment: The VTR repeatedly refers to the relationship between stream stage and alluvial groundwater. However, alluvial groundwater levels were not measured. The influence of moderately high flows (and the reduction thereof under project conditions) on recharging the groundwater was omitted from the actual analysis. The recharge to the alluvial groundwater under the current flow regime by moderate flows cannot be ignored in this assessment when the changes anticipated for the proposed action will greatly reduce the frequency of the moderate flows. This issue is another that must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

VTR Section: 6.2.5 Riparian Vegetation along the Cache la Poudre and south Platte Rivers, page 40
Statement: *"Although supportive hydrologic conditions are essential for the maintenance of wetlands, simple cause-and-effect relationships are difficult to establish (Mitsch and Gosselink 1993)….. The ground water table adjacent to a stream may be higher or lower than the stream, depending on the discharge/recharge relationship between the stream and adjacent ground water."*

Comment: Difficulty establishing such linkages does not justify ignoring them, especially where assessment of this issue is essential under the Section 404(b)(1) Guidelines. *See* comments on VTR Section 6.1.2 (page 36), above. This statement is fundamentally deficient and should be reanalyzed in a Revised Section 404(b)(1) Analysis.

VTR Section: 6.2.5 page 45
Statement: *"Table 2. High and moderate flows associated with cross sections used for spell analysis and changes with action alternatives..."*

The title for this table refers to "high and moderate flows". This is the first time these terms are used in the VTR. Also, in the body of the table there are references to "high and low" flows. No information is provided to quantitatively or qualitatively describe what is meant by "high," "moderate," and "low" flow.

VTR Section: 6.2.5 page 45
Comment on the data in the body of Table 2

Comment: The final conclusions in the VTR refer to data from this Table 2 as a key piece of evidence. The table was created by transferring data from Table 3.11 in the

River Morphology and Sediment Transfer Technical Report (RMSTTR). Significant mistakes were made during the transfer of the data.

Specifically, there is a column in Table 2 titled "*Number of Spells (days)"*. The corresponding column in Table 3.11 in the River Morphology Technical Report uses the title "*Number of high spells*" which is explained in the body of the text as "*…the number of times in the period for record that the flow threshold is exceeded. A spell must be at least 1 day long and spells must be separated by 3 days*." Table 3.11 also has a column titled "*Total duration of all High Spells (days)"* and this would have been the appropriate data to transfer to Table 2 in the VTR. To clarify, Table 2 is presented below. The correct values (the values presented in the RMSTTR in Table 3.11) have been provided in parenthesis and italicized in the 3rd and 4th columns.

Table 2. High and moderate flows associated with cross sections used for spell analysis and changes with action alternatives.

Cross Section Spell Threshold (cfs)	Number of Spells (days)1	Baseline	Project
234557	2,000 (low)	17 *(93)*	5 *(28)*
	3,600 (high)	4 *(13)*	0 (n/a)
233367	1,600 (low)	19 *(136)*	9 *(53)*
	3,400 (high)	5 *(19)*	0 *(n/a)*
187158	1,400 (low)	20 *(178)*	12 *(76)*
	2,400 (high)	10 *(51)*	5 *(16)*
152250	200 (low)	167 *(1235)*	136 *(921)*
	400 (low)	93 *(697)*	73 *(481)*
	2,300 (high)	9 *(56)*	4 *(19)*
	3,800 (high)	3 *(8)*	0 *(n/a)*
133345	1,900 (low)	28 *(120)*	7 *(30)*
	3,600 (high)	5 *(14)*	1 *(1)*

This error undermines subsequent conclusions in this section. The discussion on pages 55-58 of the VTR uses these incorrect values to draw final and significant conclusions about the influence of overbank flows on riparian vegetation. For each cross section the report refers to the frequency of overbank flows and concludes that *"neither of these flows currently occur at a frequency sufficient to provide hydrologic support for riparian vegetation."* With the correct data set this conclusion would be different. The issue must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

VTR Section: 6.2.5 page 46
Statement: *"Reductions in streamflow will result in reductions in stream stage... In areas where the water table decline was less than 3.1 feet, cottonwood mortality was between 7 percent and 13 percent. In another study, Scott et al. (1999) noted that over a 3-year period in medium grained alluvial sands, sustained declines in the water table of greater than 3.1 feet resulted in 88 percent mortality of plains cottonwood. The study further noted that gradual water declines of about 1.5 feet had no measurable effect on mortality, stem growth, or live crown volume (Scott 1999).*
Corresponding statement page 51: *"Lincoln Gage. During the growing season the largest changes in mean monthly stream stage (up to -1.77 ft) would occur during wet years,…In addition, in May, stream stage would be about 0.71 ft below baseline conditions …in average years up to 0.96 feet in June…These changes in vegetation are unlikely to cause a loss of wetland or riparian vegetation…"*

Comment: The Scott et al. (1999) study was improperly applied to the Poudre River study area. Scott et al. (1999) reported cottonwood response to changes in the alluvial ground water table. The conclusion from page 51 of Scott et al. (1999) quoted above refers to "*changes in mean monthly stream stage."* The VTR provides no data on the relationship between stream stage and ground water levels or the distinctions that may apply in this highly modified urban environment, and these relationships cannot be assumed.

Despite this flaw, the VTR uses the value of 3.1 feet as the factor that would cause *88% mortality* and a 1.5 foot decline as a change that would cause "*no measurable effect on mortality, stem growth, or live crown volume…"*and then proceeds to omit additional relevant results from this study. Scott et al. observed a 1.5 foot decline to cause "significant declines in annual branch growth increments." Given the relatively short duration of the observation period (3 years) relative to the life of a cottonwood, Scott et al. distinguish between severe water stress (rapid mortality) and sub-lethal water stress (reduced growth). The authors note that the trees experiencing sub-lethal water stress "may be more vulnerable to subsequent periods of low precipitation and high temperatures". Given the numerous studies documenting physiological and morphological stresses on cottonwoods resulting from dewatering (Reily and Johnson, 1982, Tyree et al., 1994, Obedinski et al., 2001, Rood et al., 2003), and the incorrect application of stream stage instead of ground water, the analysis in the VTR is inadequate and flawed. The issue must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

Scott et al. also discuss many site specific ecological and physiological factors which influence the responses of cottonwoods in their study. The article concludes by asserting results are valid within the specific parameters of the study site. As well, the authors acknowledge that "clearly, other combinations of antecedent water table environments, meteorological conditions, drawdown patterns and soil characteristics are possible and beyond the scope of this study…" (Scott et al., 1999). The VTR fails to discuss the characteristics that distinguish the Poudre River environment from the site of the referenced study, or to analyze the significant of those distinguishing characteristics.

Another significant problem with the analysis is the use of the monthly changes in stream stage. Given that daily flows were modeled for the Spells analysis, it is unclear why monthly values were used here. Along with many other river ecologists, the same researchers (Scott et al.) have observed that riparian vegetation is extremely sensitive to changes in minimum and maximum flows (Auble et al., 1994). Without daily flow data, the changes to flow boundaries are unknown, and the analysis is incomplete.

The potential impact of NISP on cottonwoods is extremely important to the City. As stated by Rood et al. (2003a) "Cottonwoods not only have intrinsic environmental and aesthetic value, they also provide the foundation for the riparian forest ecosystem."

Cottonwoods are a keystone species. A keystone species is a species that has a disproportionate effect on its environment relative to its abundance (Power et al. 1996). Such species affect many other organisms in an ecosystem and help to determine the types and numbers of various others species in a community

Such an organism plays a role in its ecosystem that is analogous to the role of a keystone in an arch. While the keystone feels the least pressure of any of the stones in an arch, the arch still collapses without it. Similarly, an ecosystem may experience a dramatic shift if a keystone species is removed, even though that species was a small part of the ecosystem by measures of biomass or productivity.

The City has spent decades and made significant financial investment in protecting the Poudre River floodplain, its habitat, and its aesthetic and recreation resources for the people of Fort Collins and Larimer County. A more detailed, science-driven data analysis is necessary to evaluate the fate of cottonwood forests under the proposed action. The issue must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

VTR Section: 6.2.5 pages 47-48
Statement: *"Wetland vegetation, especially herbaceous wetland vegetation, may be more sensitive to changes in ground water levels… Six inches (0.5 feet) is a conservative estimate of the change in stream stage that could affect wetland vegetation…in other reaches where wetland vegetation …it is likely that this (wetland) vegetation is supported by commonly occurring lower flows and may adjust over time to any changes in elevation."*

Comment: This section of the VTR is difficult to understand and evaluate. There seems to be confusion about the fact that areas may contain jurisdictional wetlands, but riparian areas may also include a mosaic of other fluvial influenced areas that may not be "wetlands" in the strict legal sense but are uniquely riparian (i.e. they exist specifically because of the dynamic river flows). In the absence of an inventory of jurisdictional wetlands, modeling of groundwater levels, and alluvial recharge, these conclusions are not supported on a scientific basis.

Furthermore, the claim that the herbaceous vegetation "*may adjust over time to any changes in elevation*" (we assume water table elevation) is not supported by data collection, vegetative modeling, or other research. Rather than existing plant communities adjusting over time, it is more likely that the process of non-native vegetation out-competing native species will be further accelerated, or that vegetation characteristic of wetlands will simply disappear.

VTR Section: 6.2.5 pages 51
Statement: *"In April and September, under Alternatives 2, 3, and 4, mean monthly stream stage during the growing season would change very little (ranging up to -0.01 feet), compared to baseline conditions."*

Comment: This is the first mention of "baseline conditions" in the VTR. Baseline conditions are not defined. It might be that this is a reference to the Baseline conditions modeled in the River Morphology and Sediment Transfer Technical Report (RMSTTR), but this unclear. This is relevant because if baseline conditions are developed from a dry year or based upon average low river flow, plants are more likely to be sensitive to smaller changes in river flow than if the baseline conditions are developed from a higher baseline. In other words, a reduction in stage by 0.5 foot at low flow (low baseline) would have a greater effect than the same reduction in flow at a higher baseline flow. The baseline issue must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

VTR Section: 6.2.6 Riparian Vegetation Impacts Summary, page 53
Statement: *"Based on the preliminary analysis using mean monthly flows and stage, it was determined that additional studies were needed …these studies included representative cross sections, generated daily flow data for key locations…"*

Comment: If daily flow data was generated in the additional studies suggested in this VTR section, that data should have been used throughout this analysis and disclosed. Instead, a monthly timestep was used, which is essentially meaningless for assessing impacts to vegetation and ignores the physiological stress experienced by plants under short term drought stress. A discussion based on daily reductions during the peak runoff would have created a useful comparison under which to evaluate the alternatives. This should be done in an SDEIS and Revised Section 404(b)(1) Analysis.

VTR Section: 6.2.6 page 53
Statement: *"Generally, NISP would have less effect on the more frequently occurring moderately high flows, a greater effect on high-flow events, and little effect on the rare large flood events."*

Comment: This statement is unclear and is in direct conflict with other supporting documents. For example, Section 4.1.4 of the River Morphology and Sediment Transfer Technical Report (RMSTTR) (page 4.5) states "*…In summary, the frequency of flooding would be less throughout the study area after the Project. The most consistent effect is on moderate floods where a 4-6 year average recurrence interval would occur on average once in 20 years after the Project."* Because there is no definition of "more frequently occurring moderately high flows" and "high-flows" provided, it is not possible to analyze this statement, particularly given the significant lack of consistency with conclusions in other DEIS documents. These issues must be reconciled in an SDEIS and Revised Section 404(b)(1) Analysis.

VTR Section: 6.2.6 page 53
Statement: *NISP's effects on flow duration for the Poudre River would be the greatest for the upper reaches through Fort Collins. The average annual range in the duration of flows of 800 cfs to 3,000 cfs would be reduced from 45 days per year to 28 days per year, and the mean daily flow would be reduced from 219 cfs to 158 cfs. ….. The average recurrence interval for flows of 2,000 cfs, a relatively high flow, in the Laporte through Timnath reaches would double from about 1 to 2 years; the average recurrence interval for a flow of 3,000 cfs would increase from about 1 in 4 years to 1 in 20 years.*

Comment: The role of peak flows in maintaining recruitment patterns, age-class structure, and sustaining riparian communities through rising alluvial groundwater or overbank inundation is discussed earlier in the VTR but is not considered in the statement quoted here. A 50% decrease in number of days these high flows will occur and the doubling or quadrupling of recurrence intervals for high flow events is very likely to have a major adverse impact on the riparian vegetation because of the critical functions served by these types of flows.

VTR Section: 6.2.6 page 53-54
Statement: *"Based on these projected changes in flows and assessment of representative cross sections, the following conclusions were reached regarding trends and effects to riparian vegetation….."*

The sites typically have sources of supportive hydrology in addition to the river (e.g., gravel pit ponds elevated above the river, tributary drainages, seeps, or irrigation ditches, or these in combination). These supplemental sources of water were evident even in early November during low flows as many of the sites reviewed had areas

that were saturated and water was observed moving toward the river from nearby sources at elevations higher than the river. Wetlands within these sites were saturated in the fall when streamflows were low."

Comment: As stated in comments on VTR Section 6.1.2 (page 37), above, snapshot observations, and zero groundwater data is not sufficient evidence upon which to derive this conclusion. According to Section 404(b)(1) Guidelines Section 230.5 (e), the DEIS must… "*evaluate the various physical and chemical components which characterize the non-living environment of the waters…including its dynamic characteristics*." The Section 404(b)(1) requirements are not satisfied by "*observations of wet ground in November.*" This issue must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

VTR Section: 6.2.6 page 54

"Typically, the oldest trees occur along the margins and higher elevations of the floodplain (i.e., farthest from the river), and many of these older trees are decadent."

Comment: It is unclear how the authors identified the age of the cottonwood trees. The forestry literature is replete with data demonstrating that stem diameter is often a poor indicator of tree age. Tree coring (which is reliable) was not mentioned. Given the human history of the area (including plantings, ditches) there is probably a complex mosaic of different age cottonwoods throughout the study area.

VTR Section: 6.2.6 page 55-58

Statement: *"…..The NISP action alternatives would reduce the frequency of flows of 3,400 cfs from 17 to 5 days and flows of 1,600 cfs from 19 to 9 days for the 50 years of hydrologic record (Anderson 2008). Neither of these flows currently occur at a frequency sufficient to provide hydrologic support for riparian vegetation. It is likely that most of the supportive hydrology comes from the lower more frequently occurring streamflows and supplemental sources such as the ditch and nearby ponds."*

Comments: Due to incorrect transfer of data from the River Morphology and Sediment Transfer Technical Report (RMSTTR), the results of this analysis are grossly misrepresented. For example, it should state that flows of 1,600 cfs would be reduced from 136 days to 53 days. These mistakes are fundamental and would fundamentally modify the author's conclusions. The baseline issue must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

Furthermore, the argument ignores the important increase in water available to riparian vegetation during moderately high flows (not overbank flows of 1,600 or 3,400 cfs). It is well documented that these moderately high flows cause a corresponding rise in groundwater levels in riparian soils, which the DEIS recognizes elsewhere. *See, for example,* DEIS Section 4.7.5 (page 4-40): … "*During periods of high river flow (spring runoff)… the river likely recharges alluvium adjacent to the river."*

VTR Section: 6.2.6 page 55-58
General comment about interpretation of Spells analysis: It is important to note that the River Morphology and Sediment Transfer Technical Report (RMSTTR) provides a brief "Interpretation of the Results of the Spells Analysis". Its conclusions are inconsistent with those drawn in the VTR in this Section. While the VTR essentially concludes that there will be no impact to the riparian areas along the Poudre River due to hydrologic changes, the RMSTTR excerpt below indicates recognizable, foreseeable changes to flow magnitude and duration and consequential negative impacts to vegetation:

> **RMSTTR Section 4.1.5, page 4.5**
> *"The spells analysis reported in Chapter 3 further elaborates the likely impact of the project by reporting on both occurrence and duration of flow events that correspond to flow thresholds with a particular significance to geomorphology or colonization and survival of riparian vegetation. In general, the analysis reveals a substantial reduction in the occurrence and duration of high flow events throughout the study area under Project conditions. At all of the stations that were analyzed, the number of overbank flows would be reduced by as much as 50% and the average duration of the remaining events would also be decreased.*
>
> *At all the stations that were examined, the number of occurrences of significant overbank flows has decreased markedly. For two stations in the Fort Collins Reach, the number of occurrences of significant overbank flows in the modeled period (1975 to 1999) decreases from 4 or 5 under Baseline conditions to zero with the Project. At another station in the Fort Collins Reach, and also a station downstream in the Timnath Reach, the occurrence of significant overbank flows is now halved (from 19 to 10 occurrences at one station and from 10 to 5 occurrences at the other). The reduction in occurrence is accompanied by a 50 to 70% reduction in the total duration of the overbank flows. There is a similar impact on the lower flow thresholds although the effect is generally less dramatic at the smaller flows.*
>
> *As well as having an important influence on colonization and maintenance of vegetation, the occurrence and duration of flows that inundate channel benches and the floodplain is also important to sediment movement and the morphology of the channel. An elongation of the average time between flow events that are large enough to be capable of scouring the channel gives a longer period for vegetation to establish. A shorter duration of scouring flows means that less net channel change will occur. A trend toward fewer and shorter high flow spells is apparent throughout the study area."*

4. Aquatic Habitat Quality and Aquatic Life

4a. General comments

The City and authors of the DEIS recognize the significance of the Poudre River through Fort Collins as a transition area from a cold water to warm water river. Areas of physical transition from one habitat to another are typically rich in species diversity and sensitive to external environmental perturbations. The City is particularly concerned that lack of field data and limited modeling efforts of the DEIS are not likely to lead to an accurate portrayal of the possible environmental consequences to the aquatic biological resources from the proposed action. Thus, contrary to the conclusions of the DEIS, the City believes that there may be major adverse impacts that could reduce or eliminate certain aquatic life in the Poudre River as a result of the proposed action. Further, the City believes that degraded water quality, large reduction in peak flow, channel narrowing and increased sedimentation will result in reduced ecological function that likely cannot be mitigated. Because the DEIS does a poor job of describing the direct and indirect impacts to aquatic resources resulting from the proposed action, its discussion of mitigation measures is premature at best, and does not suffice to meet the requirements of NEPA and the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for more discussion of this issue generally.

4b. Specific Comments on DEIS

DEIS Section: 3.15.5.1 Macroinvertebrate Populations, Cache la Poudre River, pages 3-74 - 3-76
Statement: *"Shieh et al. (1999) collected macroinvertebrate samples from the Cache la Poudre River…"*

Comment: In addition to Shieh, *et al*. (1999) the following relevant literature should have been reviewed to provide a more comprehensive analysis of the macroinvertebrate communities of the Poudre River, Fort Collins, and to support conclusions throughout this section:

- Grotheer et al., 1994.
- Shieh et al., 2002.
- Shieh et al., 2003.

Additionally, Dr. Douglas A. Rice, Laboratory Director, Environmental Health Services, Colorado State University, has thirty years of macroinvertebrate data available for the Poudre River through the study stretch and would be an essential resource for further evaluation.

This entire section of the DEIS is uninformative and the conclusions are not completely accurate based on the available data. The section basically concludes that "based on 2005 data, as well as earlier data, abundant and diverse macroinvertebrate populations inhabit

the Poudre River within the study area." This statement is not accurate upon examination of other published and unpublished data (Grotheer et al., 1994, Rice unpublished data, Shieh et al., 1999, Shieh et al., 2002, Shieh et al., 2003). In fact, macroinvertebrate diversity is significantly reduced and community structure and function significantly altered in the Poudre River through Fort Collins. For example, when using the NAWOA data set (based on USGS 2003, as cited on page 3-76 of the DEIS), in all reaches combined at the mouth of the Canyon at least 122 macroinvertebrate taxa were identified, 87 taxa at a Fort Collins site, and East of Interstate 25 only 45 taxa were found (Kondrateiff 2008).

Furthermore, the statement that *"at all sites, indicating that healthy invertebrate communities inhabit the Cache la Poudre River within the study area [interpreted from Shieh et al.. 1999]"* is misleading because

1. pollution sensitive and strongly rheophilic taxa such as Plecoptera (stoneflies) occurred only upstream of Fort Collins;
2. diversity clearly decreased downstream [Site 1 upstream of Fort Collins, about 30 taxa; Site 2 below Fort Collins, 21 taxa];
3. Smaller and faster growing taxa with multiple generations (e.g. chironomid midges) that are pollution tolerant and are slow water forms dominate sites below Fort Collins. (Interestingly, this is actually indicated in Section 3.15.5.1: "The number of EPT taxa [pollution sensitive and rheophilic aquatic insect orders: Ephemeroptera (mayflies)/Plecoptera (stoneflies)/Trichoptera (caddisflies)] at each site ranged from **five** taxa at I-25 to **15** taxa upstream").

Other than the Physical Habitat Simulation (PHABSIM) modeling (which does not consider water temperature), no other analysis is presented in the evaluation of the proposed action (reduced peak flows and seasonal snowmelt floods) of the structure and function of the macroinvertebrate community and benthic habitat quality of the Poudre River through Fort Collins.

Similarly, PHABSIM results are not useful for judging future impacts. Therefore, more weight should be given in a DEIS to the results of the stream morphology, water quality and hydrology reports. The detrimental effects of degraded water quality, large reduction in peak flow, channel narrowing and increased sedimentation predicted to result from NISP would result in less ecological function than currently exists in this river segment, and the DEIS fails to adequately assess those impacts.

DEIS Section: Section 4.15.1.1 Hydrology, page 4-59-60
Comment: As stated earlier, the use of mean monthly data is not sufficient for a meaningful biological analysis. Mean monthly flow masks the range of values that occur within a month. In months when flows are increasing (ascending hydrograph limb) or decreasing (descending hydrograph limb) during the month, the mean monthly value does not represent the conditions experienced by the aquatic fauna. A daily flow regime should be used to determine impacts to aquatic fauna and habitat. Daily flows for typical

wet, average, and dry years should be simulated and analyzed. The hydrologic regime issue is fundamental to evaluating water project impacts and must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

DEIS Section: Section 4.15.2.1.1 Upstream of Fort Collins, page 4-61
Statement: "*Water quality and riparian vegetation are not expected to change from existing conditions for any of the action alternatives in this segment of the river (ERO and HDR 2008; ERO 2008a) and would have no effect on aquatic biological resources.*"

Comment: This blanket statement disagrees with the conclusions presented in the Water Quality Technical Report (WQTR) (page 36): "*Temperatures greater than 20 C have occasionally occurred between mid-July and mid-September; the predicted flow decreases could result in river temperatures that exceed 20 C more frequently and for longer periods. A dissolved oxygen concentration less than the spawning standard of 7 mg/l has occurred in the past; with reduced flows and warmer stream temperatures, the dissolved oxygen standards could be more frequently exceeded.*" This statement from the WQTR indicates a minor to moderate impact to biological resources and not this "no effect" conclusion stated on DEIS page 4-61. *See also* the comments on Vegetation, above in Section IV.3 of these Comments.

DEIS Section: Section 4.15.2.1.1 Upstream of Fort Collins, page 4-61
Statement: "*The reductions in peak flows also would tend to reduce movement and scouring of the substrate, which would tend to benefit benthic invertebrates that live in the substrate and also tend to benefit longnose dace, a common minnow species in the substrate in this segment.*"

Comment: Research has shown that substrate movement is necessary in healthy river ecosystems (Bunn and Arthington, 2002). Annual runoff of snow melt to dependent streams is the process responsible for habitat creation and maintenance. Reductions in peak flows of the magnitude predicted to result from NISP and their scouring effect can result in embedding the channel substrate and subsequent loss of interstitial (soil pore) space utilized by benthic invertebrates.

The City does not agree that longnose dace live in the substrate. This species is generally found close to the bottom substrates but live on the surface of the cobbles and gravels. The only life stage of this species that is small enough to utilize the interstitial spaces would be larval forms. Spawning occurs for an extended period during the summer. This reproductive strategy is geared toward a higher probability of timing the spawn period with snow melt peak flows.

Similarly, benthic invertebrates are adapted to snow melt runoff, and the movement of the stream substrate is beneficial to the habitat. The City does not agree that a non-mobile substrate during peak flows is beneficial. In fact, the reduction in scouring flows to remove fine substrate that NISP is predicted to cause would be detrimental by allowing

fine sediments to either remain in place (go un-scoured) or settle in the water column which in turn continues to embed the channel substrate. Continued channel embedding is likely to result in a loss of aquatic diversity, including invertebrates and fish.

DEIS Section: Section 4.15.2.1.1 Upstream of Fort Collins, page 4-61
Statement: "*Therefore, the information on hydrology and habitat availability for fish and invertebrates indicates that the action alternatives would result in a minor beneficial effect to fish and invertebrate communities in this segment of the Poudre River (Table 4-11). There would be increases in abundance of fish and invertebrates and possibly increased number of species of invertebrates.*"

Comment: In contradiction to the above-quoted statement, the changes that would result from the action alternatives would not be beneficial to fish and invertebrates. Page 4-63 of the DEIS states that "…*the adverse effects of slightly degraded water quality, channel narrowing, and sedimentation*" is likely to cause significant impacts to fish and invertebrate populations, confirming that impacts would not be beneficial. Further, the DEIS incorrectly assumes that the water quality, channel narrowing and sedimentation impacts from NISP would be slight. As discussed at length above, all of these impacts would be much more significant than acknowledged in the DEIS. In addition, the lack of sediment flushing and embedding of the channel substrate with increased water temperatures as a result of the proposed action will also contribute to environmental conditions unsuited to healthy fish and invertebrate life. The cumulative effect of these negative impacts from NISP will be detrimental and will reduce or eliminate important native species and/or eliminate the opportunity for their conservation/reintroduction. The DEIS has not collectively considered these factors as a cumulative impact. The overall result for this section of the River from the action alternatives would be a major adverse impact that must be, but has not been, identified or evaluated in the DEIS. *See* Section 404(b)(1) Guidelines Sections 230.31, 230.51. *See also* Section II.1a of these Comments.

DEIS Section: Section 4.15.2.1.2 Near Fort Collins, page 4-61
Statement: "*Changes to channel morphology, increased sedimentation, degraded water quality, and the greater occurrence of low flows would be detrimental to both fish and invertebrates. The adverse effects would result in lower abundance and fewer species of fish and invertebrates. These minor adverse effects would occur gradually over time, and fish and invertebrate communities would adapt to the new flow regime and channel morphology.*"

Comment: The changes to the River from NISP would be detrimental to both fish and invertebrates, and would constitute more than a "minor adverse effect". According to the methods used for impact analysis, loss of species diversity and abundance would be a "moderate or major adverse effect". The stated conclusion that NISP would result in lower abundance and the loss of species meets the criteria to be a major adverse effect. Fish and invertebrates would not "adapt" but would be forced to conform to the new flow regime, degraded water quality, and channel conditions. The result could be a major

adverse negative effect to existing biological resources up to and including localized extirpations of existing fish and invertebrate assemblages.

Furthermore, it should be noted that the DEIS Statement quoted above concludes that there will be contrasting impacts to these two referenced river reaches. It is very unlikely that the impacts will differ from a minor beneficial effect to a minor adverse effect in adjacent river reaches.

DEIS Section: Section 4.15.2.1.3 Fort Collins to I-25, page 4-63
Statement: *"The action alternatives would have a minor to moderate beneficial effect to fish and invertebrate communities in this segment of the river (Table 4-11). This would result in increased abundance and number of species of fish and invertebrates."*

Comment: This conclusion is based mainly on the result of the PHABSIM analysis. As noted for other sections of the River where channel changes are predicted, PHABSIM results are not useful for judging future impacts. Therefore, more weight should be given to the results of the stream morphology, water quality and hydrology reports. The detrimental effects of degraded water quality, large reduction in peak flow, channel narrowing and increased sedimentation would result in less ecological function than currently exists in this segment of the River. As with the next upstream reach, this is likely to result in the loss of species and abundance and not an increase in species and abundance. There will be major adverse effects to this river segment from NISP. This issue must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

DEIS Section 5.8.3 Temperature and Dissolved Oxygen, page 5-16
Statement: *"To control adverse impacts to the temperature of the Poudre River, the District will implement, to the Corps' satisfaction, the means to mitigate any significant adverse effects of Glade Reservoir releases on the temperatures of the Poudre River. Discharge to the Glade forebay and the Poudre River will be fully aerated by the energy dissipation structures."*

Comment: The District's commitment to mitigate for the impacts of temperature variation and dissolved oxygen levels on the cold water fishery requires more detail to meet the requirements of the Section 404(b)(1)Guidelines. More information is required concerning the target minimum stream flows in the reach and the District's operational response when temperatures exceed those identified by cold water fishery experts. Without additional detail or commitments, these vague assertions and assurances do not suffice to address the serious harms to the aquatic ecosystem in the City. *See* Section II.4b of these Comments.

4c. Comments on the Aquatic Biological Resources Technical Report (ABRTR)

ABRTR Section: 2.2, page 31
Statement: *"All three of these other resource areas are conducting additional studies and when these studies are done, the resulting effects on aquatic organism may have to be revised."*

Comment: This statement is in reference to the Water Quality Technical Report (WQTR), Vegetation Technical Report (VTR), and River Morphology and Sediment Transfer Technical Report (RMSTTR). It is not clear when this additional analysis will be completed and whether the comment period would be extended for public review of the revised ABRTR. The ongoing need for this work further confirms the inadequacy of the DEIS and the need for an SDEIS to allow meaningful public review and comment on this issue.

ABRTR Section: 2.2.1. Approach to Analysis, page 32
Statement: *"From approximately the western edge of Fort Collins downstream to approximately Interstate 25, the Cache La Poudre River is a transitional stream from coldwater to warm water habitat."*

Comment: The City agrees with this statement and notes that the River in this transitional reach supports both coldwater and warmwater species. However, the Water Quality Technical Report (WQTR), upon which the ABRTR depends for information regarding changes to water quality to result from NISP, considers the River from approximately Shields Street downstream as warm-water. Therefore, the conclusions in the ABRTR regarding the environmental consequences from NISP do not address impacts to the coldwater species. The data and analysis of environmental consequences must address the impacts to the existing coldwater biological resources downstream to approximately Interstate 25. This would require additional analysis of water quality; in particular, water temperature changes as a result of the proposed action. Effects of the proposed action on water temperature and the potential impact to the aquatic resources were an important factor noted during project scoping. This issue must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

ABRTR Section: 2.2.2. Hydrology, page 33
Statement: "*The comparison of hydrologic parameters between alternatives was the primary tool in this report for evaluating the potential effects on aquatic resources in the streams in the study area. In this report, we used summaries of mean monthly flow at nine locations on the Cache La Poudre River and one location on the South Platte River (Figure 5).*"

Comment: Mean monthly data is not an adequate basis for analysis of effects on aquatic resources. The monthly time scale is not sufficient to determine changes on the aquatic resources. The EPA in its scoping letter (EPA letter page 2) recommended the following: "*The hydrologic analysis should be sufficiently detailed to provide the necessary information for the assessment of biological impacts. Monthly average discharge is usually insufficient for such analysis. At a minimum, wet, average, and dry year analysis should also be included*." There are large changes to hydrology for the action alternatives, which should be addressed by using daily hydrology for wet, average, and dry year types. This would allow the comparison on a biologically meaningful time scale. This analysis should be conducted and presented in an SDEIS and Revised Section 404(b)(1) Analysis.

ABRTR Section: 2.2.3 Instream Flow Incremental Methodology, page 40
Comment: The City agrees with the use of the Instream Flow Incremental Methodology (IFIM) and the Physical Habitat Simulation (PHABSIM) portion of that model. The study relied on existing data sets for the habitat simulations. Based on the methods described, only the existing Weighted Usable Area (WUA) data was used in the analysis. It does not appear that any ground-truthing of the existing cross section data was completed to determine applicability to the present day channel. All of the existing data sets were collected over 20 years ago and substantial changes may have occurred to the River within the City. In particular, the cross section data should have been reviewed to insure that the hydraulic simulations conducted in the mid-1980s were still representative of today's environment.

The PHABSIM data included cross sectional information that could be used to address impacts of changes in wetted area on benthic invertebrates. As noted earlier, the use of mean monthly flow data does not allow a biologically meaningful analysis of flow fluctuations on benthic fauna; however, the large changes in flows on a monthly basis seem to indicate that large fluctuations on a more frequent basis are possible.

ABRTR Section: 2.2.3 Instream Flow Incremental Methodology, page 40
Statement: "*We focused our effects analysis on the minimum habitat levels for each species/life stage. Therefore, we determined the minimum habitat level in a given year type (average, wet, and dry*)."

Comment: Minimum habitat level can influence population levels; but impacts on habitat levels cannot be adequately analyzed based on a single minimum habitat value for each year type, especially a single monthly value. Other factors such as frequency of occurrence are also important to aquatic populations. Additional interpretation of time of year should be addressed, as well as minimum habitat value. Time of year is important to determining the impact of changes in river flows on habitat. For most PHABSIM studies, the habitat suitability criteria are derived for moderate to low flows. Habitat use by the species of interest is typically variable on a seasonal basis. Habitat occupied during base flow is likely not the same habitat occupied during peak runoff. The analysis should

include an interpretation of a time series graph of the habitat for wet, average, and dry years and should be fully explained and presented in an SDEIS.

ABRTR Section: 3.2 Fish Populations, page 46
Comment: The fish occurrence data should be segmented by study reach to provide a basis for evaluating environmental consequences. While the list of species for the total study area is informative (Table 2, Page 46), the presence of species by river segment would provide more useful information, especially since the Cache La Poudre River is transitional from coldwater to warm-water within the study area. The historical data should be presented in the same format as the supplemental data collected in 2005.

ABRTR Section: 4.1.1. Upstream of Fort Collins, Effects Summary, page 71
Statement: *"The reductions in maximum flows during runoff in May, June, and July with the action alternatives would tend to increase habitat availability for brown and rainbow trout more than the reductions in winter flows would decrease habitat availability."*

Comment: This statement is confusing. It is illogical to compare impacts to trout from reduced peak flows with the impacts due to reduced winter flows. Furthermore, the assertion in the first half of the statement runs contrary to accepted ecological theory and the ABRTR should therefore provide supporting literature. Second, it is unusual to make a direct comparison between habitat at peak flow and habitat during winter flow, as habitat requirements are distinct for each season. Recent research on ecological flows has shown that the channel maintenance that occurs at peak flow is very important to long term habitat health (Bunn and Arthington, 2002, Fausch et al., et al., 2002, Rathburn et al., in press).

Additionally, the use of PHABSIM to evaluate peak flows should be secondary to the stream morphology analysis for peak flows. The habitat time series graphs do show that the minimum habitat occurs during runoff (Figures G-3 & G-6). These same graphs show winter habitat is reduced by NISP by approximately 20% or more for several months. The fact that the full channel is wet during peak flow and only a partial channel is wet at the base flow should be incorporated into the interpretation of impacts. The cross section data used from the previous studies with graphs of water surface versus discharge would depict the amount of wetted area available for fish habitat. The amount of wetted area is also important to the continued productivity for benthic invertebrates. The reduced area of wetted channel would provide less habitat for invertebrates and will negatively impact the biological community.

ABRTR Section: 4.1.2. Near Fort Collins, Effects Summary, page 77
Statement: *"The changes to channel morphology, the increased sedimentation, degraded water quality, and the greater occurrence of low flows would be detrimental to*

both fish and invertebrates. The adverse effects would result in lower abundance and fewer species of fish and invertebrates."

Comment: The City agrees with this statement. An SDEIS should study in detail the effects of lower dissolved oxygen levels and higher temperatures on fish and invertebrates as well as on trout habitat. The City does not agree with the following statement that concludes the paragraph:

ABRTR Section: 4.1.2. Near Fort Collins, Effects Summary, page 77
Statement: "*The minor adverse effects would not be more serious because, over time, these changes will happen gradually, and the fish and invertebrate communities would adapt to the new flow regime and channel morphology."*

Comment: A reduction in fish and invertebrate abundance and diversity can not be considered an "adaptation". There will be a reduction or elimination of biotic diversity due to degradation of stream conditions from NISP. The resulting loss of species should be considered a major adverse impact. The ABRTR presents a good summary of the loss of species over time. However, that gradual loss of species due to human induced changes to the Cache La Poudre should not be considered "natural" and must be put in context of the impact of the proposed action on the baseline (i.e. existing) aquatic fauna in the River. This misleading characterization must be corrected in an SDEIS.

ABRTR Section: 4.1.3 Fort Collins to Interstate 25, Effects Summary, page 83
Statement: "*The information from both the hydrology and PHABSIM simulation indicates that the action alternatives would provide substantially more habitat for fish and invertebrates than the baseline flow conditions …. However, the beneficial effect would be dampened by the adverse effects of slightly degraded water quality, channel narrowing and sedimentation.*"

Comment: This statement appears to argue that decreased peak flows and increased winter base flows would provide more habitat than the current flow regime. The City does not agree, however, that a reduction in spring flows of the magnitude predicted to result from NISP, which would result in additional sedimentation and channel narrowing (among other negative effects), would provide more aquatic habitat. Accumulation of sediment would change the environment for both invertebrates and fish, and possibly modify (negatively) the food chain. Further analysis in an SDEIS is needed to determine if the degree of sediment accumulation, water quality degradation, and channel narrowing would override the benefit of higher winter base flows.

ABRTR Section: 6. Mitigation, page 99
Comment: The ABRTR contains no discussion of avoiding or lessening losses to aquatic resources for the transitional reaches of the Cache La Poudre River. The mitigation, as proposed, does not address the loss of habitat and species complexity in the

River downstream of the Pleasant Valley and Lake Canal. The proposal to stock native fish in isolated, off-channel habitats would not constitute mitigation for losses in the primary channel. Isolated habitat without connection to the River for voluntary ingress and egress does not contribute to the riverine community. Further, these types of habitat were not quantified in the existing environment section to determine if these habitats are available, have permanent water of sufficient water quality to support reproducing population, or would be subject to avian and mammalian predation without adequate escape cover. Finally, the hypothesis that these stocked fish "may escape from these areas and recolonize the Cache La Poudre River" is highly unlikely given the reduction of peak flows. Out of channel peak flows would be required to inundate these isolated off-channel areas and allow fish to move out of the isolated areas.

5. Terrestrial Wildlife

5a. General comments

Riparian habitats in semiarid landscapes support a disproportionately high number of wildlife species. For example, 82% of all breeding birds in northern Colorado occur in riparian habitats while 51% of all species in the southwestern U.S. are obligate to riparian systems (Knopf et al., 1988, Knopf 1985). Furthermore, during migration, riparian habitats attract 10 to 14 times the number of birds compared to upland habitats (Stevens et al.1977, Hehnke and Stone, 1979). A large volume of peer reviewed research indicates the proposed alternative could cause short- and long-term negative changes to critical habitat components to wildlife including loss of mature cottonwood forests, lack of cottonwood recruitment, homogenization of habitats consisting of highly adapted species (weeds), and a subsequent reduced diversity of wildlife guilds. Because the City is heavily invested in over 1,400 acres of habitat along the Poudre River through Fort Collins, the maintenance and/or improvement of riparian habitat and conservation of the dependent wildlife within the riparian system are of paramount concern.

Analysis of wildlife in a riparian ecosystem depends on a "clear understanding of habitat requirements and the physical and biotic processes that create and maintain those habitats" (Askin, 2000, Baron et al., 2002, Skagen et al., 2005). Overall the DEIS does not adequately describe the wildlife resource along the Poudre River through Fort Collins. The DEIS also does not describe the direct and indirect impacts to wildlife resulting from the proposed action.

Due to the sparseness of data in this chapter and oversimplification of ecological theories, the project proponents have not met the minimum requirements outlined in the Section 404(b)(1) Guidelines to understand the terrestrial wildlife resource and predict project impacts. Although some information was gathered from other published sources, this effort was not thorough and was inadequate. Without the required data gathering and analysis, the Corps is not able to address the impacts from NISP in the manner required by NEPA and the Section 404(b)(1) Guidelines. This analysis should be conducted and presented in an SDEIS and Revised Section 404(b)(1) Analysis.

Only once was City of Fort Collins Natural Areas Staff consulted (for a one hour meeting) during the scoping period to discuss wildlife issues along the Poudre River through Fort Collins. At that time, City staff was not given clear information on the impacts of NISP to the flow regime when asked about the potential impact to wildlife (meeting in November 2006 with Stacy Antilla (ERO) with Rick Bachand and Karen Manci (City)). The proponent's consultants did not request any data from the City's Natural Areas Program.

The City has a wildlife species list for Poudre River Natural Areas (routinely available to the public) documenting 267 distinct species. This information was not included or considered in the DEIS. There is no evidence presented in the DEIS that suggests site specific surveys were conducted for species other than for a few select species of concern.

Fundamental conflicts exist within and between the DEIS and the Wildlife Technical Report (WTR) regarding basic elements of the project, severity and magnitude of impacts to wildlife and impacts to the wildlife habitat. Similar disconnects are present between the Biological Assessment (BA) and the WTR.

No information or discussion is provided on: species specific habitats, density and distribution, season of use, breeding vs. migratory habitat requirements, source versus sink populations, patch size, movement corridors, high versus low quality habitat, habitat juxtaposition, larger scale landscape issues, disproportionate loss of species, disproportionate habitat value, cascade of impacts due to reduced water quality and change in impacts to lower food chain species.

The following are specific examples of why the analysis of wildlife is inadequate:

1. The DEIS describes impacts to wildlife along the Poudre River only once, in a subsection entitled "Temporary Impacts." Contrary to the DEIS conclusion, changes to wildlife habitat are likely to be permanent and wide ranging. This is a fundamental issue, because Section 404 requires the Corps to give particular consideration to permanent impacts.
2. In the cursory description of wildlife in the riparian corridor there is a section dedicated to highlighting the importance of this area for waterfowl. The discussion never addresses the existence of neotropical migrant birds in the Poudre River riparian corridor.
   The WTR provides a brief and anecdotal description of the impacts to wildlife habitat, and then concludes: "*Although species diversity and abundance of riparian-dependent wildlife species could be reduced in localized areas, no major changes in species composition or distribution are likely.*" WTR Section 6.2.6 (page 45).
3. If species diversity and abundance are reduced then they should be quantified and characterized as a moderate or major adverse effect.

Without quantifying what wildlife will be impacted by the project, any proposed mitigation measures to address those impacts are speculative and essentially meaningless. Mitigation objectives must be measurable, and based on specific and quantified habitat components (shrub density, plant species composition etc) and wildlife components (species richness, nesting vs. migration habitat etc.) based on pre-construction (baseline) surveys. Without these data, there is no way to understand project impacts or the probability that mitigation measures would be targeted and successful. As a result, the Corps cannot comply with the requirements of NEPA or Section 404 without further analysis in an SDEIS and a Revised Section 404(b)(1) Analysis.

5b. Specific comments on the DEIS

DEIS Section: 3.14.11 Poudre-South Platte River Corridor Study Area, page 3-67
Statement: *"Wildlife species tolerant of human disturbance associated with riverine and riparian habitat likely occur in this study area. White-tailed deer winter range and concentration areas occur throughout the Poudre-South Platte River corridor study area (Figure 3-15). The Poudre-South Platte River corridor study area provides breeding, wintering, and migratory habitat for a variety of waterfowl species. According to Andrews and Righter (1992), 16 species of ducks are described as common to abundant in the Poudre-South Platte drainage (including the study area) during migration, breeding, and winter. Several other duck species are rare to uncommon, but regularly occur in the drainage."*

Comment: This description of the wildlife resource does not adequately capture the value of the riparian corridor to wildlife and the species currently utilizing this habitat. Riparian ecosystems, especially those in semi-arid landscapes, support a disproportionate number of species compared to the surrounding landscape (Brode and Bury, 1984, Finch and Wang, 2000, Skagen et al., 1998, Skagen et al., 2005). In addition to the suite of obligate riparian species, many upland species depend on riparian habitats for forage, cover and for migrating corridors. The statement above seems to indicate the Poudre River currently hosts only "*species tolerant of human disturbance, white-tailed deer and waterfowl*."

In fact, the study area actually hosts a set of species far exceeding this description. The City is deeply concerned by this misrepresentation of Poudre River habitat value. Below is a list of species that have been observed within the City-owned Poudre River Natural Areas (which is limited to only 10 miles of the most urbanized segment of the Poudre River). This list of **267 species** provides a much better portrayal of the exceptional value of the riparian corridor to wildlife and explains why the health of the riparian habitat is of utmost importance to the City.

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Animals Observed on Poudre River Natural Areas, 1974-2008

Species: U = unusual; I = Introduced (to North America for Birds; to Fort Collins area for other species); FT = Federal Threatened; FE = Federal Endangered; ST = Colorado Threatened; SC = Colorado Species of Concern.

Occurrence: X = recorded on site; XN = nests on site; Xn = attempted to nest (unsuccessful); XD = dens on site.

Sources: Compiled from observations by local naturalists, researchers, CSU and Natural Areas Program volunteers, Colorado Division of Wildlife, Colorado Field Ornithologists' reports, and Natural Areas Program staff.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

Birds:
Greater white-fronted goose
Snow goose
Canada goose
Tundra swan (U)
Wood duck
Gadwall
Eurasian wigeon (U)
American wigeon
Mallard
Blue-winged teal
Cinnamon teal
Northern shoveler
Northern pintail
Green-winged teal
Canvasback
Redhead
Ring-necked duck
Greater scaup (U)
Lesser scaup
Bufflehead
Common goldeneye
Barrow's goldeneye (U)
Hooded merganser
Common merganser
Red-breasted merganser (U)
Ruddy duck
Ring-necked pheasant (I)
Wild turkey (U)
Northern bobwhite (U)
Pied-billed grebe
Horned grebe
Eared grebe
Western grebe
Clark's grebe
American white pelican
Double-crested cormorant
American bittern (U)
Least bittern (U)
Great blue heron
Great egret (U)
Snowy egret
Cattle egret (U)
Green heron (U)
Black-crowned night-heron
White-faced ibis
Turkey vulture
Osprey
Bald eagle (FT, ST)
Northern harrier
Sharp-shinned hawk
Cooper's hawk
Northern goshawk
Broad-winged hawk (U)
Swainson's hawk
Red-tailed hawk
Ferruginous hawk (SC)
Rough-legged hawk
Golden eagle
American kestrel
Merlin
Peregrine falcon (SC)
Prairie falcon
Black rail (U)
Virginia rail
Sora
American coot
Killdeer
Black-necked stilt (U)
American avocet
Greater yellowlegs
Lesser yellowlegs
Solitary sandpiper
Willet
Spotted sandpiper
Whimbrel (U)
Marbled godwit (U)
Western sandpiper
Least sandpiper
Baird's sandpiper
Long-billed dowitcher
Wilson's snipe
Wilson's phalarope
Franklin's gull
Bonaparte's gull
Ring-billed gull
California gull
Herring gull
Glaucous gull (U)
Caspian tern (U)
Forster's tern
Least tern (U)
Black tern
Rock pigeon (I)
White-winged dove (U)
Mourning dove
Yellow-billed cuckoo
Barn owl
Eastern screech-owl
Great horned owl
Long-eared owl (U)
Short-eared owl (U)
Common nighthawk
Common poorwill
Chimney swift
Broad-tailed hummingbird
Belted kingfisher
Red-headed woodpecker (U)
Red-naped sapsucker (U)
Downy woodpecker
Hairy woodpecker
Northern flicker
Olive-sided flycatcher
Western wood-pewee
Willow flycatcher
Least flycatcher
Cordilleran Flycatcher
Say's phoebe
Western kingbird
Eastern kingbird
Loggerhead shrike
Northern shrike
Plumbeous vireo
Warbling vireo
Red-eyed vireo (U)
Steller's jay
Blue jay
Black-billed magpie
American crow
Common raven
Horned lark
Tree swallow
Violet-green swallow
Northern rough-winged swallow
Bank swallow
Cliff swallow
Barn swallow
Black-capped chickadee
Mountain chickadee
Red-breasted nuthatch
White-breasted nuthatch
Brown creeper
Rock wren
House wren
Marsh wren (U)
American dipper
Golden-crowned kinglet
Ruby-crowned kinglet
Blue-gray gnatcatcher
Western bluebird
Mountain bluebird
Townsend's solitaire
Veery (U)
Swainson's thrush
Hermit thrush
American robin
Gray catbird
Northern mockingbird (U)
Sage thrasher
Brown thrasher (U)
European starling (I)
American pipit
Bohemian waxwing
Cedar waxwing

Blue-winged warbler (U)
Tennessee warbler (U)
Orange-crowned warbler
Virginia's warbler
Yellow warbler
Magnolia warbler (U)
Black-throated blue warbler (U)
Yellow-rumped warbler
Townsend's warbler
Palm warbler (U)
Blackpoll warbler
American redstart
Prothonotary warbler (U)
Swainson's warbler (U)
Northern waterthrush
Kentucky warbler
Mourning warbler (U)
MacGillivray's warbler
Common yellowthroat
Wilson's warbler
Yellow-breasted chat
Western tanager
Green-tailed towhee
Spotted towhee
American tree sparrow
Chipping sparrow
Clay-colored sparrow
Brewer's sparrow
Vesper sparrow
Lark sparrow
Black-throated sparrow (U)
Savannah sparrow
Song sparrow
Lincoln's sparrow
Swamp sparrow (U)
Harris' sparrow (U)
White-throated sparrow
White-crowned sparrow
Golden-crowned sparrow (U)
Dark-eyed junco
Black-headed grosbeak (U)
Blue grosbeak (U)
Lazuli bunting
Indigo bunting (U)
Red-winged blackbird
Western meadowlark
Yellow-headed blackbird
Rusty blackbird (U)
Brewer's blackbird
Common grackle
Great-tailed grackle (U)
Brown-headed cowbird
Orchard oriole (U)
Bullock’s oriole
House finch
Pine siskin
Lesser goldfinch
American goldfinch
Evening grosbeak
House sparrow (I)

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Mammals:

Masked shrew (U)
Fringed myotis (U)
Long-legged myotis (U)
Western small-footed myotis (U)

Little brown bat
Red bat
Hoary bat
Silver-haired bat
Big brown bat
Eastern cottontail
Rock squirrel
Fox squirrel
Plains pocket gopher
Beaver
Western harvest mouse
Deer mouse
Mexican woodrat
Prairie vole
Meadow vole
Muskrat
Norway rat (I)
House mouse (I)
Coyote
Red fox
Black bear (U)
Raccoon
Mink (U)
Striped skunk
River otter (U)

Elk (U)
Mule deer
White-tailed deer

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Amphibians and Reptiles:

Tiger salamander
Woodhouse's toad
Chorus frog
Bullfrog
Northern leopard frog (SC)
Snapping turtle
Painted turtle
Ornate box turtle (U)

Racer
Northern water snake
Bullsnake
Plains garter snake

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In sum, given the valuable role the riparian system serves in supporting regional wildlife diversity, the failure to objectively and methodically describe this wildlife resource is of significant concern to the City. Consequently, the City wishes to emphasize, as stated above, that this issue must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis. *See* Section 404(b)(1) Guidelines Section 230.32. *See also* Section II.4b of these Comments.

DEIS Section: 3.16.11 Species of Concern, Poudre-South Platte River Corridor Study Area, page 3-90
Statement: *3.16.11.1.1 Preble's Meadow Jumping Mouse*
Known occupied Preble's habitat in the study areas is shown on Figure 3-16. Preble's is not known to occur on the Cache la Poudre River downstream of Fort Collins or on the South Platte River downstream of its confluence with the Poudre River.

Comment: A field inventory (trapping effort) should be conducted to verify that Preble's does not occur within the Poudre River drainage.

DEIS Section: 4.2.1.1 Effects Common to All Action Alternatives, Changes to Poudre River Flows, page 4-6
Statement: "*Flow reductions are likely to have significant localized effects on…riparian resources."*

Comment: If this statement is true, then the riparian resources, including utilization by wildlife, must be properly evaluated in an SDEIS and Revised 404(b)(1) Analysis. *See* Section 404(b)(1) Guidelines Section 230.32. Furthermore, if this statement is true then there is a direct conflict between this statement and Table 4-6, which appears in the DEIS a few pages later and summarizes the "Distinguishing Effects of the Alternatives". Table 4-6 compares the proposed action with the no action alternative and states there is "No Distinguishing Effect" for all wildlife categories, except for Threatened and Endangered species. This claim, based on no field data or analysis and the failure to extrapolate habitat impacts to wildlife impacts, is of great concern and also must be subjected to further environmental review to meet the requirements applicable to the DEIS and Section 404(b)(1) Analysis.

DEIS Section: 4.14.3.2.2 Temporary Disturbances, Riparian Habitat along the Cache la Poudre and South Platte Rivers, page 4-55
Statement: "*However, a reduction in the infrequently occurring overbank flows may affect the periodic disturbance of the riparian zone that can aid in creating new habitat for riparian vegetation establishment and rejuvenation of the riparian zone."*

Comment: It is incorrect to treat impacts to the wildlife within the riparian corridor of the Poudre River as temporary by placing them in the Temporary Disturbances section.

In fact, nowhere else in the DEIS or supporting documents are the impacts to the riparian corridor (and wildlife dependent on it) described as temporary. Despite the conflicting conclusions regarding riparian habitat throughout the documents, the one consistent conclusion in these documents is that there will be a long-term effect due to reduced overbank flooding and consequent reduced capacity for cottonwood regeneration. This is not a temporary impact, and the effect it has on wildlife also would not be temporary. As discussed in Part II, this is particularly important, because Section 404 requires the Corps to pay particular attention to impacts that would be permanent.

Furthermore, the Scoping Report for NISP clearly identifies the Poudre River riparian corridor as an affected environment and defines both Wildlife and Riparian resources as "significant general categories" to become the focus of the DEIS. Discussing the impacts to wildlife solely in the Temporary Disturbances section of the DEIS is inconsistent with the Scoping Report.

Another key point about this citation from DEIS page 4-55 is that it understates and incorrectly characterizes impacts to wildlife along the Poudre River. Many studies show that the dewatering of a river could cause steady (linear) degradation of the habitat. These adverse effects include; loss of herbaceous and/or shrubby species and physiologic stress to larger woody species over the short term (see comments to the Vegetation Technical Report). Landscape level changes such as declines of cottonwoods along entire river segments may be expected over the long-term. Because the Poudre River is already in a compromised state (lowered resistance and resilience) the probability that future flow reductions will cause these impacts is increased (City of Fort Collins, 2008). Associated impacts to wildlife may be wide-ranging and deserve analysis on both a local and a regional scale.

Finally, while these changes may be described as linear, the potential for non-linear (and less predictable) change must also be considered. Significant reduction of peak flows could potentially cause the Poudre River to cross a threshold and respond in a non-linear manner that would result in much greater loss of ecological values, ecosystem complexity, and physical and ecological function.

DEIS Section: 4.14.3.2.2 Temporary Disturbances, Riparian Habitat along the Cache la Poudre and South Platte Rivers, page 4-55
Statement: *"As described in the Wildlife Technical Report (ERO 2008c), the flow reductions are not expected to cause losses of riparian and wetland habitat. However, a reduction in the infrequently occurring overbank flows may affect the periodic disturbance of the riparian zone that can aid in creating new habitat for riparian vegetation establishment and rejuvenation of the riparian zone."*

Comment: Within the Wildlife Technical Report (WTR) there are opposing conclusions about impacts to wildlife along the Poudre River. For example:

WTR Section: 6.2.6, page 45
Statement: *"Although species diversity and abundance of riparian-dependent wildlife species could be reduced in localized areas, no major changes in species composition or distribution are likely."*

And;

WTR Section: 7.2.1, page 65
Statement: *"Many species of birds, mammals, reptiles, and amphibians dependent on these (riparian and wetland) habitats would in turn be affected by these changes."*

The public cannot assess the impacts to wildlife when the WTR effectively cancels out its own conclusions. This issue must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

DEIS Section: 4.14.5 Mitigation
Statement: *The District and the Corps will coordinate with CDOW regarding mitigation of impacts to wildlife and wildlife habitat.*

Comment: This statement provides no information about an actual mitigation plan, nor does it address impacts sufficiently to meet the requirements of the Section 404(b)(1) Guidelines. Without quantifying what wildlife will be impacted by the project, any proposed mitigation is speculative and essentially meaningless. Mitigation goals must be based on specific and quantified habitat components (shrub density, plant species composition etc) and wildlife components (species richness, nesting vs. migration habitat etc.) based on pre-construction surveys. The Corps cannot defer its analysis of impacts and how they must be addressed until beyond the Section 404 and NEPA process. Without these data, there is no way to understand project impacts or to evaluate the proper responses or requirements to address them. This assessment should be completed and presented in an SDEIS.

DEIS Section: 5.4.1. Wildlife (Mitigation)
Comment: see comments for Section 4.14.5

DEIS Appendix B: Consultation with U.S. Fish and Wildlife Service Biological Assessment and Biological Opinion
Comment: Although the US Fish and Wildlife Service has provided a "final" biological opinion on a proposed action, that opinion appears premature as no decision on a final action has been made. A Biological Opinion is traditionally issued with a Record of Decision, not along with the DEIS. In addition, due to omissions, deficiencies and inadequacies throughout the DEIS, the Biological Assessment (BA) is substantively

premature. The BA must be reevaluated after an SDEIS that includes improved data and analyses regarding all categories of impacts from NISP relevant to wildlife, including trapping of the Preble's Meadow Jumping Mouse along the Poudre River, improved analysis of the effects of the proposed action on riparian vegetation and invasive species. Consultation should be reinitiated once a final decision is made given that it may differ from the original proposed action.

5c. Comments on Wildlife Technical Report (WTR)

WTR Section: 5.1 Big Game, page 21 AND Section 6.3.1, page 46
Statement: *"white-tailed deer are most often seen in riparian areas bordering large streams and river. …white-tailed deer will move seasonally up and downriver corridors in small numbers….white-tailed deer concentration areas are considered critical habitat for white-tailed deer and occur in corridors of riparian habitat that support higher populations of white-tailed deer or serve as travel corridors…Numerous mule and white-tailed deer crossing areas occur near the SPWCP forebay and diversion study area, highlighting the importance of the Poudre and South-Platte river corridors as deer habitat."*

Comment: Despite the direct identification (in this statement from Section 5.1) of the importance of river corridors to deer, Section 6.3.1 of the WTR makes no mention of impacts to deer due to changes to the riparian habitat such as a decline in woody cover.

WTR Section: 5.2. Raptors, page 30 and Section 6.3.2., page 49
Comment: Nests were identified based on size, nest materials, structure, location etc. Little effort was made to document nest use or to identify species using the nest. Also, little thought was given to the use of nests by different species over time. Surveys appeared to have been conducted late in the breeding season (July 8 or later) and only one year of field observations were used for each study location. Based on the data provided, little is known about raptor resources in the area. Surveys were inappropriately limited to Reservoir sites and the Highway 287 realignment and excluded the Poudre River.

WTR Section: 5.2.2 Migratory Birds, and Section 6.3.2, page 49
Statement: *"Based on a study conducted by Hopper (1968), the Poudre-South Platte study area lies within one of the four most important waterfowl regions in Colorado, the South Platte River drainage. Spring (May) surveys established in the 1950s and conducted until the 1990s indicated that more than 20,000 migrant or locally breeding ducks were present in this area during the survey period (Gammonley 2008). Much higher numbers of ducks use the area throughout the spring and fall migration periods (Ibid). According to Andrews and Righter (1992), 16 species of ducks are described as common to abundant in the Poudre-South Platte drainage (including the study area)*

during migration, breeding, and/or winter; and several other duck species are rare to uncommon, but regularly occur in the drainage. Dabbling ducks such as mallards, green-winged teal, blue-winged teal, American widgeon, gadwall, northern pintail, and northern shoveler are most common along the Poudre River drainage from the foothills to the South Platte confluence. These species not only use the river and associated streams, but rely heavily on small wetlands and sloughs. Wood ducks and hooded mergansers, both riparian-dependent species, are increasing in numbers in this area (Ibid.). Resident and migrant populations of Canada geese have increased in the South Platte River drainage. Andrews and Righter (1992) reported that about 1,200 Canada geese breed on the plains near the northeastern foothills, including the Poudre River corridor, and that more than 50,000 geese winter in this area."

Comment: Given this characterization of the importance of the Poudre River to waterfowl, it is reasonable to expect that a data-driven, science-based methodology would be used to assess and quantify impacts to waterfowl that would result from the significant reductions in river flows NISP is predicted to cause. No such effort was made. Such an analysis must be conducted and presented in an SDEIS.

With regard to all other migratory birds it appears little or no site specific data were gathered. Species identified were based on broad habitat categories and listed as species expected to occur. While species based on habitat affinities are a good start, without site specific information describing density, breeding populations etc, it is difficult to determine impacts from the project. Also, species listed are minimal and are far from inclusive. In contrast, the City Natural Areas program maintains a list of species that contains 267 entries. *See* comments on DEIS Section 3.14.11 in Section IV.5b of these Comments. Based on information provided in the DEIS, virtually nothing is known about the site-specific attributes of the avifauna.

The Poudre River is extremely important to migrating songbirds. It is unclear why this section titled "Migratory Birds" did not include the neotropical migrants along the Poudre River riparian corridor. In the table shown below, birds found within City Natural Areas along the Poudre River account for two-thirds of the Fort Collins total bird diversity. This table also shows that the Poudre River through Fort Collins closely compares to major national parks as measured by bird diversity.

Area	# Acres	# Bird Species
Poudre River City-owned Natural Areas	**1,423**	**223**
Fort Collins Growth Management Area	~48,000	353
Yellowstone National Park, WY	2.2 million	311
Everglades National Park, FL	1.5 million	310
Pawnee National Grassland, CO	193,060	301
Rocky Mountain National Park, CO	265,726	280
Acadia National Park, ME	35,000	273
Mesa Verde National Park, CO	52,122	186
Bryce Canyon National Park, UT	35,835	171
Isle Royale National Park, MN	571,790	168
Denali National Park, AK	6 million	165

In sum, this issue must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

WTR Section: 5.3. Amphibians and Reptiles and Section 6.3.3, page 53
Statement: *"Many amphibians inhabit areas near wetlands and areas containing a water source throughout the year …wetter habitats tend to support a higher diversity of reptiles"*

Comment: No surveys were conducted to determine species richness, density or distribution. Impacts are discussed relative to habitat (wetland) loss due to reservoir and other construction. No impacts are discussed relative to water loss, wetland loss, or habitat modification from reductions in flows in the Poudre River predicted from NISP.

If, as stated in this report, 75 acres of wetlands will be lost along the Poudre River (above Interstate 25), surveys for reptiles and amphibians should have been conducted to quantify the expected loss of species diversity and abundance. This is a significant omission and must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

WTR Section: 6.2.6, Riparian Habitat…, page 41
Statement: *"The effects of changes in stream flows on wildlife were evaluated based on the analysis of impacts to riparian and wetland habitat, described in detail in the Vegetation Resources Technical Report (ERO 2008b), which were assessed based on an analysis of potential changes in stream morphology, ground water, and stream stage as discussed in the Water Resources Technical Report (HDR 2007) and River Morphology and Sediment Transport Technical Report (Anderson 2008). Methods and results of these analyses are summarized below."*

Comment: The quoted conclusion regarding riparian and wetland habitat along the Poudre River is not supported by the scientific literature, nor is it supported by field level data. Furthermore, it appears to be based on a profoundly incorrect river-flow data set.

Within the WTR there are conflicting statements regarding the impacts to riparian habitat. The conflict undermines the analysis of resources dependant on riparian habitat. Terrestrial wildlife relies on the composition and structure of riparian vegetation. Immediately below are just two examples of conflicting statements about impacts to wildlife habitat *within* the WTR:

WTR Section: 6.2.6, page 43
Statement: "*The reductions in streamflows on the Poudre and South Platte rivers associated with the action alternatives are not anticipated to cause a loss of riparian and/or wetland vegetation."*

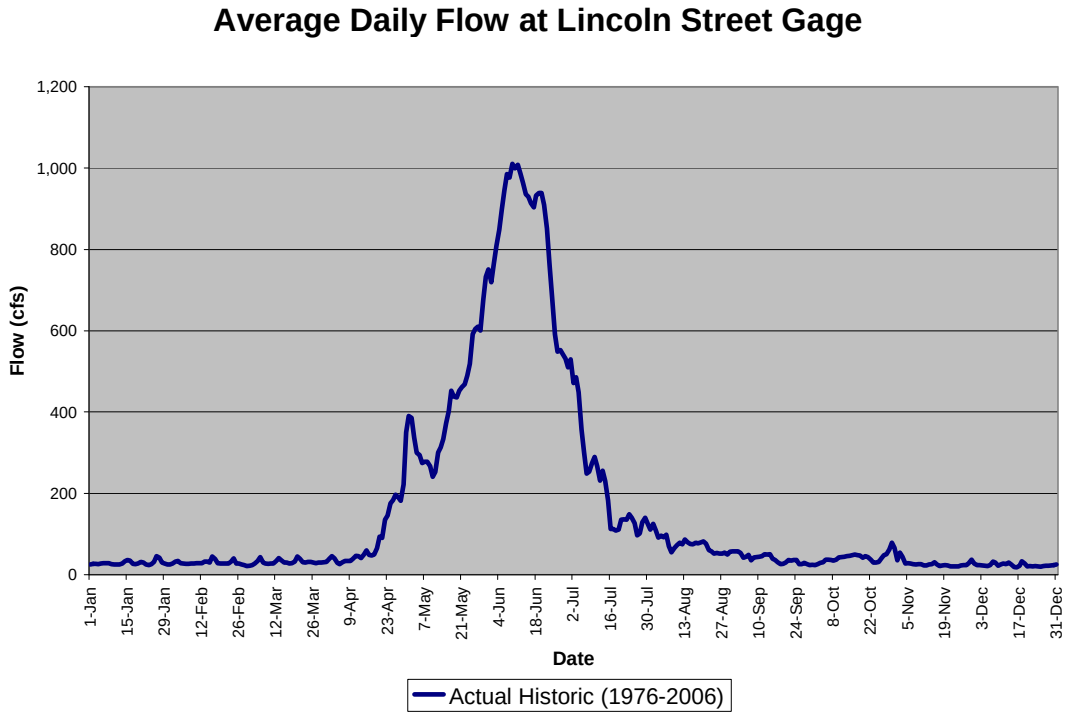
And;

WTR Section: 7.2.1., page 65
Statement: "*The action alternatives would likely result in changes to and losses of riparian and wetland vegetation, especially herbaceous vegetation, in sensitive riparian areas along the Poudre River corridor."*

These fundamental conflicts must be resolved and an improved analysis presented in an SDEIS.

WTR Section: 6.2.6, Riparian Habitat…, page 42
Statement: *"... Because of human alterations… there has been a change in flow regime from one characterized by large spring runoff with low flows the remainder of the year, to a flow regime that is characterized by moderate flows spread throughout the year."*

Comment: This statement is incorrect. While there have been changes to the flow regime of the Poudre River, the current flow regime is still characterized by a spring snow-melt dominated flow regime (see graph of actual historic flows below). This information is readily available to the public from a variety of sources. The rest of the year is characterized by fairly low to very low flows. Understanding the current flow regime is essential to assessing the potential impacts due to predicted reduction (up to 71%) of spring peak flows from NISP. The DEIS must make accurate statements about the existing conditions to adequately identify impacts of the proposed action and to address those impacts as required in the Section 404(b)(1) Guidelines. *See* Section II.3 of these Comments.



Graph assembled from publicly available data on the Internet at: http://waterdata.usgs.gov/CO/nwis/uv?06752260

WTR Section: 6.2.6, Cache la Poudre Upstream of I-25…, page 42
Statement: *"Assuming that the changes discussed above will occur in only portions of these 301 acres, about 89 acres of the sensitive areas may change over time. Of these 89 acres, it is estimated that about 75 acres of wetlands would be affected."*

Comment: The author does not state how the values of 89 and 75 acres values were determined other than references to the terms "assuming" and "estimated". The stated numerical values are not explained in the WTR or the Vegetation Technical Report (VTR). Assumptions and estimations are not adequate methods for analysis of wetlands impacts. An adequate DEIS and Section 404(b)(1) Analysis would indicate whether these were wetlands identified using the Corps' method for identifying jurisdictional wetlands; this is not done. It appears no effort was made to identify jurisdictional wetlands on the Fort Collins Reach of the Poudre River. This issue must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

WTR Section: 6.2.6 Cache la Poudre Upstream of I-25…, page 42
Statement: *"Through the City of Fort Collins, it appears that the flow changes that would occur under the action alternatives would likely affect stream morphology,*

because of large reductions in flow during spring runoff in wet and average years. Some potential changes include channel narrowing, greater sediment deposition and less sediment flushing, vegetation encroachment into the channel, increase in the size of inchannel islands, flow obstruction, and bank erosion (ERO 2008d)."

Comment: The referenced study in this passage in the WTR - ERO 2008d - refers to the South Platte River near Kersey in the River Morphology and Sediment Transfer Technical Report (RMSTTR) and, therefore, is not relevant to the Fort Collins segment of the River.

If these changes are expected to occur, however, it is reasonable to expect this study area to be included in the discussion of Alternative 2 in WTR Section 6.3. Throughout Section 6.3, there is no mention of the wildlife habitat or affected species as a result of Alternative 2.

WTR Section: 6.2.6 Cache la Poudre Upstream of I-25…, page 44
Statement: *"Effects to sensitive riparian areas associated with streamflow changes are anticipated to be localized and subtle…habitat changes will likely occur slowly and subtly over many years…."*

Comment: There is little, if any, evidence, to support the concept that the effect to herbaceous wetlands, an important habitat for much wildlife, would be subtle or slow. In fact, with regard to this topic the Biological Assessment (BA) states (page 30): "*changes in groundwater levels...would likely remove the supportive hydrology and the wetlands would no longer be wetlands...*" Specifically for the Lincoln Gage, the BA states (page 32): "*These changes in mean monthly stream stage in sensitive riparian areas …would affect herbaceous wetland vegetation (and therefore scrub-shrub wetlands).*" This issue must be analyzed and addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

WTR Section: 6.2.6 Cache la Poudre Upstream of I-25…, page 44
Statement: *"…it is estimated about 75 acres of wetlands would be affected."*

Comment: It is not stated and not apparent how this numerical value was derived. If this statement is true, these wetlands should have been 1) delineated in the field according to the Corps' method; 2) surveyed methodically for Threatened and Endangered Species or species of concern; and 3) evaluated as habitat for all local wildlife. This issue must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

WTR Section: 6.3
General Comment: There is no mention within this entire WTR section of the impacts to wildlife in the riparian corridor. This is a serious procedural flaw because:

1) the Scoping Report states the Poudre River riparian corridor is an "affected environment" and identifies Riparian Resources and Wildlife as "Significant General Categories"; and
2) the Section 404(b) Guidelines require *appropriate factual determinations, evaluations, and tests on the physical*…for the affected resources (Section 230.11 of 404(b) Guidelines). The WTR states that: *"Many species of birds, mammals, reptiles, and amphibians dependent on these habitats would in turn be affected by these changes"* (WTR Section 7.2.1, page 65). Therefore compliance with the Section 404(b)(1) Guidelines requires that the participants evaluate effects to "Other wildlife" and the possible loss of values to other wildlife. *See* Section 404(b)(1) Guidelines Section 230.32 (a) and (b). The anecdotal level analysis provided in WTR Section 6.2.6 does not come close to fulfilling this requirement.

Specifically Section 230.32 (b) of the Section 404(b)(1) Guidelines states:

"Possible loss of values: The discharge of dredged or fill material can result in the loss or change of breeding and nesting areas, escape cover, travel corridors, and preferred food sources for resident and transient wildlife species associated with the aquatic ecosystem. These adverse impacts upon wildlife habitat may result from changes in water levels, water flow and circulation, salinity, chemical content, and substrate characteristics and elevation. ….Changes in such physical and chemical factors of the environment may favor the introduction of undesirable plant and animal species at the expense of resident species and communities. In some aquatic environments lowering plant and animal species diversity may disrupt the normal functions of the ecosystem and lead to reductions in overall biological productivity."

Most if not all of the habitat components or ecosystem attributes mentioned in this paragraph (above) may be affected within the Poudre River study area by the proposed action. This must be addressed in an SDEIS and Revised Section 404(b)(1) Analysis.

WTR Section: 6.3.4. Other Wildlife Species
Statement: *"Small and large mammals associated with affected vegetation types described in Section 6.3.2 would be directly affected by alternative 2."*

Comment: WTR Section 6.3.2 does not mention the Poudre River study area at all, requiring reassessment in an SDEIS and Revised Section 404(b)(1) Analysis.

WTR Section: 7.2.1. Mitigation, page 65
Statement: *"The action alternatives would likely result in changes to and losses of riparian and wetland vegetation, especially herbaceous vegetation, in sensitive riparian areas along the Poudre River corridor. Many species of birds, mammals, reptiles, and amphibians dependent on these habitats would in turn be affected by these changes. Most*

of the riparian areas potentially sensitive to reduced flows and stream stage are designated as natural areas by the City of Fort Collins. Mitigation measures under consideration at this time are:

• Work with the City of Fort Collins to create and restore habitat by lowering the surface elevation of selected riparian areas to provide a supportive hydrology with the future flow reductions.
• Work with aggregate mines to reclaim these mines as riparian areas.
• Construct check structures in the Poudre River that would raise stream stage to compensate for low stream flows and stages."

Comment: This report fails to discuss the expected impacts to migratory birds, amphibians, raptors, reptiles and mammals. This makes it difficult, in not impossible, to craft adequate measures to address the impacts to wildlife from NISP. Furthermore, the suggested mitigation measures are stated in vague terms, with no binding or enforceable commitments of any kind. Finally, this section asserts conclusions that are directly contrary to other conclusions in the report. Therefore, it is not possible to discuss the proposed mitigation until an SDEIS is prepared that provides consistent conclusions and analysis based on sufficient and correct data. *See* comments on DEIS Section 4.14.5 in Section IV.5b, above.

6. Air Quality and Climate Change

6a. General comments

The scientific literature is now replete with admonitions for water managers regarding the need to include the potential effects of climate in water resource planning (Milly, et. Al, 2008). For example, Stewart el al. (2005) predict that "almost everywhere in western North America, a 10% - 50% decrease in the spring-summer streamflow fractions will accentuate the typical seasonal summer drought with important consequences for warm-season supplies, ecosystems, and wildfire risks." Regonda and others (2005) state that "if the trends in temperature, snowfall, and streamflow demonstrated in this paper persist and even intensify, changes in water management practices will be necessary to adapt to the altered hydrologic regime." As evidenced by many studies published since 2000, the specific concept of rising regional temperatures has been used to explain statistically significant trends and patterns in hydrologic response at basin scales relevant to water management in the Mountain West.

Many of these effects will be further affected by changes in the vegetation and structure of the Poudre River watershed. The near certainty of pine beetle infestation and more catastrophic forest fires in the next decade and beyond suggests that the next fifty years in the Poudre watershed will be significantly different than the 50 years modeled for the DEIS and on which all of the predictions of NISP impacts are based. Pine beetle and fire

effects on the forests will also influence the timing and amounts of runoff from the watershed and, thus, the water available for diversion to Glade, the water remaining in the Poudre and the overall water quality.

Having acknowledged the reasonable foreseeability of climate impacts on stream flow, the DEIS proceeds to ignore it, even though the fundamental basis for the project and its impacts would be profoundly influenced by climate change. The fact that uncertainty regarding the precise degree and effects of climate change exists does not excuse the Corps from analyzing this critical issue. "NEPA prohibits uninformed agency action." *Robertson v. Methow Valley Citizens Council,* 490 U.S. 332, 351, (1989). ''The procedures included in § 102 of NEPA are not ends in themselves. They are intended to be 'action forcing.' The unequivocal intent of NEPA is to require agencies to consider and give effect to the environmental goals set forth in the Act, not just to file detailed impact studies which will fill governmental archives.'' *Envtl. Def. Fund, Inc. v. Corps of Eng'rs of the U.S. Army,* 470 F.2d 289, 298 (8th Cir.1972) (citation omitted).

"The impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct." *Center for Biological Diversity v. NHTSA*, 508 F.3d 508 (9th Cir. 2007). Indeed, the United States Supreme Court has noted that the "harms associated with climate change are serious and well recognized." *Massachusetts v. EPA*, 549 U.S. ___, 127 S.Ct. 1438, slip op. at 18 (2007). The Court noted, in particular, the likelihood of a "significant reduction in water storage in winter snowpack in mountainous regions with direct and important economic consequences." *Id.* The Supreme Court also admonished the EPA that it could not "avoid its statutory obligation by noting the uncertainty surrounding various features of climate change…"[12] *Id.* at 31. The same reasoning applies to the Corps' obligations under both the Clean Water Act and NEPA.

The Council on Environmental Quality (CEQ) regulations that govern the conduct of environmental impact review make clear that agencies have an obligation to develop information that is necessary to a reasoned choice among alternatives (including the no-action alternative). 40 C.F.R. § 1502.22(a). Even if it cannot reasonably obtain such critical evidence, it must at least assess the significance of the missing information, provide a summary of the existing scientific evidence, and provide an evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. *Id.* at § 1502.22(b). CEQ has stressed the importance of addressing even uncertain effects in its Forty Most Asked Questions that provide guidance on the implementation of its NEPA regulations:

> [I]n the ordinary course of business, people do make judgments based upon reasonably foreseeable occurrences. . . . The agency has the responsibility to make

[12] The Supreme Court also attached "considerable significance to EPA's 'agree[ment] with the President that 'we must address the issue of global climate change,'" 68 Fed.Reg. 52929 (quoting remarks announcing Clear Skies and Global Climate Incentives, 2002 Public Papers of George W. Bush, Vol. 1, Feb. 14, p. 227 (2004). *Id.* at ___.

> an informed judgment, and to estimate future impacts on that basis, especially if trends are ascertainable . . . . The agency cannot ignore these uncertain but probable, effects of its decisions.

46 Fed. Reg. at 18031. Climate issues clearly fall within this category of reasonably foreseeable effects that affect the underlying purpose and impacts of the proposed action. Indeed, the National Academies of Science – in a joint statement with national science academies from other leading countries – has stressed that "[t]he scientific understanding of climate change is now sufficiently clear to justify nations taking prompt action…" *National Academies of Science, Joint Science Academies' Statement: Global Response to Climate Change*, available at http://nationalacademies.org/onpi/06072005.pdf.

The DEIS does not even take first steps towards addressing these climate issues. The purpose and need identified for this project hinges on providing a certain firm yield for NISP participants through 2050. The DEIS then assesses whether the project and certain alternatives would provide this firm yield (along with other project impacts) through 2050 using a purely retrospective data set (from 1949-1999). It is unreasonable to rely solely on a retrospective data set with no consideration of the effects of climate where the scientific evidence makes clear that future conditions will be different. *See* National Research Council, *Air Quality Management in the United States* at 234 (2004) (available at http://www.nap.edu/catalog/10728.html) (the "general consensus within the scientific community is that this warming trend will continue or even accelerate in the coming decades"). *See e.g*., Milly, et. al (2008).

The DEIS further ignores the most recent seven years of data, including serious drought, even though these years may be more representative of future conditions than the data set the DEIS used. In light of this past seven years of data and the overwhelming evidence that climate change will significantly affect water flows, the Corps cannot reasonably assume that the next fifty years will be like the period from 1949-99 and not include periods like 2000-2007. "Projected changes in runoff during the multidecade lifetime of major water infrastructure projects begun now are large enough to push beyond the range of historical behaviors." *Id.*

In other words, the Corps cannot assume that there is stationarity in the climatic and hydrological trends in the face of overwhelming evidence to the contrary (Milly, *et al.*, 2008). It is essential for decision makers to have information regarding the potential effects of climate trends on the firm yield of the project, the cumulative effects of the project on changing river flows, the need for acquisition of additional agricultural water for municipal use, and similar information. The DEIS already shows that the NISP project would be able to divert flows in only a handful of years in every decade based on the older historical regime. Changes in climate can be expected to further reduce this ability to divert, reducing firm yield significantly, requiring more agricultural dry-ups in the action alternatives and massively increasing the cost per acre foot for participants.

Despite uncertainty in the combined effects of future temperature and precipitation changes in the region, there is general consensus that there are substantial risks of altered annual runoff timing, increased interannual variability, and reduced runoff. There are scientifically accepted methods for using the current trajectory of streamflow behavior and a weight of scientific evidence to identify a reasonable probabilistic envelope depicting how regional streamflow could change over the coming decades. *See, e.g.*, Milly (2008) ("Methods for estimating model parameters can be developed to combine historical and paleohydrologic measurements with projections of multiple climate models, driven by multiple climate forcing scenarios."). Such an envelope can be used in selecting appropriate sensitivity factors for modeling purposes. *Id.* ("Projections of runoff changes are bolstered by the recently demonstrated retrodictive skill of climate models.). For example, the City of Boulder has been conducting sensitivity analyses of the effects of a range of climate scenarios on water supply and flows, an approach that could be readily conducted for NISP. *See*, City of Boulder, Lee Rozlaklis, Presentation to SWMP Community Study Group (Nov. 27, 2007) (available at http://www.ci.boulder.co.us/files/csg_nov_27_presentation_wip_revised_on_site.pdf); City of Boulder, Source Water Master Plan Water Availability Executive Summary (Nov. 2007) (available at http://www.ci.boulder.co.us/files/Utilities/Projects/source_water_mp/swmp_csg_mtg2.pdf). Other water suppliers in the region are also evaluating assessing or planning to assess the effects of climate on water supplies and flows. *See e.g., Denver Water*, *Comprehensive Annual Financial Report* at I-20 to I-21 (Dec. 31, 2007) (available at http://www.water.denver.co.gov/financialinfo/annualreport/DW_AR2007.pdf).[14]

Such sensitivity analyses are necessary to avoid uninformed agency action, as required both by NEPA and the Clean Water Act. The information and methodologies are reasonably available and supported by sound science. Indeed, assuming blindly -- and against the scientific record of the last decade -- that the future will be the same as the period starting in 1949 without any additional analysis lacks scientific merit. An SDEIS must include new MODSIM and other analyses with appropriate sensitivity analyses that reflect current trends in climate change and a reasonable range of effects predicted by climate models. The Boulder approach and other ongoing efforts can provide useful guidance and approaches.

Finally, an SDEIS must correct the DEIS's failure to provide any information about the effects of the proposed project on climate. For example, the DEIS should evaluate how many greenhouse gases are produced through the large scale pumping contemplated in the NISP project, as compared to other alternatives including no action.

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[14] Denver Water has conducted sensitivity analyses for its system that used two different climate scenarios. Under one scenario with a two degree increase in temperature, average streamflows and Denver Water supply would drop by seven percent. Under the other scenario with a five degree change, average stream flows would drop 19 percent and Denver Water's supply by 14 percent. *Id.* These types of changes would have a large impact on the firm yield assumptions and streamflow impacts of NISP.

6b. Specific Comments on DEIS

DEIS Section: 3.25 Air Quality, page 3-127
Statement: *"As of November 20, 2007, the areas in the vicinity of the proposed Glade and Galeton reservoirs have been designated as nonattainment areas for ozone. However, air quality is currently not an issue in these areas."*

Comment: The cited conclusion is cavalier, unsupported and completely wrong. The fact that the proposed reservoir sites are in an area designated by the Environmental Protection Agency as nonattainment for the ozone standard is conclusive evidence that air quality is an issue in these areas, because ozone from elsewhere in the nonattainment area can affect these sites and because emissions of ozone precursors at these locations can affect ozone levels elsewhere in the nonattainment area. Thus, air quality is a very important issue that deserves serious treatment instead of the trivial dismissal it receives in the DEIS. Indeed, the EPA included Larimer County within the nonattainment area because of its concerns that emissions from within the county contributed to Denver-area ozone levels. These issues have become yet more challenging with EPA's tightening of the 8-hour ozone standard earlier this year. While ozone levels in Ft. Collins have not exceeded the new ozone standard based on the regulatory three-year average, annual readings have risen above the standard. *E.g.*, Larimer County, Compass of Larimer County (available at https://www.co.larimer.co.us/compass/airquality_env_quality.htm#tables). Further, nearby monitoring in Rocky Mountain National Park shows that ozone levels are above the new standard.

Section 3.25 needs to provide more analysis regarding the effects and nature of ozone as a powerful oxidant that can cause respiratory harm in humans, damage to vegetation, injury to materials and other effects. The section also needs to include both the 1997 and 2008 National Ambient Air Quality Standards for ozone and a description of what the standards mean. The section should also contain discussion about air quality monitoring in the nonattainment area. The section should describe the types of emissions and their sources that contribute to ground-level ozone, including the combustion sources that would be associated with construction of the project and generation of electricity for the project's massive pumping needs. Finally, the Section needs to describe both the transportation and general conformity rules (40 C.F.R. Part 93), including the *de minimis* standards applicable to the project area.

DEIS Section: 4.25.2 Air Quality, page 4-96
Statement: *"All of the alternatives would cause short-term increased exhaust emissions associated with construction vehicles (employee, delivery and heavy-duty equipment). … These emissions are expected to be within conformity levels."*

Comment: The statements and conclusions drawn in this section are completely unsupported and inadequate to comply with NEPA or the Clean Air Act. The section does not identify the conformity standards that apply or the basis for its conclusion that emissions would be below the *de minimis* thresholds of the general conformity rule. As a result, the DEIS is inadequate both under NEPA and the Clean Air Act. The construction activities proposed under any of the action alternatives are massive and would entail significant emissions from construction activities (including on-site earth moving, materials and fill hauling, and concrete hauling and placement equipment). Large new contributions to ozone precursor emissions are of considerable concern because the entire nonattainment area is struggling to meet both the 1997 and 2008 ozone standards, which have been determined by EPA to be requisite for human health.

The Glade Dam itself would involve the placement and construction of earth, rock and concrete almost a mile long and almost 300 feet high, along with forebay and other improvements. In addition, construction would include the Poudre Valley Canal Upgrades, pump stations, the Munroe Canal Bypass, the highway relocation, and the Glade-Horsetooth Pipeline. Galeton Reservoir would involve an almost-two-mile dam 60 feet high and other related facilities. All of these efforts would involve large numbers of emitting vehicles and equipment for considerable periods of time.

Because the DEIS makes no commitments for any use of low-emissions technology, it must be assumed that all of this work would be conducted with generally available diesel-powered equipment that would emit significant quantities of oxides of nitrogen ("NOx"), one of the principal ozone precursors. Projects of comparable size around the country have exceeded *de minimis* thresholds and required a full conformity analysis under the Clean Air Act. *See e.g.*, U.S. EPA, *General Conformity Guidance: Questions and Answers* (1994) (http://epa.gov/ttn/oarpg/conform/gcgqa_71394.pdf) at 6 (conformity applies to emissions from Section 404 permitted construction). An SDEIS and subsequent documents must provide a full emissions inventory from both construction and operational equipment, along with an analysis of whether a full conformity determination is necessary. The analysis should also include an emissions dispersion analysis for particulate matter to assure that the massive earthworks in the dry environments of the proposed reservoir sites would not violate health-based standards.

In addition, an SDEIS needs to better analyze the effects of the project on the emissions of ozone precursors from the operation of the project. Table 4-15 of the DEIS identifies the massive pumping and power demands that would be associated with this project. The increased electricity demand would likely need to be met primarily with coal-based generation, which would entail significant emissions increases of NOx. These emissions need to be quantified, analyzed and compared to relevant conformity thresholds.

DEIS Section: 4.28.2.1 Water-Based Actions, page 4-104
Statement: *"Although climatic change is considered reasonably foreseeable, there is no accepted science for transforming the general concept of variations in global temperature into incremental changes in streamflow at particular locations. Hydrologic*

changes attributable to global climate change are a possibility; however, potential impacts have not been quantitatively estimated in the EIS because of the uncertainties associated with predicting change and the effects."

And;

DEIS Executive Summary, page ES-14
Statement: *"Climate change may affect precipitation, Poudre River streamflows, and the amount of water available for diversion by NISP, which could alter how the action alternatives operate and, in combination with the action alternatives, could further alter flows in the Poudre River."*

Comment: Even though the Corps acknowledges that climate change and impacts on streamflows are reasonably foreseeable,[15] the DEIS unlawfully brushes aside the potential effects of climate change on the project and the cumulative effects of the project and climate change on natural resources, including stream morphology, riparian vegetation, aquatic and terrestrial vegetation and water quality.

Several recent articles in peer-reviewed scientific journals, as well as national and international scientific bodies, also indicate a growing convergence of predictions regarding climate change in the western US. *E.g.*, Intergovernmental Panel on Climate Change, *Technical Paper on Climate Change and Water* at 137-144 (Apr. 2008); National Research Council, *Hydrologic Effects of a Changing Forest Landscape* (2008). Models consistently predict an ongoing warming trend leading to earlier snowmelt. Predictions of net hydrologic effects are more equivocal, but nonetheless point to a substantial risk of diminished runoff. The Intergovernmental Panel on Climate Change, the leading international scientific effort to address climate issues and the recipient of the 2008 Nobel Peace Prize has concluded that:

> Warming and changes in the form, timing, and amount of precipitation will very likely lead to earlier melting and significant reductions in snowpack in the western mountains [of North America] by the middle of the 21st century. In projections for mountain snow melt-dominated watersheds, snowmelt runoff advances, winter and early spring flows increase (raising flooding potential), and summer flows decrease substantially. Hence, heavily-utilized water systems of the western U.S. and Canada that rely on capturing snowmelt runoff could be especially vulnerable… [IPCC (2008) at 138]

This acknowledgement is the only reasonable conclusion in light of the scientific consensus on this issue. According to the Intergovernmental Panel on Climate Change ("IPCC"), "[w]arming of the climate system is unequivocal, as is now evident from observations of increases in global air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." IPCC, Summary for Policy Makers: Climate Change 2007 at 5 (Feb. 2007). Moreover, "[m]ost of the observed increase in global average temperatures since the mid-20th century is *very likely* due to the observed increase in anthropogenic greenhouse gas concentrations." *Id.* at 10. Thus, the world's leading scientific body on the subject has now concluded, with greater than 90 percent certainty, that emissions of greenhouse gases are responsible for climate change. *Id.*

The federal government has also acknowledged the same likely impacts of climate change to the Mountain West:

> Mountain West — Higher winter temperatures are very likely to reduce late winter snow-pack. This is likely to cause peak runoff to be lower, which is likely to reduce the potential for spring floods associated with snowmelt. As the peak flow shifts to earlier in the spring, summer runoff is likely to be reduced, which is likely to require modifications in water management to provide for flood control, power production, fish runs, cities, and irrigation.

U.S. Department of State, U.S. Climate Action Report 2002, *Third National Communication of the United States of America under the United Nations Framework Convention on Climate Change* (2002) (available at http://www.gcrio.org/CAR2002). [16]

7. Procedural Issues

DEIS Section 2.1.1.1 Independent Review of NISP Alternatives Evaluation, page 2-2
Statement: *"The Phase II report used a multi-tiered screening process through which water supply concepts and elements were screened, and those that passed screening were used to develop a set of alternatives."*

Comment: The basic alternatives were developed prior to initiation of the NEPA process, but there is no indication that they were ever evaluated or measured against the issues raised by the public during scoping, other than in the analysis of effects. In fact, it appears that the comments raised during scoping were generally ignored. No alternatives were developed specifically to address issues raised in scoping and there is no tracking system in place that allows the reviewer to track comments through the analysis process.

DEIS Section 2.1.2.1 Purpose and Need Screening Criteria, page 2-5
Statement: *"The Project concepts and elements were screened using three purposes and need criteria: firm yield, timeliness, and regional project, as described below."*

Comment: The alternatives were basically developed prior to public scoping and identification of the 24 main issues raised in that process. Although the alternatives developed may have been evaluated against the issues raised, no alternatives were developed in response to the issues raised. Consequently, public involvement resulting from scoping appears to have been ignored in the early stages of the NEPA process.

[16] The United States EPA also identified these projected impacts to water resources in the West from climate change: www.epa.gov/climatechange/effects/water/northamerica.

DEIS Section 2.1.2.2 Environmental Screening Criteria, page 2-5
Statement: *"Wetland areas were estimated using National Wetland Inventory maps, the Phase II report (MWH 2004), and/or geographic information system (GIS) tools, as discussed in the Alternatives Evaluation Report (HDR 2007a)."*

Comment: Although adequate for concept development, the National Wetlands Inventory (NWI) is not sufficiently accurate for project level planning. Many small wetlands will be overlooked and many of the units identified in the inventory will be wrong. This approach does not allow for identification of project specific impacts or evaluate the impacts that might result from required mitigation. There is no assessment as to whether the mitigation can even be accomplished "in-kind" and "in-place." Under section 404 of the Clean Water Act and NEPA, this is an inappropriate use of "adaptive management." *See* Section II.5 of these Comments.

DEIS Section 2.1.2.2 Environmental Screening Criteria, page 2-6
Statement: *"Therefore, any new proposed reservoir element located on a perennial stream was eliminated from further evaluation."*

Comment: The assumption that perennial streams should be dropped from consideration seems based on false assumptions. The decision appears to be based on the inability of the proponents to collect an adequate level of information during their planning process. This decision may have eliminated viable alternatives.

DEIS Section 2.4.1 Operational Flexibility, page 2-30
Statement: *"The District has the following needs for operational flexibility for the Proposed Project."*

Comment: The City cannot seriously evaluate the effects of the project with so little information provided regarding implementation and operation of the project. The specific impacts of these options cannot be evaluated in the context of the entire project's operation. An SDEIS is necessary to provide the requisite data and take the legally required "hard look" at the alternatives considered and the Proposed Project.

DEIS Table 3-17 Wetlands and Other Waters, Glade Reservoir Study Area, page 3-49
Statement: *"A determination has not been made regarding the jurisdictional status of these wetlands and other waters under Section 404 of the Clean Water Act."*

Comment: A jurisdictional determination must be made and circulated in an SDEIS prior to making a decision or issuing a permit. Presently, it is impossible to know the amount of wetlands mitigation that will be required, where it will be developed, and the

impacts that might develop as a result of wetlands mitigation-related activities. Since this is a project specific proposal, the Corps must base its evaluation on project specific information before a decision can be made. *See* discussion in Sections II.6 and II.7 of these Comments.

DEIS Section 3.14.1 Regulatory Framework, page 3-61
Statement: *"The Fish and Wildlife Coordination Act requires the federal action agency to consult with the U.S. Fish and Wildlife Service (Service) and the CDOW on issues related to conservation of wildlife resources for federal projects resulting in modifications to waters or channels of a body of water (16 U.S.C. §§ 661–667c)."*

Comment: The DEIS makes no mention of the Bald and Golden Eagle Protection Act. *See* 16 U.S.C. 668-668d. The Corps must comply with that Act in addition to others noted, including identifying, analyzing and considering incidental take issues as they relate to eagles.

DEIS Section 4.12.4 Summary of Effects to Wetlands and Other Waters, page 4-50
Statement: *"Table 4-9 summarizes the direct effects to wetlands and other waters that would occur under all of the alternatives."*

Comment: This "summary" of the effects on wetlands and other waters fails to address the effect of building or providing the necessary mitigation to alleviate these impacts. It must be redone in an SDEIS that addresses such questions as: Where will the new mitigation occur and in what quantities? What impacts will result from creation of the mitigation? Will the mitigation offset the impacts to the sites identified in Table 4-9?

DEIS Section 4.15.2.1.1 Upstream of Fort Collins, page 4-61
Statement: *"Therefore, the information on hydrology and habitat availability for fish and invertebrates indicates that the action alternatives would result in a minor beneficial effect to fish and invertebrate communities in this segment of the Poudre River (Table 4-11)."*

Comment: These conclusions differ considerably from those on other rivers in Colorado. For example, reduced winter and spring flows on the Yampa have had a major negative effect on critical downstream spawning habitat for endangered fishes. This evaluation fails to address the effects of reduced flows on the creation or elimination of specific spawning habitats for individual species.

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Part V - Recreation, Aesthetics, Socioeconomics & Cumulative Impacts

1. General Comments

The proposed action will have negative impacts to the quality of life of Fort Collins residents. There will be impacts to the general economic health of the community and to aesthetic and recreation values. These quality of life indicators are strongly correlated with the biological condition of the Poudre River, its visual appearance, and its ability to support recreation activities. The millions of dollars invested by the City in reliance on the continued viability of the Poudre River evidence and illustrate the importance of the River in Fort Collins and to Fort Collins residents.

The great importance the City places on the Poudre River is reflected in several key planning documents. Overall guidance is provided by City Plan, the City's comprehensive plan, which states in the community vision: "The Poudre River will be a major part of a coordinated system of open lands that includes the foothills, corridors, streams and other water bodies, parks, natural areas and community separators." (City of Fort Collins City Plan at 10). City Plan further states, "The Poudre River Corridor is highlighted in *City Plan* because of its special significance to the entire Fort Collins community…The special significance of the Poudre River Corridor has been recognized in a series of planning documents adopted by the City Council over many years.." (City of Fort Collins City Plan at 229).

Some of the more recent plans that emphasize the importance of the Poudre River to the City include the Downtown River Corridor Implementation Program, Fort Collins Downtown Plan, the Downtown Strategic Plan, North College Avenue Corridor Plan, Natural Areas Policy Plan, Parks and Recreation Policy Plan, Framework for Environmental Action, and Stormwater Master Plan. Protection and enhancement of the River is a common theme in each of these planning documents. Flow reductions undermine these planning efforts by reducing wildlife, scenic and recreational values, as well as the efforts to revitalize areas in the vicinity of the River.

Finally, it is a policy of the City to coordinate with appropriate agencies, when possible, to provide adequate instream flows to maintain ecological, recreational, and scenic values in the Poudre River Corridor (Policy PRC-2.4 Instream Flows).

There are two types of flaws critical to the DEIS analyses of recreation, aesthetics, and socioeconomics. First, there are significant and unacceptable omissions in the analyses of these issues. For example, the assessment of community impacts fails to include the community of Fort Collins when it concludes there will be no community cohesion or quality of life impacts associated with any of the action alternatives (See Section V.3d that follows). Another example is the omission of the DEIS to identify the potential that impairment of water quality in the Poudre River that may result from the reduction in flows that NISP will cause could result in future "no body contact" and "no swimming" zones in the River. *See* comments regarding DEIS Section 4.5.9 in Section III…2a of these Comments. Such degradation of river conditions could severely impair or preclude

the continued use of the River for recreation. Without recognizing this concern, analyses of the impacts to boating and fishing and other forms of recreation are incomplete.

Second, there are numerous significant errors, inaccuracies and inconsistencies in the analysis and conclusions of the DEIS and supporting technical reports, as described in Parts III through V of these Comments. These errors and inconsistent conclusions about impacts to water quality and the ecology of the Poudre River throughout the DEIS undermine analyses of recreation and economic impacts. For example, the DEIS repeatedly makes contradictory conclusions about impacts to the riparian vegetation and wildlife. See Section IV.3b and Section IV.5c of these Comments. If, for example analyses of riparian vegetation and wildlife habitat are inconclusive throughout the DEIS, then dependant analysis and conclusions about the impact to recreational wildlife viewing is unsupported. Similarly, the limitations of these ecological analyses prevent a meaningful analysis of visual and aesthetic impacts, which depend upon a meaningful understanding of the impacts NISP would have on riparian vegetation and invasive species.

This theme of inconsistency is carried into the socioeconomic and recreational analyses. For example, DEIS Attachment G: Technical Memorandum- NISP Visual Impacts to Recreation Activities states:

> *"Reduced water flows in the river would decrease the area of riparian vegetation communities and surface water. Potential effects to visual quality from active and passive recreation areas in Lee Martinez City Park (Fort Collins) would be negligible. Although smaller in area, riparian plant communities would persist, and continue to screen the park from adjacent industrial and residential land uses. Effects to the long distance visibility of trees within the remaining riparian plant communities would also be negligible…. Although fewer in quantity, the same species of trees would remain at the same size and same locations as presently exist."*

This excerpt, which is based on little if any scientific evidence, makes no clear statement, is not consistent with other sections of the DEIS and does not support the assertion that impacts to wildlife viewing and aesthetics will be negligible (*See* Sections V.2b and V.3e that follow).

To summarize, because of the analytical problems found in the more readily measurable and quantifiable impacts described in Parts III and IV, rigorous identification of issues regarding the impacts NISP would have on Recreation, Socioeconomics and Aesthetics, meaningful analysis of those impacts, and consideration of ways in which those impacts may be addressed, is hindered and, to some extent, not possible. The Corps must evaluate and address the impacts of NISP on these areas of concern and fully address the expected impacts in accordance with the Section 404(b)(1) Guidelines. *See* Section II.1a of these Comments for further discussion in this regard. Additional identification and analysis of these impacts, building upon the additional work needed to address the

concerns noted throughout these Comments, must be completed and incorporated into an SDEIS and Revised Section 404(b)(1) Analysis.

1a. Impact of the Proposed Action on Fort Collins' Economy

The City of Fort Collins has built substantial infrastructure along the Poudre River and based substantial investments upon the location and character of the Poudre River as it flows through Fort Collins. This may result in part from the fact that the Poudre River flows through the original center of the City. These investments and infrastructure improvements range from the design and construction of multi-million dollar wastewater treatment plants, to the acquisition of parks, Natural Areas and trail alignments along the River, to the completion of Downtown land use and infrastructure plans to complement and encourage interaction with the nearby reaches of the River.

Below is a table depicting selected projects, acquisitions and investments of the City of Fort Collins in and around the Poudre River, along with the general timeframe for the expenditures. This table illustrates the extent to which the River has been central to City programs and priorities.

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Summary of Selected City Investments and Acquisitions Along the Poudre River

Poudre River Projects	Year	Cost
Natural Areas Acquisitions (see page 94 for detail)	1955 – present	$8.4 million
Natural Areas Restoration and Rehabilitation	2003 -- present	$500,000
Park Acquisitions (see page 193 for detail)	1960 - present	$14.6 million (present day values)
Poudre River Trail (see page 193 for detail)	1980 – present	$8.3 million
Drake Water Reclamation Facility Levee	1992	$462,000
Pickle Factory Site Purchase & Improvements	1995	$290,000
Stormwater Land Acquisitions	2001 – present	$360,000
Old Fort Site Historic Survey Project	2002	$35,000
Poudre River Enhancement Project	2003	$120,000
Bicycle/Pedestrian Bridge over Poudre River	2002	$998,007
Timberline R-Path Levee	2000	$50,000
Downtown River Corridor Preliminary Brownfields Pilot Assessment Project	1999	$250,000
Targeted Brownfields Assessment – Poudre River	2004	$80,000
North College Improvements – Phase I	2005	approximately $5 million
Oxbow Levee	2005	$700,000
Northside Aztlan Community Center Construction	2007	$10 million
Timberline L-Path Levee	2007	$1.5 million
Downtown River District Infrastructure Project	2008/ in progress	$200,000 for planning $3 million ($1.5 million in federal funds, and $1.5 million in Downtown Development Authority funds) Estimated costs of full implementation is $17.5 million
Museum/Discovery Science Center	in progress	$363,000 for land (partial) $9.6 million ($6.6 million in dedicated City tax revenues and $3 million in private foundation funds) for development

As noted above, the Downtown River Corridor – the area directly adjacent to both sides of the River between North College Avenue and Lemay Avenue – is the focus of the City's revitalization efforts. As a result, there have been considerable investments made by the private sector and other entities along the River Corridor, in addition to the City's

investments. The attractiveness of the River to housing, office and recreational uses has been a key factor in these investments. A few recent projects include:

- In-Situ, a 30,000 square foot office building along the Poudre River off of Lincoln Avenue. In-Situ located in Fort Collins in part to be near the Poudre River.
- Rooftops on the River, a housing project under construction near the Poudre River off of Willow Street.
- Mason Street North, a mixed use project located near the Poudre River off of Mason Street.
- Old Town Athletic Club, a project that renovated an older building on Linden Street.
- Colorado State University's Environmental Learning Center at Drake Road.
- Colorado State University's Engine and Energy Conversion Laboratory at the Old Power Plant Site along the Poudre River off of North College Avenue.

Many other private projects have been proposed for the Downtown River Corridor. Changes to the morphology, vegetation, and aesthetics due to reduced river flows may have an adverse impact on the attractiveness of the River Corridor for private investment.

In Fall 2007, Dr. John Loomis of Colorado State University conducted a scientific, peer-reviewed survey of Fort Collins households to determine the economic benefit (non-market valuation) of maintaining peak flows in the Poudre River through Fort Collins. *See "Estimating the Economic Benefits of Maintaining Peak Instream Flows in the Poudre River through Fort Collins, Colorado"* (the "Loomis Report") (Loomis, 2007).

As described in the Loomis Report, a mailed survey questioned a random sample of 550 Fort Collins households (with an impressive response rate of 64%) found that slightly more than two-thirds (66%) of the respondents thought a 50% reduction in flows was a very bad change with an additional 15% believing it would be a bad change. Thus, more than 80% of the households surveyed believe a 50% reduction in flows is a bad change. A 50% reduction in flows is within the range of reductions from NISP predicted for Fort Collins.

The Loomis Report notes that the same survey also found that three-fourths (75%) of Fort Collins households surveyed have visited the Poudre River in town at least once, and more than half do so every year, with a median of 6 trips per person. Using a federally accepted Contingent Valuation Method, the median value of $15 per visit per survey respondent was estimated. Given the six trips per person per year with a value of $15 per visit, this translates to an annual recreation value of $90 per year per household. When median and mean willingness to pay results are generalized to the percentage of households in Fort Collins that responded to the survey, the analysis yields an annual benefit of $8.5 million to $12.7 million with a present worth or value of these benefits in perpetuity estimated at $283 to $424 million. These impacts must be considered in the Corps' public interest review required by 33 C.F.R. § 320.4(a). It is consistent with the

contingent valuation studies frequently used to estimate the effects of federal actions in the benefit-cost context.

The Socioeconomic analysis in the DEIS is also profoundly deficient in its lack of assessment of the impacts that NISP will have on the economy of the City. The Cache la Poudre River and its attendant natural environment, recreational amenities and aesthetics are critical to the economic health – present and future – of the City.

Surveys and studies conducted for the City have shown that the River and its amenities are central components to the high quality of life in the City, which, in turn, is essential to the economic development of the City. *See e.g.*, *City of Fort Collins Communication and Public Information Office, Brand Report Summary* (the "Brand Report") (available at http://fcgov.com/business/pdf/brand_summary_cpio.pdf). High quality of life is an integral part of retaining and attracting the high-skill, high-education and creative workers that are essential to the high-technology, biotech, brewing and other jobs that drive the local economy. *Id.*

The River has made the City extremely competitive in attracting highly desirable workers and businesses. *Id.* Indeed, the City regularly wins awards and recognitions nationally for its recreation and quality of life due in large part to the recreational and environmental qualities of the River. The City has recently won awards as the "Best Place to Live" from *Money Magazine*, "One of America's Most Walkable Small Cities" from *MSN.com*, one of the "Best Places to Live" from *Men's Journal*, "One of 18 Perfect Towns" and "One of America's Dream Towns" from *Outside Magazine*, "Bicycle Friendly Community" from the League of American Bicyclists and "Top Retirement Spot" from *Where to Retire Magazine*. See Why Fort Collins? Quality of Life (available at http://www.fcgov.com/business/qol.php.).

City residents identify the natural beauty of the River, the mountains and parks as the greatest asset of the City. *Id.* State tourism and economic development officials, along with industry experts, highlight the City's outdoor recreation opportunities, clean water and hiking/biking trails as essential parts of the City's "brand" and economic development. Brand Report at 2-4. "Fort Collins possesses incomparable brainpower, an excellent education system, a desirable quality of life and vast open space – all important factors when competing for and retaining those companies and jobs that will ensure a diverse and prosperous economy." *Id.* at 10. The outdoors and open space are identified as among a handful of "key economic drivers" for the City. *Id.* at 11, 13. The economic development benefits spin off to all of Northern Colorado, which shares in the City's economic success.

As an example of the importance of the River to the City's economy, City economic development promotional material highlights the River, City Parks, City Natural Areas and bike paths as essential elements of the quality of life that attracts businesses and high-value workers. *See* "The Fort Collins Way of Life" (available at

http://www.fcgov.com/business/pdf/FortCollins_QualityofLife.pdf). It highlights photographs of a fly fisherman with a significant stream flow and healthy vegetation. *Id.*

City economic redevelopment and land use plans also revolve around a healthy River. For example, the City's River District plan is based on the connection of the City and its built environment with "recreation on the river and preserved natural areas." City of Fort Collins, River District Plan at 2 (available at http://fcgov.com/riverdistrict/pdf/river_district.pdf).

All of these efforts will be substantially impaired by the impacts of NISP on the River. As discussed in Parts III through V of these Comments, the reduction of Poudre flows by 25 % to 71 % would lead to potential algal blooms, fish kills, losses of native vegetation, choking of the stream channel, impairment of fishing and boating, potential losses of birds and other species, and the aesthetics of the River Corridor. These impacts are completely at odds with the City's and region's economic future. The Loomis Report confirms that residents already perceive the degradation to quality of life and recreation that a large reduction in flow will cause.

1b. Impact of the Proposed Action on Recreation

As reported in the Loomis Report (2007), survey respondents were asked how their visits to the Poudre River in Fort Collins would change if peak spring and summer flows were reduced by half. About one-third would visit less with the lower flows, 5 percent would stop visiting altogether, and about half would not change their visits (the remainder currently do not visit the River and the lower flows would not change that). Combining all the responses yields an average reduction of 3.2 visits per person, with a median reduction of 2 fewer visits per person with a 50 percent reduction in flow. Given the reported current median visits is 6 trips per person per year, this is a substantial decrease (-33%) in the median number of visits made to the Poudre River if flows were cut in half. Given the economic value of $15 per visit, average annual recreation losses are between $30 and $48 per Fort Collins household and represent a loss of approximately $1.3 million in recreation-related economic activity on an annual basis.

As described in more detail in Section V.2 of these Comments, it is anticipated that reduced flows associated with the proposed action are likely to reduce or eliminate boating and fishing opportunities in the Poudre River during the high recreation spring and summer months. Similarly, modification of the river channel as a result of reduced flows including habitat "terrestrialization" and the loss of native riparian wildlife will reduce opportunities for wildlife viewing that have been enjoyed in Fort Collins for more than half a century. Assuming that the proposed action were to be approved, over a period of time the River Corridor may visually appear more like a "canal" than a river, which would be expected to reduce visitor enjoyment and usage.

Property	Site Acres	Present Day Value	Acq. Year	Management Purpose	Miles of Trail	Recreational Uses
Lee Martinez Park	89.56	$ 11,866,700	1973	Active and passive recreation	0.6	Organized sports (ballfield and turf field sports), tennis, basketball, playground and picnic shelter users, walking, jogging, wildlife viewing, biking, equestrian, dogs, fishing, boating, Poudre River Trail through the park, community gatherings
Legacy Park	8.4	$ 1,050,000	1975	Active and passive recreation	0.2	Walking, jogging, turf for informal play, picnic shelter, wildlife viewing, biking, equestrian, dogs, Hickory Trail through the park, community gatherings
Old Fort Collins Heritage Park	13.0	$ 812,500	1960	Active and passive recreation	0..1	Organized sports (turf field sports) walking, wildlife viewing, biking, playground, dogs, fishing, boating, Poudre River Trail through park, community gatherings
Buckingham Park	5.75	$891,250	1962	Active and passive recreation	0.1	Organized sports (ballfield and turf field sports), basketball, walking, playground and picnic shelter users, wildlife viewing, Poudre River Trail through the park, community gatherings
Poudre River Trail		$ 8,334,750	1980-present	Active and passive trail recreation	10.10	Walking, jogging, biking, wildlife viewing, organized community walks and runs
Totals	**116.71**	**$ 22,955,200**			**11.1**	

Above is a table illustrating the four public parks and the Poudre River Trail that are managed by the City of Fort Collins' Parks Department and affected by the proposed action. The existing water craft course improvements at the Old Power Plant will have a reduced challenge rating and shortened boating season due to the proposed action. The new water craft course that is currently in the development stage will likely be rendered not feasible due to the reduced flows and shortened boating season.

1c. Concluding General Comments

In summary, the Loomis Report indicates a substantial economic and recreation value to Fort Collins households in maintaining current peak spring and summer flows in the Poudre River. It appears the value of these instream flows to Fort Collins residents is of significant magnitude even relative to the market value of the water. Further, the value of water in the Poudre River to the residents of Fort Collins is sufficiently high to suggest that additional water diversions from the Poudre River should occur downstream of Fort Collins even if this involves higher costs to diverters or reduced water yields to diverters.

Finally, these non-market values are part of the Corps' National Economic Development assessment of benefits and costs and must be factored into the Corps' decision on whether or not to permit the proposed action and the mitigating measures that would be included in an approved permit.

Under the Section 404 regulations promulgated by the Corps, the Corps may not issue a permit for NISP if it determines that doing so would be contrary to the public interest based on a "careful weighing" of the probable impacts of the project. 33 C.F.R. § 320.4(a). As has been discussed throughout these comments, the current record is inadequate for the Corps to undertake this analysis, because it fails to account for the economic and noneconomic negative impacts of NISP, while possibly exaggerating the benefits.

The more careful consideration of the public interest required by the Corps' own regulations would show that this project as currently configured is not in the public interest. Adding to the public interest balance the hundreds of millions of dollars of costs the project as configured could cause due to new drinking water treatment infrastructure and operating costs/impacts (*see* Section III.1 of these Comments), needed wastewater treatment infrastructure and operating costs (*see* Section III.2), the loss of stormwater conveyance capacity (*see* Section IV.2), lost recreation from fishing, boating and other uses (*see* Section V.2), the costs associated with impacts such as lost existence value, lost economic development, ecological damage and degraded habitat values would tip the balance towards finding that this project is not in the public interest under Section 320.4(a). Adding these hundreds of millions of dollars of costs to the rate base for NISP participants and realistically considering the effects of climate on reduced yield may lead even consumers of water from NISP to conclude that the project is not in their interest either. *See* Section IV.6 of these Comments.

2. Recreation

2a. General Comments

The Cache la Poudre River Corridor in Fort Collins provides extensive riparian, riverine, and wetlands habitat and recreation opportunities. The City owns 19 Natural Areas comprising 1,423 acres, 4 parks, and over 27 miles of trail associated with the River *See* Table in Section V.1b of

these Comments. Surveys have shown that there are over 500,000 visits annually to the Natural Areas alone (City of Fort Collins, 2006). The City has invested over $8 million in its Natural Areas and associated trails along the River (not adjusted for inflation) and over $22 million in parks and trails (current value).

Both the DEIS and the Recreation Resources Technical Report acknowledge impacts from the proposed action on the aesthetics, fishing, boating and economics of the Poudre River through Fort Collins. The proposed action reduces flows in the River and contributes to the "miniaturization" of the River. Reduced flows result in less environmental diversity along the River and consequently a reduction in the recreation resource value to the community. An SDEIS and Revised 404(b)(1) Analysis should be prepared to contain the appropriate and legally required level of analysis, detail and avoidance, minimization or mitigation strategies to address recreational impacts from the proposed action.

The City has invested significant resources in improving the River and creating adjacent infrastructure for the enjoyment of the community. A Cache la Poudre River with sustained flows remains the "heart of the community" and is particularly vital to the continued growth of the downtown area. The proposed action will diminish the health of the River and its recreation value.

2b. Specific Comments on DEIS

Section 2.4.1.4 Sources of Water for Drought Conditions, page 2-32
Statement: *"NISP will have the option of entering into contracts with agricultural water users to lease water that can be subsequently diverted and stored in NISP facilities."*

Comment: The City currently irrigates numerous parks with irrigation ditch water and the impact on these deliveries of water leased by NISP is not addressed. NISP leases and diversion of water from irrigation ditches that supply water to the City's park system may affect the City's ability to convey water to the park system. For example, it may affect the amount and timing of water that is available for use at City parks. Additional analyses related to these potential leases are needed to determine what impacts to the City will result. These concerns are in addition to the potential impacts identified above in Part III of these Comments regarding DEIS Section 2.4.1.4.

Table 4-1. Effects Common to All Action Alternatives, page 4-4
Statement: Recreation Effect: *"Poudre River streamflows downstream from the Poudre Valley Canal diversion would be reduced. This would potentially affect boating recreation on the Poudre River from Shields Street to Prospect Street in Fort Collins."*

Comment: The statement should acknowledge the potential effect to river aesthetics, planned City improvements, other recreational experiences, and the economic value of the River to the

community in addition to boating. The impact should be quantified and more precisely defined in an SDEIS.

Section 4.2.1.7.1 Socioeconomics, Poudre River Recreation, page 4-4-11
Statement: *"Reductions in flow may also adversely impact recreation activities on the Poudre River trail, resulting from a reduction in the aesthetic quality of the recreation experience."*

Comment: The City agrees that reduced flows in the Poudre River through Fort Collins will adversely impact recreation along the River. In fact, the City contracted a scientific, peer-reviewed study with Dr. John Loomis of Colorado State University (the Loomis Report, as described above) to determine the economic benefit (non-market valuation) of maintaining peak flows in the Cache la Poudre River through Fort Collins.

It is important to note that this survey asked citizens about a 50% reduction in peak spring and summer flows. It is noteworthy that some of the modeling detailed in the DEIS suggest up to a 71% reduction in flows during the same periods. One would logically conclude that had the survey asked about a 71% reduction, there would be a corresponding increase in adverse responses.

The aesthetic value of the River includes the recreation experience people have being adjacent to or on the River. Reduced flows will result in a diminished experience for fishermen if the River has fewer and less desirable fish, experiences fish kills and has a less diverse vegetative habitat that could compromise the aquatic community. Park and trail users will also be impacted by the potential for the composition of the River to present fewer and reduced eddies and ripples during reduced flows with resulting loss of enjoyment. Bird watching, for example, could be impacted if the cottonwood tree population or other bird habitat is diminished due to reduced flows or reduced flooding. Boating users could experience frustration with low flows in the River, a reduced channel width and the floatability of the River. The result would be fewer fishermen, boaters and in general fewer people coming to the River for recreational purposes.

Section 4.2.1.7, Socioeconomics, Page 4-11
Statement: *"Since aesthetic impacts are anticipated to be negligible, economic impacts are uncertain, but are expected to be similarly negligible."*

Comment: This conclusion is not supported by data or factual findings in the DEIS or supporting documents. It runs contrary to the findings of the Loomis Report. The Loomis Report (see attachment to these comments) indicates a high value to the community for maintaining current river flows. The DEIS finding that "aesthetic impacts are anticipated to be negligible" ignores the further reduction in human and natural value of the River likely to result directly and indirectly from decreased flows. Reduced flows could jeopardize the survival of native fish, and changes to river flow and water quality could result in fish kills and a less diverse plant environment and resulting loss in wildlife species diversity. The human experience of the River will be diminished with this overall reduction in aesthetic richness.

Comparison of Alternatives (Table 4-6) and Distinguishing Effects of the Alternatives, Page 4-16
Statement: *"If Glade is managed for public recreation, it would provide a new sport fishery."*

Comment: This section of the chart should reference the potential for negative impacts to fishing through Fort Collins in order to provide a comprehensive overview of the impacts to fishing.

Section 4.17.3.1 Poudre River Recreation, Page 4-72
Statement: *"A water craft course is currently being planned for this location and has a preliminary minimum design streamflow of 150 cfs."*

And;

Section 4.22.2 Impacts Common to Action Alternatives, Page 4-102
Statement: *"Currently, the feature of the course will be designed to function at flows as low as 150 cubic feet per second (cfs)."*

Comment: Recent research by the consultant hired to design the water craft course, indicates that a minimum flow of 250 cfs is a realistic value for a viable course, with the desired flows to range up to over 500 cfs. McLaughlin Whitewater Design group, 2008. Additional analysis is needed in an SDEIS to determine the magnitude of the impact reduced flows from NISP would have on the water craft course. Flow reductions of the magnitude anticipated from NISP likely render the proposed water craft course impracticable or of very little usefulness, depending upon the timing and extent of reduction of river flows in this location. If the number of days that flows of sufficient volume are available is significantly reduced, the course would get little use, would have little economic impact, and would not be worth building. *Id.* This must be addressed in an SDEIS and Revised 404(b)(1) Analysis.

Section 4.17.3.1 Poudre River Recreation, pages 4-72-73
Statement: *"Fishing along this reach of the Poudre and in several of its associated ponds is growing in popularity and may be affected by streamflow changes that affect fish population and pond water levels."*

Comment: Additional analysis is needed to determine the real magnitude of the impact on fishing through Fort Collins on the River and adjacent ponds. As indicated in the City's comments on the aquatic resources sections of the EIS, the impacts to aquatic resources should be characterized as major given the significant changes to the flow regime and concomitant changes in channel morphology, habitat composition, etc. The DEIS does not sufficiently describe or quantify impacts to recreational fishing

Section 4.17.3.1 Poudre River Recreation, page 4-73
Statement: *"Use of the Poudre River trail and nature observation are not expected to have more than minor impacts due to any diminished aesthetic qualities."*

Comment: This conclusion is not supported by any rigorous analysis and is contrary to the findings from the Loomis Report. The Report indicates that the community has a high value for maintaining current river flows. The diminished plant, aquatic and wildlife environment of the River resulting from the impacts to the River itself, will result in fewer people coming to enjoy the River. Activities such as bird watching, photography of nature, school outings to learn about nature, and other recreational opportunities have the potential to be reduced, resulting in less human experience and interaction with the river environment. The river environment of the Poudre River is largely "aesthetic" for many Fort Collins residents and reduced flows will impact this community value, particularly during the periods of lowest river flows.

Section 4.17.6 Mitigation, page 4-75
Statement: *"The District would seek an agreement with the Lake Canal Company to move diversions from the Lake Canal intake on the Poudre River near College Avenue to the Timnath Reservoir Inlet Canal about 3 miles downstream. On average, moving the diversions from the Lake Canal downstream will add about 50 cfs to the Poudre River for 6 weeks from late May to early July."*

Comment: It is unlikely that a successful effort by the District to move the Lake Canal intake would be helpful to the viability of the water craft course. The DEIS includes no analysis of the impacts from the significant flow reductions to result from NISP, no discussion of avoidance or minimization of reduced flows, no definite commitment, no enforceable mitigation measure and thus no effective, acceptable mitigation of this impact. The aspiration expressed in this statement is not effective. Moreover, analysis of the effect of retaining 50 cfs for six weeks through a portion of the City is needed to determine the extent to which detrimental impacts from flow reductions would be avoided. An increase in flows of 50 cfs to offset the reductions projected to result from NISP is not likely to be sufficient to result in a viable water craft course, and clearly would not allow for strong regional draw anticipated from current peak flow levels. McLauphlin Whitewater Design group, 2008.

Table 4-20, Summary of Estimated Effects for the Alternatives, Chart, No. 15, Recreation Resources, Boating (kayaking and canoeing), page 4-132
Statement: *"Tubing on the Poudre River would be unaffected by reduced flows."*

Comment: This conclusion is not supported by any analysis in this section. Tubing activities have become extremely popular in the last several years through Fort Collins with many hundreds, and probably thousands, of users annually (there is no data set available). The reduced flows associated with NISP will almost certainly reduce the recreation season for in-town tubers and this effect (and similar effects to canoers, rafters, and kayakers) should be quantified in an SDEIS .

Chapter 4, Table 4-20, Summary of Estimated Effects for the Alternatives, Chart, No. 15, Recreational value, page 4-145
Statement: *"Offsetting impacts. Approximately $0.30 to $1 million in annual loss from Poudre River activities. Approximately $17 million in benefit from recreation at Glade Reservoir."*

Comment: The analysis of impacts of NISP on recreational values on the Poudre River is not based upon adequate data. As noted below, the Recreation Resources Technical Report (p. 19) notes that no recreation/user data was developed as the basis for evaluation of recreation impacts.

Further, the cited passage implies that potential Glade recreation values will offset lost recreation values on the Poudre River in Fort Collins. The City does not agree with this implication. First, the Loomis Report (attached to these comments) indicates a high value to the community for maintaining current river flows. Further, this implication is not supportable because the offset in recreation is not in-kind. River kayaking and fly-fishing would be replaced by flatwater boating and fishing. Additionally, recreation opportunities several miles outside of Fort Collins at Glade would not offset recreation along the Poudre River in the central downtown of Fort Collins, or inside Fort Collins generally.

Even if recreational opportunities at Glade Reservoir could adequately substitute for recreational opportunities along the Poudre River in the center of Fort Collins, the supporting basis for the estimated benefits from the Glade recreation is flawed. As described in the Socio-economic Resources Technical Report, the $17 million estimate is based on the assumption that Glade would experience an equivalent amount of recreation as Horsetooth Reservoir, but that there would be no reduction in recreation at Horsetooth. This key assumption is not supported by any data or analysis. In addition, the development of recreational facilities at Glade would be dependent upon the investment of funds, likely public funds, at a time of increasing scarcity of public and private resources. Without any commitment or demonstration that such investment will be forthcoming, the Corps cannot reasonably expect these $17 million in benefits.

Table 4-20, Summary of Estimated Effects for the Alternatives Chart, No. 15, Recreation Resources (Page 4-15)
Statement: *"Additional cumulative impacts to recreational value may occur."*

Comment: These additional cumulative impacts are not adequately addressed and may result in the reduction or elimination of existing recreational uses. Additional information is needed for the City to respond.

2c. Comments on Recreation Resources Technical Report (RRTR)

RRTR Section: 3.3., Assumptions, page 19
Statement: *"This report is based on existing information and no formal recreation/user surveys were conducted. Impacts were quantified to the extent possible based on available information; however, in most instances impacts to recreation were qualitative because of the limited amount of recreation user preference data necessary to derive a relationship between surface water elevation and visitor use at reservoirs, and streamflows and visitor use on rivers."*

Comment: The analysis of potential impacts to recreation is hindered by the lack of data and therefore lack of basis for the conclusions reached. The conclusion that impacts to recreation

from NISP would be minor is derived from dubious assumptions only, and is merely speculative. This must be addressed in an SDEIS and Revised 404(b)(1) Analysis.

RRTR Section: 5.1.5., At the LINCGAGE, page 46
Statement: *"Although species diversity and abundance of riparian-dependent wildlife species could be reduced in localized areas, no major changes of species composition or distribution are likely (ERO 2007c). Therefore, no impacts to wildlife-related recreation are expected."*

Comment: The finding of no major impact to riparian dependent wildlife is incorrect and unsupported by the DEIS (see previous comments on the Wildlife Technical Report (WRT)). Therefore, any finding about recreation that is based on the WRT, or other related portions of the DEIS, is similarly flawed. This must be addressed in an SDEIS and Revised 404(b)(1) Analysis.

RRTR Section: 5.1.5., At the LINCGAGE, page 46
Statement: *"Because the highest use of these public recreation areas and the trail occurs during summer, these visual effects to park visitors and trail users would be partially screened by the native deciduous vegetation being in full leaf (Holdeman 2007)."*

Comment: The cited statement is not supported by data or analysis and is speculative. It is also inconsistent with the likely impacts to vegetation, discussed in Section IV.3 of these Comments, that are likely to result from NISP. A partial screening by native vegetation would not likely avoid or substantially reduce the visual impacts, and would have little to no effect during a large part of the year. Indeed, the Loomis Report confirms that residents - - well acquainted with the River - - believe that there would be impacts associated with large reductions in flows. Additional information is required for analysis and meaningful consideration of aesthetic impacts. A visual representation of historic and anticipated flows in the River should be provided to show the aesthetic impact caused by reduced flows. The impacts of reduced flows upon vegetation along the River, and the cumulative impacts on aesthetics should be analyzed and considered. The condition of the River in dry years should be given special attention due to anticipated climate changes.

RRTR Section: 6.1, Mitigation Common to All Action Alternatives, page 75
Statement: *"Relocate the Lake Canal to a more downstream location to mitigate for loss of flow at the proposed Water Craft Course location, but also for the in-town (Shields Street to Prospect Road) canoeing reach. Coordinate with local boating community to relocate this point of diversion to the Timnath Reservoir inlet site to avoid impacts to boating and boating potential."*

Comment: It is unlikely the effort by the District to move the Lake Canal intake would be helpful to the viability of the water craft course. This amount would not likely be sufficient to result in a viable water craft course, and clearly would not allow for strong regional draw anticipated from current peak flow levels. McLaughlin Whitewater Design group, 2008. Analysis of the effect of retaining 50 cfs for six weeks through a portion of the City is needed to determine the extent to which detrimental impacts from flow reductions would be avoided,

reduced or mitigated. Importantly, there is no guarantee that this relocation and coordination can and will occur and provide effective mitigation.

RRTR Section: 6.1, Mitigation Common to All Action Alternatives, page 75
Statement: *"See Vegetation and Stream Morphology Reports for mitigation of any aesthetic impacts along the river corridor."*

Comment: Additional information is necessary for analysis and meaningful evaluation of aesthetic impacts, and related avoidance, reduction or mitigation. A visual representation of historic and anticipated flows in the River should be provided to show the aesthetic impact caused by reduced flows. The impacts of reduced flows upon vegetation along the River, and the cumulative impacts on aesthetics should be analyzed and considered. The condition of the River in dry years should be given special attention due to anticipated climate changes. *See* Section IV.6 of these Comments.

3. Socioeconomics & Aesthetics

3a. General Comments

1. The DEIS fails to provide a detailed, data-driven assessment of the impacts to visual resources and aesthetics along the Poudre River Corridor.
2. The DEIS focuses solely on socioeconomic impacts associated with recreation and confines its review to communities participating in the project. An SDEIS should comprehensively evaluate the socioeconomic impacts (by examining more than recreation, such as economic development) to Fort Collins and other communities impacted by the proposed action. *See* Section V.1 of these Comments.
3. An SDEIS should evaluate cumulative impacts associated with significant Reasonably Foreseeable Actions within Fort Collins that are not included in the DEIS (*See* Section V.3, below).

3b. Specific Comments on DEIS – Aesthetics and Visual Resources

DEIS Section: 3.19 Aesthetics and Visual Resources, page 3-108
Statement: *"This section addresses the existing visual qualities of both the potential reservoir sites and the potential relocation of U.S. 287. These existing qualities may be affected by the construction of any of the reservoirs or the relocation of U.S. 287."*

Comment: As detailed below, the limitation of the visual resources assessment to reservoir areas and the U.S. Highway 287 relocation is inappropriate. Significant vegetation, recreation, wildlife, sedimentation and other impacts may occur as a result of the proposed alternative, and these may in turn impact the visual qualities of the Fort Collins reach of the River. The assessment needs to include all of the study areas identified in the Visual Resources Comprehensive Technical Report (VRCTR), including the Cache la Poudre River.

DEIS Section: 4.19 Aesthetics and Visual Resources, page 4-11
Statement: *"Issues of concern identified during scoping were the potential effect to existing visual quality near the reservoir sites, the visual impact of relocating U.S. 287, and the impact to scenic resources from hydrologic changes."*

Comment: Both this section and the Scoping Report identify the issue of impacts to scenic resources from hydrologic changes. Section 4.3.18 (page 16) of the Scoping Report contains the statement, "*Impacts on the aesthetic value of the Cache la Poudre River from reduced flow were of interest.*" Despite these statements, the DEIS does not contain any assessment of impacts to scenic resources, including the Poudre River, from hydrologic changes. The limitation of commentary to reservoir sites and U.S. Highway 287 clearly does not meet the intent of the issues identified in Scoping nor the Visual Resources description. An SDEIS should provide a full assessment of the impacts of NISP on the visual resources of the River.

DEIS Section: 4.19 Aesthetics and Visual Resources, page 4-11
Statement: *"Since aesthetic impacts are anticipated to be negligible, economic impacts are uncertain, but are expected to be similarly negligible."*

Comment: No data or analysis is presented to support this conclusion. It represents solely the author's opinion and value system relative to "aesthetics". No effort was made to solicit the specific views of the general public or NEPA process stakeholders. Aesthetics was one of the issues identified in the public scoping process, and this section of the DEIS fails to adequately address potential changes to aesthetics to City Natural Area, and parks properties and trails adjacent to the Poudre River in light of reduced flows, modifications to riparian vegetation and wildlife, and other factors outlined in the DEIS.

DEIS Section: 4.19.12 Mitigation
General Comment: Mitigation of visual resource impacts to the Poudre River must be addressed (the DEIS is currently silent) in an SDEIS in the context of an adequate analysis of impacts (which analysis has also been omitted from the DEIS).

3c. Comments on Visual Resources Comprehensive Technical Report (VRCTR)

VRCTR Section 2: Study Area, page 17
Statement: *"The study area for the Visual Resources Comprehensive Technical Report includes portions of Larimer and Weld counties that are potentially impacted by project activities…The study area also includes…the Cache la Poudre River Corridor from the Monroe Canal diversion to the confluence with the South Platte River…"*

Comment: This section lists areas included in the Study Area. However, only the potential reservoir areas are described in subsections 2.1 – 2.3. It appears that the Cache la Poudre River and other areas in the study area were excluded from the subsections. In fact, the entire study

area except for the reservoir sites has been excluded from the report. The report needs to include a description of the visual resources in these other areas (as a subsection); the Visual Impacts section (page 34) needs to include an assessment of impacts due to reduced river flows, potential loss of riparian vegetation, algal blooms and other impacts discussed in Part IV of these Comments; and the Potential Mitigation Measures section (page 47) needs to provide mitigation for any impacts to the reduced visual qualities of the River due to lower flows.

In an SDEIS, the Visual Assessment Report (VAR) should provide photo simulations of the River along the affected Corridor at different flow levels. The analysis needs to provide more assessment on the visual impacts of reduced tree densities and fewer tree species as briefly mentioned as an impact in the Recreation Resources Technical Report (RRTR), section 5.1.5, page 47.

The City requested reference information to support the findings in the Visual Resources Comprehensive Technical Report regarding loss of vegetation and impacts to the visual qualities of the River Corridor. The Corps provided in response the Technical Memorandum: NISP Visual Impacts to Recreation Activities, Dated June 18, 2007, to Stacey Antilla from Mark Holdeman, Regarding Text for Recreation Report. This additional document provides no additional substantive information. This lack of underlying data and analysis reinforces the City's concern regarding the need to gather and analyze data regarding the potential visual impacts.

3d. Specific Comments on DEIS - Socioeconomics

DEIS Section: 4.22.2 page 4-91;

And;

NISP Socioeconomic Resources Technical Report Section: 5.1.2 Community Impacts, page 64 & Table 63, page 114
Statement: *"All of the components of NISP action alternatives are located outside of community boundaries. No community cohesion, quality of life, or access impacts are associated with any of the action alternatives."*

Comment: This statement is inaccurate. Although the construction of NISP facilities occurs outside of incorporated municipalities, reduced river flows impact a number of downstream urban communities (Laporte, Fort Collins, Timnath, Windsor, and Greeley). This report does not assess the impacts on community cohesion, quality of life, or access impacts in these communities so the statement cannot be verified. In fact, many City of Fort Collins' community improvement and development plans are predicated on a robust and healthy Poudre River ecosystem, with connections and access being made between the Downtown and the Downtown River Corridor and the North College Corridor. The impact of reduced flows on these connections is not assessed in the DEIS, and should be part of the analysis.

Because the River is an essential community asset that brings together residents and visitors of all types - gender, race, income, neighborhood and other - it encourages and enhances community cohesion in Fort Collins. Its central role as a biking, running and walking corridor through the City means that it plays an important part in getting residents out of cars and interacting with each other. As discussed elsewhere in these comments, it is an essential part of the quality of life that makes Fort Collins a highly desired location and a critical part of the economic development and redevelopment of the City. The City's comprehensive, community improvement and development plans rely on the River as a critical link between neighborhoods, Downtown, the Downtown River Corridor, the North College Corridor, Natural Areas and Parks.

Community cohesion, quality of life and economic development are all threatened by any action that would diminish the flows of the River, impair water quality, threaten treasured trees and other vegetation, kill or displace fish and impair recreation. Failure to address these important issues through an unsupported blanket dismissal is inconsistent with both the Section 404 Guidelines and the public interest requirements of the Corps' Section 404 implementation regulations. See 33 C.F.R. § 320.4(a); 40 C.F.R. Part 230.

DEIS Section 3.22.2 Socioeconomic Issues, page 3-121
Statement: *"Socioeconomic issues identified in scoping were: Effects to regional population growth"*

Comment: This section does not contain any information regarding effects on population growth in the region, including in and around Fort Collins, despite this being an issue identified in the scoping. The NISP Socioeconomic Resources Technical Report (SRTR) briefly discusses population impacts on participating communities, but does not contain any analysis of the regional population impacts of NISP. The effects of NISP on water rates and the relative desirability of participating communities and neighboring communities could influence migration patterns between communities. In fact, the DEIS on page 4-13 states, "Availability of sufficient water supplies in the municipal areas served by many NISP participants may, however, *help steer growth into those areas* and away from unincorporated portions of the region." [italics added]. An SDEIS needs to assess the effects on <u>regional</u> population growth, not a narrow assessment of population growth effects in the participating communities.

DEIS Table 4-14, Summary of Socioeconomic Impacts for All Alternatives, page 4-94
Statement: *"Action alternatives – Community Impacts – No impact*
Alternative 2 Proposed Action – Recreational value – Offsetting impacts"

Comment: The community impacts on non-NISP communities such as Fort Collins have not been assessed. As described by the City throughout these Comments, the community impacts to Fort Collins may be substantial. In addition, the recreational values proposed for the Glade Reservoir and the existing and future ones for the Cache la Poudre River are much different. For example, Poudre River recreation includes a proposed Downtown water craft course, which allows for popular whitewater boating confined to one or two drop structures in an urban environment. Alternative 2, on the other hand, is likely to provide hypothetical flatwater boating several miles outside of Fort Collins on Glade Reservoir and primarily for motorized craft. As

discussed above, there is no guarantee that any such flatwater boating would be developed and no demonstration that it would satisfy any significant demand that is not otherwise met at Horsetooth Reservoir or other facilities. For each of these reasons, the recreation impacts do not offset.

DEIS Section: 3.2 Types of Impacts Assessed, page 20
Statement: *"With respect to potential economic impacts, the following issues will be considered…"*

Comment: In addition to the list provided, this section needs to examine the issue of whether the project would impact other values in all of the communities affected by the reduced river flows. An SDEIS needs to consider all economic and social impacts, such as the possibility of reduced property values on private and public land, the impacts on tax revenue from reduced visitation, the economic loss from unrealized development projects, and the impacts to the intrinsic value of the River to the non-participating communities.

3e. Comments on Socioeconomic Resources Technical Report (SRTR)

SRTR Section: 5.1.6 Recreational Values, page 74
Statement: *"Lower flows could potentially impact the aesthetics, which could slightly impact the intrinsic value of the projects and development. Any impacts to the recreational value of activities associated with the Downtown River Corridor Implementation Program or UniverCity Connections, with the exception of the Water Craft Course, are expected to be minor…It can be assumed that the recreational value of activities in this stretch of the river would be diminished if the aesthetics of the area were degraded; however, it has been found that there would only be negligible impacts to the aesthetics. Changes to aesthetics are expected to be unnoticeable by most users, so the impact to the recreational experience of low flows is likely something much less than impacts experienced by river-based activities, such as kayaking and canoeing."*

Comment: As mentioned under comments in the Aesthetics and Visual Resources Section above, no evaluation of the aesthetics or visual resources of the Downtown River Corridor was included as part of the DEIS. Therefore, these statements are conjecture and are not based on any objective or scientific assessment. The conjecture is also at odds with the real data reflected in the Loomis Report that indicates that City residents would view reductions in flow in the range contemplated by NISP to be very significant. This section needs to describe specifically how the aesthetics could change, such as the reduction of diversity and density of vegetative cover, reduction of wildlife, exposed bed and banks, potential algal blooms, exposure of rip-rap and man-made structures and other factors due to the reduction of river flows. Photo simulations and surveys should be conducted to evaluate the public's perception of lower river flows and the effects this could have on the visitor's experience and future development along the River Corridor. A visual representation of historic and anticipated flows in the River should be provided to show the aesthetic impact caused by reduced flows. The impacts of reduced flows upon vegetation along the River, and the cumulative impacts on aesthetics should be analyzed

and considered. The condition of the River in dry years should be given special attention due to anticipated climate changes.

The Loomis Report (2007) is one source of objective information of the public's perceptions of reductions in flows in the River. As the report states, "Respondents were asked how their visitation to the Poudre River would change if peak spring and summer flows were reduced in half…about one-third would visit less with the lower flows, 5% would stop visiting altogether…Households were asked whether they viewed reducing the peak spring and summer flows in half as a Very Good Change, Somewhat Good Change, Neither Good nor Bad, Somewhat Bad Change, Very Bad Change, No Opinion, or Not Enough Information…slightly more than two-thirds of respondents thought such a reduction in flows was a very bad change, with an additional 15% stating it was a somewhat a bad change." An SDEIS should disclose, analyze and respond to this information.

3f. Comments on Reasonably Foreseeable Actions and Cumulative Effects Technical Report (RFACETR)

RFACETR Section: 4.28, page 25
Statement: *"**Discovery Science Museum.** Conceptual plans are in place for the construction of a new Discovery Science Museum. Two locations are being considered, one along the Poudre River near Lee Martinez Park and the other north of town and not associated with the river. No formal plans are in place for this project; therefore, this action is not considered reasonably foreseeable."*

*"**Mason Street Corridor Improvements.** The City of Fort Collins plans to improve public transportation by constructing a train system along the Mason Street corridor. This new construction venture would bring more people more easily to the downtown area thereby reducing traffic. This project is still in the planning phase; therefore, this action is not considered reasonably foreseeable."*

Comment: These two projects, identified as "Actions Not Considered Reasonably Foreseeable", should be identified as "Reasonably Foreseeable Actions" in an SDEIS. The Discovery Science Center has a dedicated source of funding and is planned for construction near the Poudre River and scheduled for completion in 2011 (see http://www.dcsm.org/media/pr030108.htm for more information). The Mason Corridor (or "MAX") has also received preliminary approval for federal funding and is currently in an Environmental Assessment review (http://www.fta.dot.gov/printer_friendly/news_events_7787.html). These projects appear to be further along than several of the other projects identified as "Reasonably Foreseeable Actions" – some of which are described as "proposed" or being "investigated".

In addition, there are other projects that need to be included in the list of "Reasonably Foreseeable Actions," as identified below.

1. The Poudre River Enhancement Project (PREP), which was completed in October, 2003. The project provided conceptual designs for the construction of in-stream drop structures, native vegetation plantings, backwater habitats, bank stabilization, water's edge "discovery points" and other recreation improvements along the Poudre River between Linden Street and Lincoln Avenue in Fort Collins. See http://www.univercityconnections.org/docs/poudre-river-corridor.pdf ; http://www.fcgov.com/riverdistrict/pdf/dtrd-200702.pdf . For more information, contact Bob Smith, City of Fort Collins Utilities, at 970-224-6021.

2. CSU's Clean Energy Cluster & Engines and Energy Conversion Laboratory in the Old Power Plant building at College and the Poudre River has been incubating energy businesses at its location, such as Envirofit and Solix. New structures have been built to accommodate these companies, and CSU is planning a much larger expansion in the future. See http://www.eecl.colostate.edu/staff/guy.html

3. The Bohemian Foundation's Amphitheater/Music Venue is planned for the location of a river oxbow between Linden Street and Lincoln Avenue in the Downtown River Corridor. See http://fcgov.com/advanceplanning/pdf/downtown-csu-inventory.pdf

4. The Downtown River District Infrastructure Project has been approved by the Fort Collins City Council and funding available for project work to implement portions of the Project has been identified in the amount of $3 million. The projects meets the criteria for "Reasonably Foreseeable Actions" as there is "a reasonable certainty as to the likelihood of the future action occurring". See http://www.fcgov.com/ riverdistrict.

4. References for Part V

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City of Fort Collins, Department of Utilities. June 2004. Stormwater Master Plan Contact the Utilities Department for access to this document at 970-221-6700, utilities@fcgov.com.

Loomis, J. 2008. Estimating the economic benefits of maintaining peak instream flows in the Poudre River through Fort Collins, Colorado. Colorado State University, Technical Report.

McLaughlin Whitewater Design group. September 3, 2008. Letter to Jason Stutzman, P.E., City of Fort Collins Park Planning and Development, Regarding Whitewater Park Impacts from Reduced Flows in the Poudre River.

Appendix A: NISP DEIS Comment Contributors (with professional biographies)

1. City of Fort Collins Staff:

Rick Bachand
Rick Bachand is a Senior Environmental Planner in the City of Fort Collins Natural Areas Program and is responsible for overseeing the Natural Area's ecological restoration program. Rick has a Master's Degree in Forestry from the University of Massachusetts and more than 20 years experience in public and protected land management. In addition to his six years with the City of Fort Collins, Rick previously served with the National Park Service, U.S. Forest Service, and the National Wildlife Federation.

Katy Bigner
Katy Bigner is an intern at Fort Collins Utilities with the Regulatory and Government Affairs Division. She received a M.S. from Bard College in Environmental Policy in 2007, and received her B.A. in Liberal Arts from Colorado State University in 1996. Prior to working with Fort Collins Utilities, Katy served as an intern with the City's Natural Resources Department for her Master's internship. Prior to working at the City , Katy spent seven years in the financial sector as a consumer lender for Norlarco Credit Union. Additionally, she served two years in public service with AmeriCorps with Montana Conservation Corps in Missoula, Montana and with the Bay Area Youth Agency Consortium in Berkeley, California.

Judy Billica, P.E., Ph.D.
Judy Billica is the Senior Process Engineer/Watershed Manager at the City of Fort Collins Water Treatment Facility (FCWTF). Judy has worked for the City of Fort Collins since 1998. For the past two years, Judy's work has focused on water quality within the watersheds that supply the FCWTF, including the Upper Cache la Poudre (CLP), Horsetooth Reservoir, and associated components of the C-BT Project. Special studies conducted or managed by Judy have included design of a collaborative water quality monitoring program for the Upper CLP; a characterization study of total organic carbon (TOC) that is present in our source waters and treatment plant; and process design and treatment optimization studies for TOC removal from waters of the Upper CLP. Prior to working for the City, Judy worked for consulting firms in Colorado and California, as well as in academic research positions. During the span of Judy's professional career, she has worked on a wide range of water quality-related projects, including managing, designing and conducting water quality studies of watershed and ground water systems; designing water and wastewater treatment processes; and developing numerical models, conducting experiments, and performing tracer tests to better understand the movement of water and contaminants through natural and engineered systems. Judy received her M.S. and Ph.D.

degrees in Civil Engineering from Colorado State University and her B.S. degree from the University of California at Davis. She is a registered Professional Engineer in Colorado.

Dennis A. Bode, P.E.
Dennis A. Bode is currently the Water Resources Manager for the City of Fort Collins Utilities. His education includes a B.S. and M.S. in Agricultural Engineering (with emphasis in soil and water) from the University of Wyoming and Colorado State University, respectively. He is a registered professional engineer in Colorado and has been employed by the City of Fort Collins for approximately 30 years working in the general areas of water resources engineering, planning and management. His duties and expertise includes developing policies related to raw water dedication requirements, water supply systems and demand management. He has provided criteria and guidance related to hydrologic and water rights allocation modeling. He oversees the management of the City's raw water supplies including the administration of relevant water rights decrees. He also serves on the governing boards of several irrigation companies and related groups.

Carrie Mineart Daggett, Esq.
Carrie Mineart Daggett is a Deputy City Attorney in the Fort Collins City Attorney's Office, where she has worked since July 1995. In addition to advising the City's Utilities, Natural Resources and Real Estate departments, she also is responsible for environmental legal matters and for supervising the legal work for a number of other City departments and functional areas. She previously worked as an attorney at the law firm of Brownstein, Hyatt, Farber & Strickland (as it was then named) in Denver, and as an associate for the law firm of Beveridge & Diamond in Washington, D.C. Her private practice was primarily in the areas of environmental and regulatory law, and land use and general administrative law. Carrie is admitted to practice law in Colorado, the District of Columbia and Illinois. Her past work experience also includes several years as a management analyst for the State of Iowa's budget office and legislative liaison and executive assistant for the Iowa Department of Corrections. Carrie received her law degree in 1989 from Yale Law School in New Haven, Connecticut, and received her undergraduate degree from the University of Iowa in Iowa City, Iowa.

Donnie Dustin, P.E.
Donnie Dustin is currently a Water Resources Engineer for the City of Fort Collins Utilities. His education includes a B.S. in Geology from James Madison University in Virginia and a M.S. in Civil Engineering (with emphasis in Water Resources Planning and Management) from Colorado State University. He is a registered professional engineer in Colorado and has been employed by the City of Fort Collins for approximately 10 years, 8 of which has been with the Water Resources section. His main function at the Utilities is to provide hydrologic, water rights, and system modeling used to assess the Utilities' current and future water and related infrastructure needs. He is also knowledgeable in the general areas of water resources engineering, planning and management and provides his expertise to develop policies, maintain and protect water rights, and provide water supply and use information.

Keith Elmund, Ph.D.
After graduating from Culver Military Academy, Keith Elmund obtained a B.S. degree in microbiology from Colorado State University. He then served as an officer in the U.S. Air Force

with the 1st Special Operations Force at Hurlburt Field, Florida and later at CCK Airbase in Taiwan. After the service, he came back to CSU and finished his Ph.D. in environmental microbiology. He has been with Fort Collins Utilities for over thirty years starting as a chemist at the Pollution Control Lab. Since 1984, he as served as Environmental Services Manager. In this role, he manages both the City's drinking water quality and pollution control labs. Under his direction the City's Industrial Pretreatment program won two "best in class" national EPA awards. He served an active role in water quality monitoring with the Poudre, Thompson, St. Vrain Group, and on the lower Cache la Poudre River with the U.S. Geological Service, CSU and Kodak Colorado Division since the early 1980s. Most recently, he served a key role in developing the Cache la Poudre River monitoring alliance that is part of EPA's award winning "performance track" environmental leadership program. This program joins together the cities of Fort Collins and Greeley, with the Town of Windsor, the Boxelder and South Fort Collins Sanitation Districts and Kodak Colorado Division in an on-going collaborative effort to monitor and protect over 42 miles of the lower Cache la Poudre River.

Craig L. Foreman, P.E.
Craig L. Foreman is currently Manager of Park Planning and Development for the City of Fort Collins. His education includes a B.S. in Civil Engineering from South Dakota State University. He is a registered professional engineer in Colorado and has been employed by the City of Fort Collins for 22 years. His duties include all aspects of developing parks, trails and special recreation facilities. His expertise includes land and water acquisition, master planning, public involvement, development review, preliminary and final designs for numerous projects and project management. He oversees the management of the City's Park Planning and Development Department.

Kevin R. Gertig
Kevin R. Gertig is the Water Resources and Treatment Manager for the City of Fort Collins Utilities. He is a graduate of Colorado State University with a degree in Environmental Health and is also a graduate of the Water and Wastewater Leadership Center at the University of North Carolina. He is certified in both Water and Wastewater Operations. With a span of 33 years of experience, Kevin's water/wastewater career has included applied research, analysis, design, building, operations & maintenance, special studies, applications of state of the art control systems, drinking water quality, and management. His current responsibilities include overseeing Source of Supply, Watershed Monitoring Program, Water Resources, Water Treatment/Production, Environmental Services, Water Reclamation & BioSolids, Environmental Regulations, Halligan-Seaman Reservoir Project, and a number of capital projects. His past work and expertise includes involvement in regional and national AWWA committees; Universities, awwaRF, AMWA, and training operators around the country to promote the advancement of water science. Kevin was also involved in the Partnership for Safe Water program from the inception, and is the past Vice Chair of sections 5 & 8 in the USA. He was named to the National Infrastructure Advisory group in 2001 and continues to be active in the field of water security at a local, state, and national level. He is an author/co-author of more than 30 papers & articles in water treatment; his contributions include numerous water quality projects in the USA and abroad. Kevin serves as a peer reviewer for the AWWA/WEF QualServe program and has reviewed a number of Utilities throughout the nation.

Marty Heffernan
Marty Heffernan is the Executive Director of Culture, Parks, Recreation and Environment for the City of Fort Collins. Marty has worked for the City since 1991, starting as an Assistant City Attorney. He moved into management in 1996 as the Assistant to the Director of Cultural, Library and Recreational Services. Marty has a B.S. degree in Communications from Michigan State University. He received his Juris Doctorate degree from the University of Colorado in 1983.

Diane Jones
Diane Jones is currently serves as the Deputy City Manager with the City of Fort Collins, Colorado. She has been with the City for 18 years. Her responsibilities include leading and overseeing Community Services and the City Clerk's Office. As Deputy City Manager, she has several years' experience in budget and finance operations, policy and project oversight, and working with a wide variety of community boards and organizations. Prior to joining the Fort Collins' organization, Diane served as the Assistant City Manager in Gresham, Oregon overseeing planning, building, engineering, public works and emergency preparedness operations.

Jennifer Shanahan
Jennifer Shanahan is an Environmental Planner for the Natural Areas Program. Jennifer works with a team of resource management staff to develop new management plans, and to monitor and manage the natural resources on Natural Areas properties. Jennifer has worked for the City since 2006. Jennifer has a M.S. in Rangeland Ecology from Colorado State University. Her thesis work focused on riparian restoration and heavy metal contaminated soils. Prior to employment with the City, Jennifer's work experience included vegetation monitoring, research and analysis, and several years of teaching environmental education in the western United States.

Bob Smith, P.E.
Bob Smith is currently the Water Planning and Development Manager for the City of Fort Collins Utilities stormwater management division. His education includes a B.S. Civil Engineering from the University of Wisconsin-Platteville. He is a registered professional engineer in Colorado and Wisconsin. He has been employed by the City of Fort Collins for approximately 31 years working in the area of stormwater management including stormwater master planning and floodplain administration. His duties and expertise includes hydrologic and hydraulic modeling of federally and locally designated floodplains, overseeing the development and administration of the City's floodplain regulations, the generation of the citywide stormwater master plan used to provide direction for new development and the foundation of the City's stormwater capital improvement program and the City's early warning system used for flooding emergency response activities. He is also the president of the governing boards of several irrigation companies.

John Stokes
John Stokes has served as the Director of the Natural Resources Department for the City of Fort Collins since 2003. The Department operates a large and successful Natural Areas program. The department also has programs related to solid waste diversion, air quality, green house gas reductions, and various City-wide economic and environmental sustainability efforts. Prior to

his work with the City, John spent ten years with The Nature Conservancy, an international non-profit conservation group. Before The Nature Conservancy, John worked with the Appalachian Trail Conference, a non-profit entity responsible for managing and maintaining the Appalachian Trail. John has a Masters in Planning from the University of Virginia and a B.A. in English from the University of Texas.

Carol Webb
Carol Webb is the Regulatory and Government Affairs Manager for the City of Fort Collins. Her job responsibilities include overseeing EPA compliance for city operations including the City's water treatment facility, wastewater treatment facilities, and its stormwater discharge permit. Carol has worked for the City since 1997. Prior to overseeing EPA compliance activities, Carol supervised the City's Pollution Control Laboratory, which provides sampling and analytical services for wastewater plant operations and provides analytical support for an extensive surface water monitoring program along the Cache La Poudre River and Fort Collins' urban creeks. Carol graduated from William Penn College in Oskaloosa, Iowa with a degree in Biology and is currently working toward a Master's degree in Environmental Policy at the University of Denver.

Timothy Wilder, AICP
Timothy Wilder is a Senior City Planner for the City of Fort Collins Advance Planning Department. He has been with the Advance Planning Department for 11 years. Timothy oversees numerous long-range planning projects for the City. In 2000, he was the project manager for the Downtown River Corridor Implementation Program, which involved extensive public outreach to identify critical projects in the Cache la Poudre River corridor. Timothy has nearly 20 years experience in planning and has a degree in planning from the University of California, Santa Barbara. He is a member of the American Institute of Certified Planners.

2. Outside Consultants:

Alaa Aly, PhD, P.E.
Dr. Aly specializes in applying state-of-the-art computational, statistical, and operations research techniques to the development, evaluation, and analyses of hydrologic and agricultural systems as well as development of hydrological, fate, and transport models. Dr. Aly has extensive experience with hydrologic and probabilistic modeling, uncertainty analyses, hydrologic and environmental characterization, water resource management, environmental remediation, and water supply evaluation projects. Dr. Aly received his B.S. in Civil Engineering from Cairo University, a M.S. from Utah State University in Irrigation Engineering, a PhD from Utah State University in Irrigation Engineering, and a second M.S. also from Utah State University in Statistics. Dr. Aly is a registered professional engineer in Colorado, Florida, Wyoming and Utah, as well as being a Certified Ground Water Professional.

Brian Bledsoe, Ph.D., P.E.
Brian Bledsoe has 20 years of experience as an engineer and environmental scientist in the private and public sectors. He earned degrees from Georgia Tech, North Carolina State University, and Colorado State University. He is currently an Associate Professor in the

Department of Civil and Environmental Engineering at Colorado State University. His research and teaching interests are focused on the interface between water resources engineering and river ecology with emphasis on multi-scale linkages between land use, hydrologic processes, sedimentation, channel stability, and water quality. Prior to moving to Fort Collins in 1997, he served as Nonpoint Source Program Coordinator for the State of North Carolina. He has authored over fifty publications related to stream and watershed processes, restoration and water quality, and is a licensed professional engineer in Colorado and North Carolina. His full CV can be viewed at http://www.engr.colostate.edu/~bbledsoe/Bledsoe_CV.pdf

Roy D. Hugie, Ph.D.
Roy D. Hugie is the founder and President of Pioneer Environmental Services, Inc. (incorporated in Utah and Wyoming). He received his B.S. from Utah State University in Wildlife Management and Fisheries. He earned his M.S. degree in Wildlife Biology from the University of Maine (Orono) and his PhD from the University of Montana (Missoula) in Forestry (Specializing in Wildlife). He served as big game research leader, legislative spokesperson, and bear project leader for the Maine Department of Inland Fisheries and Wildlife. Prior to founding Pioneer, he was the NEPA specialist and wildlife section leader for a large consulting firm. With Pioneer he has served as project manager for several water related projects on the Colorado, Green, Platt, Snake, Bear, and other river systems in the west. He also served as the NEPA process, wildlife and wetland specialist for several reservoir projects in Wyoming, Utah, Colorado, and the northeast. His duties and experience in Colorado water projects include NEPA processes, permitting and natural resource studies for the Elk Creek Reservoir (Craig, CO), Lake Catamount Resort (near Steamboat Springs, CO), Muddy Creek Reservoir, Pebbles Jumping Mouse Studies along water courses on the east front (the USFWS) and Halligan Reservoir, and various snowmaking ponds and reservoirs for Telluride, Crested Butte, Steamboat Springs, Vail, Aspen Highlands, and other ski resorts. As president of Pioneer, Roy has had the responsibility and need to be technically conversant in the oversight of hundreds of documents and studies representing a broad spectrum of environmental disciplines. He occasionally provides instruction and lectures on the NEPA process at universities, colleges, and to other audiences.

Jennifer Kathol
Jennifer Kathol specializes in economic and social impact analysis, land and recreation use analysis, environmental justice evaluation, economic and demographic research, Native American issues, local government policy development, fiscal impact analysis, and market analysis. Her professional career has included projects with private companies and individuals, federal, state, and local government agencies, and environmental consulting and engineering firms.

Her over 30 years of experience includes economic, socioeconomic, demographic, land use, and recreation impact analysis for small and large scale resource and industrial projects, local public finance, fiscal impact analysis, and policy development, residential and commercial real estate and product market analysis, property valuation, and pro-forma financial feasibility analysis for a wide range of projects.

She has developed computerized social and economic base model and fiscal impact models for analysis of resource, industrial, and real estate projects. The models can be calibrated to reflect local and regional economic conditions, as well as assess impacts for small and large projects affecting regional geographical areas.

Ms. Kathol has completed fiscal, economic, social, land use, wilderness, recreation, transportation analyses on NEPA Environmental Impact Statements (EIS/EIRs) and Environmental Assessments (EA), and international feasibility analyses for proposed oil and gas pipelines, power plants, refineries, exploratory gas wells, timber sales, ski areas, mines, and transmission lines throughout the west and overseas. She has completed related resource sections, cumulative studies, and technical memorandums for projects in Colorado, Utah, Idaho, North Dakota, Oregon, Montana, Nevada, California, Alaska, Arizona, Wyoming, New Mexico, Russia, Mongolia, Indonesia, Myanmar (Burma), and Armenia. She has extensive experience with both public and private sector entities in assessing economic, fiscal, environmental justice, social, demographic, recreation, visual, and land use issues related to project development.

William J. Miller, Ph.D.

Dr. Miller is President and Senior Aquatic Ecologist for Miller Ecological Consultants, Inc. in Fort Collins, Colorado. Dr. Miller has 30 years experience in fisheries, instream flow, and aquatic ecology studies. He has worked extensively throughout the western U.S. and is a recognized expert in the areas of instream flow, water temperature modeling and habitat assessments. Dr. Miller's experience includes research and evaluations for several threatened, endangered, and candidate aquatic species in the Colorado River and Platte River basins. He has extensive experience in designing and conducting studies using the Instream Flow Incremental Methodology (IFIM), instream water temperature modeling and developing and implementing ecological models for aquatic systems. Dr. Miller is a former member of the USFWS Instream Flow Group. He is co-author on the Stream Network Temperature Model, Instream Flow Information Paper 16. Dr. Miller is a Certified Fisheries Scientist (No. 2008). Dr. Miller's dissertation work included the development of a salmonid fry emergence model that accounted for effects of water temperature, dissolved oxygen and sediment composition. Dr. Miller presented the model at the First Federal Interagency Hydrologic Modeling Conference in Las Vegas, Nevada. Dr. Miller's experience includes designing and directing basinwide instream flow evaluations. He has completed instream flow evaluations for US Forest Service, US Fish and Wildlife Service, Bonneville Power Administration, U.S. Army Corps of Engineers, U.S. Department of Justice, and state and municipal governments. Dr. Miller developed a GIS based methodology for determining flow/habitat relationships for aquatic species using 2 dimensional hydraulic modeling and habitat evaluations. Dr. Miller is co-author and Principal Investigator on an ecosystem model for the recovery of endangered species in the San Juan River basin. Dr. Miller has presented his research at international conferences in Japan (2006) and New Zealand (2007).

Lori Potter, Esq.

Lori Potter is a partner in the law firm of Kaplan Kirsch & Rockwell LLP, Denver. She has practiced environmental law for almost 30 years, specializing in NEPA, the Clean Water Act, public land management and land use law. She graduated from Harvard Law School and received her B.A. and M.A. degrees from the University of Illinois. Ms. Potter's practice focuses

on advising local government clients and owners of mountain and ranch properties regarding adjacent land development, conservation easements, access and related issues. She represents clients nationwide in litigation and administrative proceedings to protect their interests through the NEPA process and other statutes.

John Putnam, Esq.
John Putnam is an attorney and partner at the law firm of Kaplan Kirsch & Rockwell, LLP, in Denver. Mr. Putnam's practice emphasizes counseling and litigation for public and private entities on complex issues of environmental law, especially for large public and public/private projects. Mr. Putnam has extensive experience providing clients nationwide with strategic advice on large and controversial development and transportation projects, including airports, highways, real estate development, telecommunications facilities, and other infrastructure. He counsels clients regarding a wide range of environmental, transportation and development issues, including the National Environmental Policy Act, wetlands, air quality, climate change, sustainability, air toxics, noise, tolling and innovative finance, land use, endangered species, floodplains, municipal law, transportation regulations and Native American jurisdiction. Mr. Putnam received his Juris Doctor degree from the University of Chicago and his Bachelor of Arts degree from Williams College.

Douglas A. Rice, Ph.D.

Doug A. Rice has been the Director of the Environmental Quality Laboratories at Colorado State University since 1992. The Industrial Hygiene laboratory oversees indoor air quality, asbestos, and lead programs for campus. The Environmental Quality Laboratory is responsible for analysis of food, water, soil, and air for the campus and the community. The Environmental Quality Laboratory has coordinated water quality testing and fish / benthic population surveys of the Cache la Poudre River since 1970.

Doug received his Bachelor's degree in 1985 and Master's degree in 1987 from Colorado State University. Doug worked for five years as head of microbiology for the Clorox Company in Pleasanton, California before returning to CSU. In 1998, Doug completed his Doctor of Philosophy degree in Microscopy through the McCrone Institute associated with the University of Chicago. He has consulted internationally in the fields of water quality and mycology.

Jim Schall, Ph.D, P.E.
Jim is Vice President of the Colorado and California operations for Ayres Associates. Ayres is a mid-sized engineering firm with about 400 people in 17 offices. Jim did his undergraduate engineering degree at Purdue University and moved to Colorado in 1977 to do his graduate work at Colorado State University. He started working as a consulting engineer in Fort Collins in 1980, and is currently a licensed professional engineer in Colorado, Nevada and California. Jim's education and nearly 30 years consulting experience encompass all aspects of water resource engineering, with specific expertise in river analysis and design. He regularly works on water resource projects with significant environmental and channel restoration issues. Jim has significant environmental permitting experience including several large water resource EIS projects in Colorado. He has authored widely used design manuals on fluvial systems, including the Design Manual for Engineering Analysis of Fluvial Systems (Arizona DWR), Stream Stability at Highway Structures, HEC-20 (FHWA), and Bridge Scour and Stream Stability

Countermeasures, HEC-23 (FHWA). Dr. Schall is a certified instructor for the National Highway Institute and regularly teaches short courses on urban drainage, scour and sediment transport throughout the country.

William J. Spitz, PG

William J. Spitz is a senior geomorphologist with Ayres Associates where he has worked for 23 years. He has considerable experience using geomorphic analyses that integrate hydrology, hydraulics, sediment transport, geology, and geomorphology to develop process-based understandings of fluvial system dynamics for a wide range of projects and a diverse range of clients. He has been extensively involved in geologic and geomorphic investigations of fluvial systems throughout the United States with highly variable morphologies and stability problems. He has worked closely with federal, state, and local agencies on fluvial systems where there are concerns and issues involving not only stream channel stabilization and rehabilitation, but also restoration, enhancement, and management of riparian and aquatic habitat. He is currently working on projects ranging from watershed erosion assessments in Texas and New Mexico to levee stability assessments and streambank stabilization on rivers in California's Central Valley. Mr. Spitz has been involved with several projects on the Cache la Poudre River including the detailed field investigation and mapping of the morphologic characteristics of the river through the city in the early 1990's as part of the Cache la Poudre Master Drainageway Plan. He is currently involved in the analysis and design of a new permanent replacement for the recently failed temporary low-flow diversion dike on the Cache la Poudre River near the CSU Environmental Learning Center. Mr. Spitz received a B.S. degree in Geology from Colorado State University and is a registered professional geologist in Wyoming and Arizona.

Ellen Wohl, Ph.D.

Ellen is a professor of geology in the Department of Geosciences at Colorado State University. Ellen has been on the CSU faculty since 1989. She teaches courses in river environmental history, geomorphology, and fluvial geomorphology. Her research includes hydraulics, sediment transport, channel morphology, biological-physical interactions in rivers, and human effects on rivers. She has conducted field research on every continent but Antarctica, and much of her research has been conducted in the Cache la Poudre River and South Platte drainage basins. Ellen received her B.S. degree in Geology from Arizona State University, and her Ph.D. in Geosciences from the University of Arizona.

Appendix B

List of City of Fort Collins, Scientific and Legal Documents on Data Disc

1. Air Quality Compass Measure
2. Brand Summary
3. City of Boulder SWMPA Executive Summary
4. City of Boulder SWMP Community Study Group
5. Climate Action Report Cover
6. Climate Action Report Ch.1
7. Climate Action Report Ch. 2
8. Climate Action Report Ch. 3
9. Climate Action Report Ch. 4
10. Climate Action Report Ch. 5
11. Climate Action Report Ch. 6
12. Climate Action Report Ch. 7
13. Climate Action Report App. A
14. Climate Action Report App. B
15. Climate Action Report App. C
16. Climate Action Report App. D
17. Climate Action Report App. E
18. City of Fort Collins Natural Areas Policy Plan
19. City of Fort Collins River District
20. Discover Science Center
21. Downtown-River Corridor Implementation Program
22. Downtown-River District Improvement Plan
23. Denver Water Comprehensive Annual Financial Report
24. EPA General Conformity Guidelines
25. EPA Nutrient Criteria Manual
26. Final Upper CLP Design Report
27. Fort Collins City Plan Cover
28. Fort Collins City Plan Vision
29. Fort Collins City Plan Structure
30. Fort Collins City Plan Principles
31. Fort Collins City Plan Appendices
32. Fort Collins Downtown Strategic Plan
33. Fort Collins Quality of Life
34. Framework for Environmental Action/Air Quality Policy Plan
35. FTA News and Events
36. Image 91-Ambient Ozone
37. Image 92-Ambient CO
38. Image 93-Ambient Particulates
39. Loftis and Moore CLP Data Analysis Report
40. Loomis Report
41. NAS Global Response
42. Natural Areas Observational and Intercept Surveys

43. NISP Potential Impacts to Treatment Operation
44. NISP Water Quality Technical Memorandum
45. North College Corridor Plan
46. PTAG White Paper
47. Why Fort Collins QOL

Appendix C

City of Fort Collins Natural Areas Program: Fort Collins Natural Areas Map

Appendix D

List of Additional References Provided with Comments

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Poff, N.L., J.D. Allan, M.A. Palmer, D.D. Hart, B.D. Richter, A.H. Arthington, J.L. Meyer, J.A. Stanford, and K.H. Rogers, 2003. River flows and water wars? Emerging science for environmental decision-making. Frontiers in Ecology and the Environment 1:298-306.

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Rood, S.B., C.R. Gourley, E.M. Ammon, L.G. Heki, J.R. Klotz, M.L. Morrison, D.M. Mosley, G.G. Scoppettone, S. Swanson, and P.L. Wagner. 2003b. Flows for floodplain forests: a successful riparian restoration. BioScience, 53, 647-656.

Skagen, S.K., R. Hazlewood, and M.L. Scott. 2005. The importance and future condition of western riparian ecosystems as migratory bird habitat. USDA Forest Service Gen. Tech. Rep. PSW-GTR-191, 525-527.

City Manager's Office
City Hall
300 LaPorte Ave.
PO Box 580
Fort Collins, CO 80522
970.221.6505
970.224.6107 - fax
fcgov.com

September 2, 2015

Mr. John Urbanic
NISP EIS Project Manager
U.S. Army Corp of Engineers, Omaha District
Denver Regulatory Office
9307 S. Wadsworth Blvd.
Littleton, CO 80128

Via Electronic and Hand Delivery
nisp.eis@usace.army.mil

RE: City of Fort Collins' Comments to the Supplemental Draft Environmental Impact Statement for the Northern Integrated Supply Project

Dear Mr. Urbanic:

Please find attached to this letter detailed comments and associated reference material from the City of Fort Collins regarding the Supplemental Draft Environmental Impact Statement for the Northern Integrated Supply Project. Please make this submission a part of the administrative record in this matter. We respectfully submit these comments for your consideration and look forward to the response of the United States Army Corp of Engineers.

On September 1, 2015, the Fort Collins City Council adopted the attached Resolution directing that these comments be submitted on behalf of the City.

If you have any questions, please feel free to contact me, or you may also John Stokes, City of Fort Collins Natural Areas Department Director, at (970) 221-6263, jstokes@fcgov.com.

Thank you.

Sincerely,

Darin A. Atteberry
City Manager

Attachments:

1. Resolution of the City Council of the City of Fort Collins (Exhibit A omitted).
2. City of Fort Collins Comments on Supplemental Draft Environmental Impact Statement for the Northern Integrated Supply Project, Dated September 2, 2015.

CC:

Fort Collins Mayor and City Council Members
Carrie Daggett, Fort Collins City Attorney
Eric Potyondy, Fort Collins Assistant City Attorney
John Putnam, Kaplan Kirsch & Rockwell LLP
John Stokes, City of Fort Collins Natural Areas Department Director

RESOLUTION 2015-082
OF THE CITY OF FORT COLLINS
DIRECTING THE CITY MANAGER TO SUBMIT TO THE U.S. ARMY CORPS OF ENGINEERS THE CITY'S COMMENTS ON THE SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE NORTHERN INTEGRATED SUPPLY PROJECT

WHEREAS, the Northern Colorado Water Conservancy District ("District") is pursuing the Northern Integrated Supply Project ("NISP"), a water storage and supply project that would divert significant amounts of water from the Cache la Poudre River upstream of Fort Collins; and

WHEREAS, to move forward with the necessary federal permitting for NISP, the District is required by the National Environmental Policy Act ("NEPA") to complete an environmental impact review process, conducted in this case by the U.S. Army Corps of Engineers ("Corps") as the permitting agency under the federal Clean Water Act; and

WHEREAS, as part of the review process, on April 30, 2008, the Corps issued a draft Environmental Impact Statement ("DEIS"), and the City timely submitted comments to the DEIS on September 10, 2008, pursuant to Resolution 2008-002; and

WHEREAS, on June 19, 2015, the Corps issued a supplemental draft Environmental Impact Statement ("SDEIS"), and pursuant to a subsequent extension of time, provided for submission of public comment up to September 3, 2015; and

WHEREAS, at the May 12, 2015, City Council work session, City staff presented background on NISP as well as staff's proposed analytical and data-driven objective approach to commenting on the SDEIS, which approach City Council endorsed; and

WHEREAS, pursuant to the direction of City Council, City staff, working with the assistance of outside technical experts, undertook a thorough and detailed technical analysis of the SDEIS primarily as it pertains to the NISP proposed action and its direct impacts in Fort Collins and to the City; and

WHEREAS, at the July 28, 2015, City Council work session, City staff presented preliminary analyses and findings related to staff's review of the SDEIS; and

WHEREAS, the City wishes to express its support for other communities, including participants in NISP, in their quest to acquire reliable water supplies without significantly adversely affecting other communities and the environment; and

WHEREAS, the City has concluded that the SDEIS is deficient under NEPA and the federal Clean Water Act in various respects, including in its analysis of potential impacts to the City, as set forth in the City's comments to the SDEIS; and

WHEREAS, staff has concluded the project will be harmful to Fort Collins based on a thorough review of the impacts described by the SDEIS as well as the impacts that staff expects from the project; and

WHEREAS, in view of the significance of the impacts that NISP would have on the City and the Fort Collins community, it is in the City's best interest to comment on the SDEIS, to continue to participate in these proceedings, and to monitor the responses to the comments of the City and others.

NOW THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF FORT COLLINS as follows:

Section 1. That the City Council cannot support NISP as it is currently described and proposed in the SDEIS, with the understanding that the City Council may reach a different conclusion with respect to a future variant of NISP, such as the proposed Modified Alternative Number 4 as described in the City's comments, if such variant addresses the City's fundamental concerns expressed in the City's comments to the DEIS and comments to the SDEIS.

Section 2. That the City Manager is hereby authorized and directed to submit to the Corps formal comments to the SDEIS that are substantially similar with those attached hereto as Exhibit "A" and incorporated herein by this reference, in accordance with the deadline for such submission.

Passed and adopted at a regular meeting of the Council of the City of Fort Collins this 1st day of September, A.D. 2015.

Mayor

ATTEST:

CITY OF FORT COLLINS SEAL COLORADO

Wanda Winkelmann

City Clerk

Comments on Supplemental Draft Environmental Impact Statement
for the
Northern Integrated Supply Project

Dated: September 2, 2015

Table of Contents

INTRODUCTION AND EXECUTIVE SUMMARY

The City of Fort Collins ("Fort Collins") respectfully files and submits to the United States Army Corps of Engineers ("Corps") these comments to the Supplemental Draft Supplemental Impact Statement, dated June 2015 and issued on June 19, 2015 ("SDEIS"), and its associated technical reports and related documents, regarding the Northern Integrated Supply Project ("NISP" or "Project"), for which the Northern Colorado Water Conservancy District ("Northern" or "District") is the applicant. Reference materials are identified in the comments and the majority of such reference materials are being provided to the Corps in electronic format. These reference materials shall constitute part of these comments. Fort Collins reserves all rights to provide additional and supplemental comments on the SDEIS and/or NISP, as may be appropriate.

To the extent permitted by the short comment period, Fort Collins has completed a thorough, scientific review of the SDEIS by expert City staff and consultants summarized in Appendix A. Several of Fort Collins' concerns regarding the original NISP draft environmental impact statement ("DEIS") remain. The SDEIS has also created new issues under National Environmental Policy Act, 42 U.S.C. §§4321-4370h ("NEPA"), and the rules and regulations and guidelines thereunder, the Clean Water Act, 33 U.S.C. §§1251-1387 ("CWA"), and the rules and regulations and guidelines thereunder, and other relevant legal requirements, as discussed herein. In short, the SDEIS remains inadequate for the Corps to discharge its obligations under these requirements, including its selection of the least environmental damaging practicable alternative ("LEDPA") for the Project. *See* 40 C.F.R. § 230.10(a) ("[N]o discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem …").

If a Section 404 permit under the CWA is awarded for the Project, substantial compensatory mitigation will be needed, in addition to any avoidance and minimization measures. It is Fort Collins' understanding that mitigation for NISP will be finalized with any Record of Decision ("ROD"), and that avoidance and minimization measures may be finalized before the ROD. As discussed further herein, Fort Collins notes that, at this point, the District's plans in these respects, which are summarized in Appendix F of the SDEIS, are conceptual and offer limited information on specific measures. Appendix F indicates the intent of the District to recognize and react constructively to impairment of interests other than those of the District and the NISP participants, to be cooperative and responsive, and to participate in all reasonable efforts to address impairments to resources or interests caused by NISP. Where the document does not define specific limits or features of these commitments, however, it is of limited use except as a statement of general intent. Clarification of these efforts is required by NEPA and the CWA. As the entity most impacted by the Project, Fort Collins would welcome the opportunity to participate in mitigation-related discussion and efforts.

Fort Collins' comments are organized by general topic area. In general, the comments begin with broader, more conceptual concerns regarding the SDEIS and the Project, and thereafter turn to more specific issues. Certain reference materials are cited in the text of the comments and all are listed at the end of the section and in Appendix B. The following is a brief summary.

SECTION 1: Incorporation of Fort Collins Comments to DEIS. The comments included herein are a supplement and in addition to the previous comments made to the original DEIS for the Project. Several issues raised in the DEIS have not been adequately addressed.

SECTION 2: Validity of the No Action Alternative. The SDEIS includes consideration of a "no action" Alternative 1, which purportedly would not require federal action. However, Alternative 1 is developed around the proposed Cactus Hill Reservoir that, based on the information provided, appears to require an individual Section 404 permit under the CWA. If the proposed Cactus Hill Reservoir requires a Section 404 permit, then under NEPA, the Corps must revise its alternatives analysis in a new SDEIS to develop a new, true "no action" alternative that can serve as the baseline for analyzing the proposed action's environmental impact. In violation of NEPA and the CWA, the SDEIS's current "no action" alternative skews the analysis to reduce identified impacts, thereby altering the selection of the LEDPA. If the proposed Cactus Hill Reservoir would not, in fact, require a Section 404 permit under the CWA, the SDEIS must expressly set forth why no such permit is needed.

SECTION 3: Failure to Conduct Analyses on All Environmental Impacts, Failure to Fully Address Cumulative Impacts, and Uncertainty Regarding Mitigation Measures. The SDEIS defers several key analyses of impacts to a later date, namely, quantitative water quality analyses. The failure to provide these analyses violates NEPA and such analyses must be provided to Fort Collins and other stakeholders for review before any determination on the Project can be made. The SDEIS also does not fully describe how the cumulative impacts from NISP, Fort Collins' Halligan Water Supply Project, and Greeley's project to enlarge Milton Seaman Reservoir will be assigned to each project. Additionally, the SDEIS's proposed measures to mitigate the environmental impacts of each alternative are vague and the effectiveness of the mitigation has not been adequately documented at this point in the process.

SECTION 4: Proposed Modified Alternative 4. Fort Collins has investigated a modified Alternative 4 for NISP that would meet the NISP Participant's purpose and need while simultaneously maintaining relatively more water in the Poudre River through Fort Collins than all other action alternatives presented in the SDEIS. Such additional flows through Fort Collins would address many of the concerns identified in these comments. The modified Alternative 4 is contemplated to operate in such a way as to significantly reduce NISP diversions upstream of Fort Collins as compared to Alternative 2 (the District's preferred action), as well as Alternatives 3 and 4, resulting in relatively more stream flows and relatively fewer impacts to aquatic and riparian resources along a 23 mile reach of river through Fort Collins than the other alternatives considered in the SDEIS. The Corps must consider and fully analyze this modified Alternative 4 in its analysis and consideration of NISP.

SECTION 5: Water Quality Comments. The SDEIS was issued without several quantitative analyses that would have allowed Fort Collins to meaningfully analyze possible effects on its interests related to the quality of water Fort Collins treats for its potable water supply, as well as the quality of water in the Poudre River. To comply with NEPA's "hard look" standard and the

Section 404 Guidelines, additional analyses must be performed and the Corps must address the specific deficiencies discussed in these comments.

SECTION 6: Operational Comments. The SDEIS's description of Alternative 2 (the District's preferred alternative) includes a proposed flow augmentation program, and certain descriptions of other NISP operations, such as deliveries to NISP Participants. However, the proposed flow augmentation program is only proposed with Alternative 2, which unjustifiably skews the analysis towards the selection of Alternative 2 as the LEDPA. Both NEPA and Section 404 require equal treatment of all alternatives. Also, as proposed in the SDEIS, the proposed flow augmentation program appears to be premised on various incorrect assumptions and errors and raises various concerns regarding its operations that could undermine its ability to meet its goals to address the impacts to Fort Collins. The SDEIS also lacks needed analysis and specificity on various aspects of the proposed operations regarding Alternative 2.

SECTION 7: Channel Structure, Storm Water, Floodplain, and Hydraulic Comments. While the SDEIS is an improvement over the DEIS, the stream morphology and sediment transport analysis in the SDEIS contain several flaws such that the analysis cannot be used to meaningfully analyze NISP's impacts on Fort Collins in the areas of drainage, storm water, and floodplain impacts. The SDEIS also contains assertions and conclusions that that lack factual bases and are arbitrary, including assertions regarding flushing flows. Revised analyses and considerations are required in order to correctly and meaningfully evaluate the impacts. The mitigation measures outlined in Appendix F do not properly evaluate or estimate the amount of sediment that will accumulate within the river through Fort Collins due to the reduced flow from the Project. This amount of sediment needs to be properly quantified and assigned a mitigation cost.

SECTION 8: Air Quality and Climate Change Comments. Fort Collins is concerned with the adequacy of the air quality and climate change analysis in the SDEIS, as well as the impacts of the proposed action. In general, the SDEIS does not fully analyze these impacts (which include greenhouse gasses), which are understated throughout the document. The Corps has failed to take a hard look at the impacts under NEPA, and the lack of analysis prevents Fort Collins and other stakeholders from meaningfully analyzing these effects. To comply with NEPA and the Clean Air Act conformity regulations, the Corps must conduct revised and additional analyses. The Corps must conduct such analyses and present them for public review and comment in a draft general conformity analysis. Neither the DEIS nor the SDEIS provide a conformity analysis under 40 C.F.R. Part 93, despite the acknowledgement in the SDEIS that it is necessary.

SECTION 9: Recreation and Aesthetics Comments. The SDEIS identifies significant, but does not adequately analyze, impacts on boating opportunities and recreational experiences in Fort Collins. The SDEIS does not provide a full and complete evaluation of the aesthetics impacts from NISP. NEPA requires that the Corps further evaluate and provide additional information on those impacts so that Fort Collins and other stakeholders can meaningfully evaluate them.

SECTION 10: Biological Resources Comments. The SDEIS's unproven assertion that the Poudre River is on a trajectory of inevitable decline is contradicted by the facts. Neither NEPA nor the CWA allow agencies to disregard the impacts of proposed actions by assuming that

environmental resources will be lost regardless. The Poudre River Ecosystem Response Model and the Poudre River Health Assessment Framework can serve as effective guideposts and decision support tools for NISP. The SDEIS fails to include a quantitative temperature analysis, as noted above, which is needed to meaningfully analyze the impacts from NISP on aquatics and fisheries. The SDEIS also relies on oversimplifications and includes assertions that are not based on defined metrics. The SDEIS does not properly assess impacts to the Poudre River's wetlands and riparian areas (including its ground water component). The SDEIS further includes various incorrect assumptions, errors, and inappropriate conclusions, all of which result in under-quantification of the identified impacts of NISP on the Poudre River's wetlands and riparian areas. The SDEIS analyses of impacts to wildlife are inadequate because they are based on the flawed analysis for the Riparian and Wetlands sections of the SDEIS. The Corps must revise these so that Fort Collins and other stakeholders can meaningfully evaluate the impacts.

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SECTION 1: INCORPORATION OF FORT COLLINS' COMMENTS TO DEIS

Fort Collins hereby incorporates by reference its comments on the original DEIS for NISP, including comments on the regulatory framework, which Fort Collins provided on September 10, 2008 ("2008 Comments"). The original DEIS contained flaws that rendered it insufficient under NEPA and the rules and regulations and guidelines thereunder, the CWA, and the rules and regulations and guidelines thereunder, and other relevant legal requirements.

The Corps has addressed some of the comments made by Fort Collins and other stakeholders. However, the SDEIS remains inadequate for the Corps to discharge its obligations under these requirements. Among flaws that carry over from the DEIS and identified in Fort Collins' DEIS comments are:

- Lack of compliance with the CWA requirement to analyze, avoid, and minimize impacts associated with NISP. *See* 2008 Comments at 13-17.
- Failure to provide adequate analysis (including modeling of water quality and other effects) at the DEIS stage. *See* 2008 Comments at 17-22. As discussed below, the SDEIS fails to provide the quantitative analyses of impacts it must provide.
- Failure to properly study and address effects of Total Organic Carbon ("TOC") levels in Horsetooth Reservoir. *See* 2008 Comments at 23-25.
- Flawed and incomplete analysis of the effects of the alternatives on lost peak flows and resulting impacts. *See* 2008 Comments at 26-28.
- Vague and insufficient avoidance, minimization, and mitigation planning and commitments. *See* 2008 Comments at 30-36.

These continuing flaws render the SDEIS inadequate and in violation of NEPA, the CWA, and other relevant legal requirements. As discussed below, the SDEIS also contains new flaws and inadequacies under those laws.

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SECTION 2: VALIDITY OF THE NO ACTION ALTERNATIVE

2.1 THE NO ACTION ALTERNATIVE VIOLATES NEPA AND RENDERS ITS ALTERNATIVES ANALYSIS INVALID

The SDEIS's alternative analysis is flawed and violates NEPA. The analysis of alternatives under NEPA is "the heart of the environmental impact statement." *Or. Natural Desert Ass'n v. Bureau of Land Mgmt.*, 531 F.3d 1114, 1121 (9th Cir. 2008) (quoting 40 C.F.R. § 1502.14). In the SDEIS, the Corps must "[r]igorously explore and objectively evaluate all reasonable alternatives" to that action. 40 C.F.R. § 1502.14(a). An integral component of the alternatives analysis is the Corps' consideration of a no action alternative that serves as "a baseline for measuring the effects of the proposed action." *Biodiversity Conservation Alliance v. United States Forest Serv.*, 765 F.3d 1264, 1269–1270 (10th Cir. 2014). The no action alternative is a measuring stick that highlights the environmental impacts of the proposed action and allows them to be compared to the proposed action's benefit. Without a true no action alternative, there is no accurate baseline for measuring the effects of proposed action in the SDEIS. Thus, the current alternatives analysis for NISP is fundamentally flawed. To comply with NEPA, the alternatives analysis must be revised to include a true no action alternative that accurately serves as the baseline for its NEPA analysis.

2.1.1 The Proposed Cactus Hill Reservoir Requires a Section 404 Permit Under the CWA, and Therefore, Is an Action Under NEPA

Alternative 1 is developed around the proposed Cactus Hill Reservoir as a "no action" alternative. *See* SDEIS at 2-16. However, based on the information in the SDEIS and associated reports, Cactus Hill Reservoir requires a Section 404 permit under the CWA, 33 U.S.C. § 1344, and is an action that would therefore be subject to NEPA review. The treatment of Alternative 1 in the SDEIS as a no action alternative is thus improper and in violation of NEPA.

According to the SDEIS, the proposed Cactus Hill Reservoir component of the no action alternative would be a major construction project that will impact, among other things, 31.8 acres of wetlands, including 1.4 acres of wetlands impacted by fill discharges and 30.4 acres of wetlands that would be inundated by reservoir. *See* NISP Vegetation and Wetland Resources Technical Report at 13–14. Based on this information, Cactus Hill Reservoir would require an individual Section 404 permit and Alternative 1 is therefore an "action" under NEPA.

It is well-established that, under NEPA, the issuance of a Section 404 permit is an "action." *See, e.g., Ramsey v. Kantor*, 96 F.3d 434, 444 (9th Cir. 1996) ("If a federal permit is a prerequisite for a project with adverse impact on the environment, issuance of that permit does constitute major federal action and the federal agency involved must conduct an EA and possibly an EIS before granting it."). *See also Stewart v. Potts*, 996 F. Supp. 668, 672 (S.D. Tex. 1998) (stating that issuance of a Section 404 permit by the Corps is deemed to be a "major Federal action" to which NEPA's mandates apply). *See also, e.g.,* Daniel R. Mandelker, NEPA Law & Litig. § 8:19 (2d ed. 2014) (explaining that "[f]ederal permits" are "typical examples" of major federal action triggering NEPA). Based on the information in the SDEIS and the various technical reports, the treatment of

Cactus Hill Reservoir as a no action alternative—when the project would require a 404 permit and NEPA analysis—is arbitrary and capricious and violates NEPA.

If it is the Corps' position that Cactus Hill Reservoir would not require a Section 404 permit, then the Corps must provide a comprehensive explanation and factual basis for this conclusion—including a delineation of the wetlands on the proposed site of Cactus Hill Reservoir under the Corps' new "waters of the United States rule," 80 Fed. Reg. 37054 (June 29, 2015), and a demonstration why an individual Section 404 permit is unnecessary. The justification would be especially important here, because the Corps' entire alternatives analysis hinges on measuring the impacts of the proposed action against a major construction project with significant wetlands impacts.

The information provided in the SDEIS indicates that the estimated wetland impact caused by the Cactus Hill project would not fall within nationwide permits. For instance, Cactus Hill Reservoir's impacts exceed the Nationwide Permit 18's threshold requirements for minor discharges. 77 Fed. Reg. 10184 at 10202 (Feb. 21, 2012). Also, given that the Corps estimates that Cactus Hill Reservoir would impact 257 acres of wetlands and other waters (SDEIS at S-45), the Project would cause more than minimal individual and cumulative adverse effects on the aquatic environment and would require an individual permit. *See* 33 U.S.C. 1344(e). *See also* 77 Fed. Reg. at 10288.

As further example, the level of wetland impacts, both in terms of fill discharges (1.4 acres) and reservoir inundation (30.4 acres), for construction of Cactus Hill Reservoir for the no action alternative is more than the amount Fort Collins preliminarily estimated as being impacted from the enlargement of Halligan Reservoir, an action for which the Corps is requiring an individual Section 404 permit.

2.1.2 The Failure To Consider A Legitimate No Action Alternative Renders Its Alternatives Analysis Deficient under NEPA and the CWA

The use of Cactus Hill Reservoir as the no action alternative skews its entire analysis of alternatives, in violation of NEPA. The no action alternative is intended to "provide a baseline against which the action alternative" is evaluated." *Ctr. for Biological Diversity v. United States DOI*, 623 F.3d 633, 642 (9th Cir. 2010). Without "[accurate baseline] data, an agency cannot carefully consider information about significant environment impacts … resulting in an arbitrary and capricious decision." *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067,1085 (9th Cir. 2011). *See also Friends of Yosemite Valley v. Kempthorne*, 520 F.3d 1024, 1038 (9th Cir. 2008) (holding an agency's no action alternative in its NEPA analysis invalid because it improperly defined the baseline); *Openlands v. Dept. of Transport.*, No. 13 C 4950 (N.D. Ill., June 16, 2015)[1] ("The flawed 'no build' analysis also dooms the ROD and EIS'analysis of the direct effects of the proposed Corridor"; same with indirect impacts).

[1]https://scholar.google.com/scholar_case?case=5946396167037980773&q=ILLIANA&hl=en&as_sdt=4006&as_ylo=2015 (last visited August 6, 2015).

The SDEIS tables comparing alternatives illustrate the problem with treating Cactus Hill Reservoir as a no action alternative instead of an action alternative. In its comparison of alternatives, the SDEIS arbitrarily and simultaneously treats Cactus Hill Reservoir as both the no action alternative and as part Alternatives 3 and 4. SDEIS at 2-17, Table 2-3. *See also id*. 2-61. A "no action alternative in an EIS is meaningless if it assumes the existence of the very plan being proposed." *Friends of Yosemite Valley v. Scarlett*, 439 F. Supp. 2d 1074, 1105 (E.D. Cal. 2006). Because Cactus Hill Reservoir is an action that would have significant impacts requiring the Corps' review, it cannot serve as baseline against which the Corps' can compare the preferred alternative (Alternative 2). The consideration of Cactus Hill Reservoir's impacts as a consequence of no action, including environmental effects and financial costs, artificially reduces the significant impacts of the proposed action. This in turn precludes a meaningful alternative analysis and makes it "impossible to accurately isolate and assess the environmental impacts of the [proposed action]." *N.C. Wildlife Fed'n v. N.C. DOT*, 677 F.3d 596, 602 (4th Cir. 2012).

The no action alternative cannot include a project that requires a Corps permit and is an action under NEPA. The treatment of Cactus Hill Reservoir distorts the alternatives analysis and prevents the Corps, other agencies, and the public from "objectively evaluat[ing] all reasonable alternatives" to the proposed action. 40 C.F.R. § 1502.14(a). Further, in arbitrarily treating the Reservoir as both a no action alternative and as a major component of the Alternatives 3 and 4, the District fails to satisfy Section 404(b)(1) Guidelines' high burden imposed on projects that are not water dependent. Because the proposed action is not water dependent, the District must overcome presumption that practicable alternatives that do not involve impacting wetlands are available. *See* 40 CFR § 230.10(a)(3). To satisfy the Guidelines, the District must "clearly demonstrate" no practicable alternatives are available. *Id*. In treating Cactus Hill Reservoir as the no action alternative, the District has failed to rebut that presumption.

To comply with NEPA and the CWA, the Corps must conduct a reevaluation of the alternatives and present that information in a revised or second supplemental DEIS. And that analysis must include a true no action alternative that will serve as the baseline for an accurate and informed alternatives analysis.

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SECTION 3: FAILURE TO CONDUCT ANALYSES ON ENVIRONMENTAL IMPACTS, FAILURE TO FULLY ADDRESS CUMULATIVE IMPACTS, AND UNCERTAINTY REGARDING MITIGATION MEASURES

3.1 THE FAILURE TO CONDUCT AND DISCLOSE ANALYSES ON CERTAIN ENVIRONMENTAL IMPACTS IN THE SDEIS VIOLATES NEPA AND THE CWA

Like the DEIS, the SDEIS defers critical environmental impact analyses to the final environmental impact statement ("FEIS") rather than providing them at the draft stage. For example, the SDEIS provides only incomplete and vague qualitative analysis of critical impact categories like water quality, as discussed further below. *See* SDEIS at 4-85 ("Results of Phase II water quality modeling will be presented in the FEIS") (emphasis added). Additional examples of such deferrals are included in the specific comments below, such as in Section 6.3.7 of these comments (No Analysis of Subsequent Exchanges Using Augmentation Program Flows). In deferring key analyses to a later date, the Corps violates NEPA's mandate that an agency timely "consider every significant aspect of the environmental impact of a proposed action" and "inform the public that it has indeed considered environmental concerns in its decisionmaking process." *Baltimore Gas & Elec. Co. v. Natural Res. Def. Council, Inc.*, 462 U.S. 87, 97 (1983). The SDEIS falls far short of satisfying either objective by failing to include in the SDEIS analyses of issues that are central to the evaluation of the proposed action.

CEQ regulations governing implementation of NEPA state that a draft impact statement "must fulfill and satisfy to the fullest extent possible the requirements established for final statements in [§ 4332(2)(C) of NEPA]." 40 C.F.R. § 1502.9 (emphasis added). Moreover, the regulations require that an insufficiently detailed DEIS be supplemented or revised: "if a draft statement is so inadequate as to preclude meaningful analysis, the agency shall prepare and circulate a revised draft of the appropriate portion." *Id*. (emphasis added). *See also N. Buckhead Civic Ass'n v. Skinner*, 903 F.2d 1533, 1540 (11th Cir. 1990) (it must be ensured that environmental effects will not be "overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast."). To comply with NEPA, the missing analyses must be conducted and included in a revised or second supplemental DEIS. Without that information, the Corps, other state and federal agencies, and the public cannot conduct a fully informed evaluation of NISP and its LEDPA.

3.1.1 A Hard Look at the Environmental Impact of NISP Has Not Been Taken Due to a Failure to Complete All Necessary Evaluations

NEPA "prohibits uninformed agency action." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 351, (1989). In preparing the SDEIS, a "hard look" at the environmental consequences of the proposed action and its impacts must be taken. The primary function of this detailed statement is to ensure "a fully informed and well-considered decision." *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.*, 435 U.S. 519, 558 (1978). The "hallmarks of a 'hard look' are thorough investigation into environmental impacts and forthright acknowledgement of potential environmental harms." *Nat'l Audubon Soc'y v. Dep't of Navy*, 422 F.3d 174, 187 (4th Cir. 2005). Contrary to the principle that "accurate scientific analysis" is

"essential to implementing NEPA," *Sierra Club v. Van Antwerp*, 709 F. Supp. 2d 1254, 1259 (S.D. Fla. 2009), the SDEIS has substantial gaps that are claimed will be filled in later. Delaying environmental review that should be included in the SDEIS violates NEPA.

For example, in the SDEIS, only the qualitative analysis of water quality impacts is provided—stating, without explanation, that the quantitative analysis would be provided in the FEIS. *See* SDEIS at 4-85. The SDEIS indicates that modeling will be conducted to "facilitate the [CWA Section] 401 permitting process" in "coordination with the [Water Quality Control Division ("WQCD")] and the EPA using WQCD protocols." *Id*. at 4-153. However, the obligation to analyze and present impacts at the draft EIS stage is independent under NEPA. No sufficient reason is provided as to why this modeling cannot be completed and included in the SDEIS, or another draft document. WQCD Section 401 protocols are not needed to provide quantitative analysis of impacts in the SDEIS. The CWA Section 401 certification is a wholly separate federal process from the NEPA. It neither supplements the EIS, nor remedies flaws in the NEPA process stemming from the failure to provide the public with all relevant information on the impacts of NISP.

The incomplete analysis on water quality effects in the SDEIS undermines both the intent and expressed requirements of the NEPA. As stated above, NEPA is intended to ensure "accurate scientific analysis" and adequate public involvement. It prevents agencies from making decisions without timely and adequately analyzing the environmental impacts of a project. Thus, NEPA expressly mandates that if there is "incomplete information relevant to reasonably foreseeable significant adverse impacts [that] is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement. 40 C.F.R. § 1502.22. And that information should be provided in the draft EIS. *See* 40 C.F.R. § 1502.9. Here, the fact that plans exist to conduct the requisite water quality modeling at a later date demonstrate that the information is necessary and available; the analyses just need to be prepared. The failure to conduct water quality modeling and other relevant studies and include that information in the SDEIS violates NEPA.

3.1.2 The Failure to Conduct All Relevant Studies Violates NEPA's Requirement That The Public Is Fully Informed Of NISP's Environmental Effects

By deferring certain scientific analyses to a later date, the SDEIS does not satisfy NEPA's requirement that agencies "will have available, and will carefully consider, detailed information concerning significant environmental impacts, and that the relevant information will be made available to the larger [public] audience." *N. Idaho Cmty. Action Network v. U.S. Dept. of Transport.*, 545 F.3d 1147, 1153 (9th Cir. 2008). Because all relevant scientific analyses have not been conducted, the SDEIS is incomplete. In violation of NEPA, this lack of information prevents the "public and other government agencies [from] react[ing] to the effects of a proposed action at a meaningful time." *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 371 (1989). Stated another way, Fort Collins and others are not fully informed about the impacts of NISP, and cannot conduct meaningful review of the proposed action, if the SDEIS itself has not fully evaluated NISP.

Where, as here, the relevant information and scientific analyses are not available to the public for comment, the "[SDEIS] process cannot serve its larger informational role, and the public is

deprived of [its] opportunity to play a role in the decision-making process." *N. Plains*, 668 F.3d at 1085. As the Ninth Circuit states in *Pacific Rivers Council v. United States Forest Service*:

> The scope of its analysis of environmental consequences in [the] EIS must be appropriate to the action in question. NEPA is not designed to postpone analysis of an environmental consequence to the last possible moment. Rather, it is designed to require such analysis as soon as it can reasonably be done.

668 F.3d 609, 623 (9th Cir. 2012). Given the scope, complexity, and many environmental impacts of NISP, and the substantial and varied interests in the project, the Corps must fully assess and provide all relevant information on the impacts before making a decision. The failure to complete all the relevant studies and include them in the SDEIS is in violation of NEPA.

This is especially the case where Fort Collins made very clear in its comments on the DEIS how important water quality and riparian health are to Fort Collins, and Fort Collins informed the Corps that the analyses in the DEIS were vague and qualitative. The DEIS and SDEIS do not accomplish their purpose when they defer real analysis of some of the most critical issues needed for informed decision making.

3.1.3 There Is Insufficient Information to Determine Compliance With Section 404(b)(1) Guidelines and the CWA's Public Interest Review

The failure to conduct all necessary environmental analyses also violates the CWA. Under the Section 404(b)(1) Guidelines, a "permit cannot be issued if the proposed discharge will result in significant degradation of the aquatic ecosystem or if there is insufficient information to make a reasonable judgment as to whether the discharge will result in significant degradation. 40 C.F.R. §§230.12(a)(3)(ii), (iv)." *Utahns for Better Transportation v. USDOT*, 305 F.3d 1152, 1191 (10th Cir. 2002) (emphasis added). The failure to adequately consider (and expose to public scrutiny) the impacts associated with the proposed action is arbitrary and capricious under both NEPA and the CWA. *Id.* at 1192.

The inadequacies of the SDEIS demonstrate that Section 404(b)(1) Guidelines have not been complied with. To determine whether a proposed discharge will result in significant degradation, the 404(b)(1) Guidelines require detailed factual determinations regarding the effects of the discharge on the aquatic ecosystem. *Id.* at §230.10(c). *See also id.* § 230.11. Discharges that result in "significant degradation to waters of the United States" are also prohibited. 40 C.F.R. §230.10(c). Under the public interest review, a permit for NISP may not be issued if it is determined that doing so would be contrary to the public interest based on a "careful weighing" of the probable impacts of the project. 33 C.F.R. § 320.4(a). A "careful weighing" of environmental effects requires more information—including relevant quantitative analyses—than what is included in the SDEIS. Based on the current information in the SDEIS, the Section 404(b)(1) Guidelines and CWA's public interest review cannot be complied with.

3.2 FAILURE TO FULLY ADDRESS CUMULATIVE IMPACTS UNDER NEPA AND THE CWA

The SDEIS describes the cumulative impacts of NISP with the addition of Fort Collins' Halligan Water Supply Project ("Halligan Project") that includes the proposed enlargement of Halligan Reservoir, and the City of Greeley's proposed enlargement of Milton Seaman Reservoir. However, the SDEIS fails to disclose how the cumulative impacts will be evaluated with respect to each project. Of particular concern, as discussed below, is how responsibility for cumulative impacts from all three projects will be assessed to each project. As discussed above, such a deferral is not appropriate. *See Kern v. United States BLM*, 284 F.3d 1062, 1075 (9th Cir. 2002) (finding that it was not "appropriate to defer consideration of cumulative impacts to a future date when meaningful consideration can be given now").

Fort Collins is concerned that much of the assimilative capacity of the Poudre River to absorb certain impacts will be first apportioned to NISP because NISP is in an advanced stage of NEPA and CWA permitting relative to Fort Collins' and Greeley's respective projects. If true, Fort Collins is concerned that this approach would leave less assimilative capacity in the Poudre River for later analysis of the Halligan Project, which may lead to an exaggeration of streamflow impacts of the Halligan Project relative to an analysis in which the impacts of the Halligan Project are considered before the impacts of the NISP. This is especially concerning given that the streamflow impacts of the Halligan Project are expected to far less than NISP given the relative size difference between the two projects. For instance, the preferred alternative of the Halligan Project is the enlargement of Halligan Reservoir, which would be an increase of only 8,125 acre feet, which is significantly less than the volumes of all four NISP alternatives.

The SDEIS must provide information as to how the Corps intends to allocate assimilative capacity and all other cumulative streamflow impacts among the various Poudre River projects undergoing simultaneous NEPA and CWA permitting. Additional issues associated with cumulative impacts are discussed below.

3.3 UNCERTAINTY REGARDING MITIGATION MEASURES

It is Fort Collins' understanding that mitigation for NISP will be finalized with any Record of Decision ("ROD"), and that avoidance and minimization measures may be finalized before the ROD. As discussed further herein, Fort Collins notes that, at this point, the District's plans in these respects, which are summarized in Appendix F of the SDEIS, are conceptual and offer limited information on specific measures. Appendix indicates the intent of the District to recognize and react constructively to impairment of interests other than those of the District and the NISP participants, to be cooperative and responsive, and to participate in all reasonable efforts to address impairments to resources or interests caused by NISP. Where the document does not define specific limits or features of these commitments, however, it is of limited use except as a statement of general intent. *See Nat'l Audubon Soc'y v. Hoffman*, 132 F.3d 7, 17 (2d Cir. 1997) (holding an agency may rely on mitigation measures only when "the adequacy of proposed mitigation measures is supported by substantial evidence"); 40 C.F.R. § 230.75(d) (reliance on mitigation to be reasonable, the Corps' mitigation measures must "have been demonstrated to be effective in circumstances similar to those under consideration."). Clarification on these efforts is required by NEPA and the CWA.

As the entity most impacted by the Project, Fort Collins would welcome the opportunity to participate in mitigation-related discussion and efforts. After a complete assessment of the alternatives, Fort Collins urges that the proposed mitigation measures be demonstrated to be effective in minimizing the impacts of the proposed action.

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SECTION 4: PROPOSED MODIFIED ALTERNATIVE 4

4.1 THE CORPS SHOULD CONSIDER FORT COLLINS' PROPOSED MODIFIED ALTERNATIVE 4

Fort Collins investigated a modified Alternative 4 for NISP ("Modified Alternative 4") that would meet the NISP Participant's purpose and need while simultaneously maintaining relatively more water in the Poudre River through Fort Collins than all other action alternatives presented in the SDEIS. Such additional flows through Fort Collins would address many of the concerns addressed in these comments.

The Modified Alternative 4 is proposed to operate in such a way as to significantly reduce NISP diversions upstream of Fort Collins as compared to Alternative 2 (the District's preferred action), as well as Alternatives 3 and 4, resulting in relatively more stream flows and relatively fewer impacts to aquatic and riparian resources along a 23 mile reach of river through Fort Collins than the other action alternatives considered in the SDEIS. This Modified Alternative 4 is expected to entail costs comparable with other alternatives and would also result in fewer wetlands impacts than all other alternatives described in the SDEIS. Hence, Modified Alternative 4 is a practicable alternative with fewer environmentally damaging impacts than those alternatives considered in SDEIS, and consequently should be evaluated by the Corps in its NEPA and CWA Section 404 analysis. Under NEPA and the CWA, the Corps must take a hard look at this proposed alternative. 40 C.F.R. § 1502.14(a); *id*. at § 230.10(a). The Corps must consider and, if shown to be practicable, choose Modified Alterative 4 as the least damaging practicable alternative. *Id.*

4.1.1 Summary of Alternative 4 in the SDEIS

Alternative 4 features Cactus Hill Reservoir with multiple diversion points. Alternative 4 functions similarly to both Alternatives 2 and 3, except that rather than all diversions occurring at the Poudre Valley Canal headgate upstream of Fort Collins, a portion of diversions are made downstream of Fort Collins at the New Cache Canal headgate. Specifically, Alternative 4 calls for all New Cache direct flow exchange water associated with the South Platte Water Conservation Project ("SPWCP") to be diverted at the New Cache Canal rather than the Poudre Valley Canal as is common in Alternatives 2 and 3. This modification results in more flow maintained in a 23 mile stretch of river, including the reach passing through Fort Collins, than Alternatives 2 and 3. For example, Alternative 4 results in flow reductions in June at the Canyon Gage that are 17% less than Alternative 2 and 31% than Alternative 3. *See* Water Resources Technical Report, Section 8.1.

The SDEIS does not explain why Alternative 4 only considers diversions of New Cache direct flow exchange water to Cactus Hill Reservoir at the New Cache Canal headgate rather than multiple other water sources associated with NISP. SDEIS Section 2.2.7.5 indicates that the SPWCP exchanges using the New Cache Canal and Larimer and Weld Canal were evaluated for downstream diversions in various ratios, and that Alternative 4 was configured after "specialists in fisheries, stream morphology, and water quality … concluded the scenario reflected in Alternative 4 provided the most environmental benefit." The SDEIS does not indicate that either the Grey Mountain Water Right or the SPWCP reservoir exchanges associated with Terry Lake, Big Windsor Reservoir, and Timnath Reservoir were considered for downstream diversion.

Diversions for Alterative 4 under the SPWCP exchanges at the New Cache Canal only represent 20-30% of the total Poudre River diversions for the Project (depending on alternative and run). For example, in Run 5a, such diversions at the New Cache Canal represent some 12,000 acre feet of the 42,000 acre feet of diversions. *See* Run 5a final Post-Poudre Basin Network Processor, file 5aPPP_20121004_FINAL.xls.

4.1.2 Summary of Fort Collins' Proposed Modified Alternative 4

Alternative 4 could be formulated to deplete less flow in the Poudre River through Fort Collins if other sources of water for the Project were delivered to Cactus Hill Reservoir via the New Cache Canal or the Larimer and Weld Canal with pump stations to Cactus Hill Reservoir. The Modified Alternative 4 entails the following concepts as summarized below.

Modified Alternative 4 is proposed to include the same general structural components as Alternative 4 (*i.e.*, Cactus Hill Reservoir, Galeton Reservoir, distribution pipeline network, use of Big Windsor Reservoir as a forebay, etc.), with the following three primary exceptions: (1) expansion and lining of the Poudre Valley Canal would not be needed nor occur; (2) pump stations from the New Cache Canal and Big Windsor Reservoir to Cactus Hill Reservoir would be expanded, and (3) an advanced water treatment plant, as formulated for the No Action Alternative, may be needed.

Under Modified Alternative 4, the Poudre Valley Canal would still be used to fill Cactus Hill Reservoir, but would function similarly to that proposed in the No Action Alternative and would not require expansion or lining. As a result of not lining the Poudre Valley Canal, Modified Alternative 4 would result in 47 fewer acres of wetlands downslope of the Poudre Valley Canal that could suffer permanently altered hydrologic support and 92 fewer acres of other waters that would be permanently filled as compared to Alternative 4. *See* SDEIS Summary, Section S.7.6. As a result, the Modified Alternative 4 would result in fewer wetland effects (34 acres) as opposed to the Alternative 2 (the District's preferred action) (65 acres). *See* SDEIS Summary, Table S-8.

Under the Modified Alternative 4, diversions under the Grey Mountain Water Right to Cactus Hill Reservoir of up to 200 to 250 cfs would occur via the Poudre Valley Canal. This flow rate is proposed as it is the existing capacity of the Poudre Valley Canal and is equivalent to the rate of Poudre Valley Canal diversions proposed for the No Action Alternative. Above this amount, any Grey Mountain Water Right diversions to Cactus Hill Reservoir would be made at the New Cache Canal with the water thereafter pumped to Cactus Hill Reservoir.[2]

[2] Fort Collins acknowledges that this would require approval of a change of water right for the Grey Mountain Water Right by the District Court, Water Division 1. *See, e.g.,* C.R.S. 37-92-305(3)(a). However, Fort Collins notes that the point of diversion for the Grey Mountain Water Right would be moved, in part, downstream (not upstream), and that, based on Fort Collins' current understanding, the contemplated draft of the Grey Mountain Water Right would not be expected to change. *See Twin Lakes Reservoir & Canal Co. v. City of Aspen*, 568 P.2d 45, 193 Colo. 478 (Colo. 1977); *City of Thornton v. Clear Creek Water Users Alliance*, 859 P.2d 1348 (Colo. 1993). Such a change would thus not be anticipated to adversely affect the Grey Mountain Water Right. Provided that such a proposed change of water right

Based on Grey Mountain Water Right yields from Run 5a modeling and assuming a 200 cfs inflow capacity to Cactus Hill Reservoir from the Poudre Valley Canal, Modified Alternative 4 would result in approximately half of Grey Mountain Water Right yields being diverted each at the Poudre Valley Canal and the New Cache Canal. *See* Run 5a final Post-Poudre Basin Network Processor, file 5aPPP_20121004_FINAL.xls. Again using Run 5a modeling, it is estimated that overall, diversions to storage at the Poudre Valley Canal would be approximately 15-20% of the amount anticipated under Alternative 2. Additional modeling would be needed to determine specifics, but it is logical that the reduced Poudre Valley Canal diversions would thus translate to substantially more flow in the Poudre River downstream of the Poudre Valley Canal as compared to Alternative 2. This would substantially reduce the impacts to water quality, riparian health, wetlands and other impacts downstream of the Poudre Valley Canal relative to Alternative 2, as discussed in the 2008 Comments and these comments. It is assumed that diverting some water through the Poudre Valley Canal is needed to improve water quality in Cactus Hill Reservoir, and is reasonable considering that expanding and relining the Poudre Valley Canal would not be necessary for Modified Alternative 4. Additional study by the Corps would be needed on the amount and timing of Poudre Valley Canal diversions under the modified alternative as these diversions would have the benefit of improving water quality in Cactus Hill Reservoir, but the detriment of depleting Poudre River stream flow.

The Modified Alternative 4 further proposes that a majority of Poudre River diversions associated with the SPWCP would be made at the New Cache Canal headgate rather than at the Poudre Valley Canal. The Modified Alternative 4 proposes that all New Cache direct flow exchange water and all exchange water associated with Terry Lake and Timnath Reservoir be diverted at the New Cache headgate for delivery to Cactus Hill Reservoir. In order to reduce pumping and improve water quality in Cactus Hill Reservoir, it is likely desirable to make some diversions under the SPWCP exchanges at the Larimer and Weld Canal headgate for delivery to Big Windsor Reservoir with subsequent pumping to Cactus Hill Reservoir. Therefore, under Modified Alternative 4, it is conceptually assumed that 50% of the Larimer and Weld direct flow exchange water and 50% of Big Windsor Reservoir exchanges under the SPWCP would be diverted at the New Cache Canal headgate. Additional study by the Corps would be needed to determine the exact ratio of Larimer and Weld diversions at each diversion location under the modified alternative weighing improvements to water quality in Cactus Hill Reservoir with the detriments of depleting a longer reach of the Poudre River.

By diverting SPWCP exchange water further downstream at the New Cache Canal, additional flow will be maintained in the Poudre River between the originally proposed diversion point and the New Cache Canal. In the case of Larimer and Weld direct flow exchange water and SPWCP reservoir exchanges associated with Terry Lake, Big Windsor Reservoir, and Timnath Reservoir, by diverting this water further downstream flows would be improved between the current diversion locations and New Cache headgate above baseline conditions. As such, Modified

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were shown to not adversely affect Fort Collins' water rights, Fort Collins would likely not oppose such a change of the Grey Mountain Water Right.

Alternative 4 could even improve flows in places and times through Fort Collins above what is observed in the current baseline without any mitigation or augmentation flows.

The diversions to Cactus Hill Reservoir detailed above would result in far fewer flow impacts along a 23 mile reach of the Poudre River than any other action alternative examined in the SDEIS. Consequently, the Modified Alternative 4 may not require a flow augmentation program similar to that proposed by the District for Alternative 2.

4.1.3 Other Considerations for Modified Alternative 4

Under the Modified Alternative 4, water quality in Cactus Hill Reservoir is preliminarily predicted to be comparable to the water quality predicted in Cactus Hill Reservoir for the No Action Alternative, but worse than predicted for either Glade Reservoir for Alternative 2 or Cactus Hill Reservoir for Alternatives 3 and 4, especially in terms of total dissolved solids ("TDS"). Using water quality data from the SDEIS (SDEIS Tables 4-32, 4-37, and 4-39) and predicted relative flow contributions by diversion location, the TDS conceptually predicted for Cactus Hill Reservoir in the Modified Alternative 4 is 350-400 mg/L, which is below the 500 mg/L maximum containment limit and the 400 mg/L upper limit goal used for developing the No Action Alternative in the SDEIS. *See* page 4 of Technical Appendix: NISP No Action Alternative Evaluation. However, with such high TDS it is assumed (similarly to the No Action Alternative) that NISP Participants would construct advanced water treatment facilities.

Diversions at the New Cache Canal headgate are downstream of wastewater treatment plant discharges, which raise certain water quality concerns both for users of Cactus Hill Reservoir and wastewater effluent dischargers. It is likely that the Modified Alternative 4 would lead to a Total Maximum Daily Load process and limitations for nutrients associated with wastewater discharges, such as those made by Fort Collins, above diversions to Cactus Hill Reservoir at the New Cache Canal.

Under the Modified Alternative 4, annual pumping inputs would be greater than any other alternative in the SDEIS due to the relatively larger pumping head required to fill Cactus Hill Reservoir from the New Cache Canal. However, pumping costs are not so large as to preclude the viability of Modified Alternative 4. For example, and as a worst case scenario, it is conceptually estimated that if all inflows to Cactus Hill Reservoir were taken at the New Cache Canal the total energy requirement would be roughly 80,000,000 to 85,000,000 KW-hr. This amount may be compared to 64,400,000 KW-hr for Alternative 4 and 48,100,000 KW-hr for Alternative 2 under the Reclamation Action Option or 61,300,000 for Alternative 2 under the No Reclamation Action Option. *See* SDEIS Summary, Table S-10. Diverting all inflows to Cactus Hill Reservoir at the New Cache Canal exceeds that which is proposed for Modified Alternative 4, but was analyzed as a worst case scenario for illustrative purposes. Under this worst case scenario, total annual pumping power costs for Modified Alternative 4 are expected to be, at a maximum, roughly $6,000,000, as opposed to $4,511,000 for Alternative 4, $4,291,000 for Alternative 2 without Reclamation Action, and $2,663,000 for Alternative 2 with Reclamation Action (from SDEIS Table 2-12). Worst case energy and cost estimates for Modified Alternative 4 were developed with available information summarized SDEIS data and are conceptual in nature. Given that Modified Alternative 4 would

likely have significantly less environmental impact than the SDEIS alternatives, including fewer wetlands and streamflow impacts along a vital 23 mile reach of Poudre River, it remains a practicable alternative, even in light of the approximated higher pumping costs. Further, the difference in pumping costs between Modified Alternative 4 and the other alternatives is small relative to the overall costs of the proposed action.

Because of the increased pumping inputs required for Modified Alternative 4, greenhouse gas emissions associated with pumping are anticipated to be greater than any other SDEIS alternative, which may exacerbate NISP's climate change impacts, which are discussed in Section 8 of these comments. Nevertheless, given that the proposed Modified Alternative 4 will have far fewer aquatic impacts than other SDEIS alternatives, including fewer impacted wetlands and fewer streamflow impacts along a vital 23 mile reach of Poudre River, the increased greenhouse gas emissions associated with larger pumping inputs may be justified, especially given that increased greenhouse gas emissions could be avoided, minimized, or mitigated, for example, by the use of renewable energy sources or by employing other climate change mitigation methods.

Total capital costs for Modified Alternative 4 are expected to be comparable to Alternative 4 costs provided in the SDEIS. Although additional costs are required for upgrading the New Cache Canal pumping facilities and potentially for advanced water treatment, large cost savings are realized from not having to expand and line a 30 mile section of the Poudre Valley Canal. Using costs provided in the SDEIS (SDEIS Table 2-12), it is conceptually predicted that the Modified Alternative 4 would have a capital cost of roughly $700,000,000. This amount is 38% more than the Alternative 2 with Reclamation Action, but only 6% more than Alternative 2 without Reclamation Action. Furthermore, mitigation costs will likely be less for Modified Alternative 4 than other alternatives given that the environment impacts will be less. Cost estimates for the Modified Alternative 4 were developed with summarized SDEIS data and are conceptual in nature. Accordingly, Fort Collins urges the Corps to satisfy its legal obligation under NEPA and to take a hard look at Modified Alternative 4.

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SECTION 5: WATER QUALITY COMMENTS

The SDEIS describes three major water quality impacts of interest to Fort Collins, as discussed in detail below: (1) degradation of raw source water quality delivered to the Fort Collins Water Treatment Facility ("FCWTF"); (2) degraded water quality or flow regime changes on Poudre River Segments 10a, 10b, and 11; and (3) degraded water quality or flow regime changes on the wastewater discharge permits issued for Fort Collins' two water reclamation facilities ("Drake WRF" and "Mulberry WRF").

The SDEIS was also issued without several quantitative analyses that are necessary for the Corps to take a hard look at water quality impacts required NEPA and the CWA. Without this information, the Corps cannot make a "fully informed and well-considered decision." *Vermont Yankee*, 435 U.S. at 558. Also, the lack of analyses prevents Fort Collins from meaningfully understanding the possible effects on its interests. To comply with NEPA, the Corps must analyze the antidegradation regulations for the Drake and Mulberry WRFs and conduct temperature modeling and water quality modeling for the Poudre River.

The FCWTF currently receives water from two sources: Horsetooth Reservoir (by direct connection) and Poudre River water routed through the Fort Collins Pipeline and Pleasant Valley Pipeline ("PVP"). The PVP is a pipeline (separate from the Fort Collins Pipeline) that runs from the Munroe Canal to the FCWTF. Fort Collins also shares use of the PVP with other entities, including the Fort Collins-Loveland Water District, which uses the PVP to deliver water to the Soldier Canyon Treatment Plant. Under Alternative 2 with the Reclamation Action Option, both of Fort Collins' raw water sources would be affected adversely. Residence times in Horsetooth Reservoir would be substantially increased resulting in poorer water quality in Horsetooth Reservoir. As discussed below, Glade Reservoir water may be of lower quality than Poudre River water due to long hydraulic residence times in that reservoir, and would be delivered through the PVP to the Soldier Canyon Treatment Plant, adversely affecting Fort Collins' Poudre River water run through the PVP. It is reasonably foreseeable that both changes would require Fort Collins to perform increased water treatment that will be costly for Fort Collins to install and operate.

Alternative 2 will affect the Poudre River by diversions into Glade Reservoir decreasing flushing flows and Glade Reservoir releases back to the river during the warm months that will impact water quality. Flushing flows remove algal biomass and excess sediment from the river bottom. Reduction of these high flows could lead to development of large algal mats and island formation.

Glade Reservoir water has the potential to be higher in certain water quality constituents (TOC, iron, manganese, nitrogen, phosphorus) than water currently released from Horsetooth Reservoir to the Poudre River. It is reasonably foreseeable that increases in regulated constituents in the river upstream of Fort Collins' permitted discharge points would lead to exceedances of standards in the river and exceedances of effluent limits in the mixed flow downstream of the discharge point. For the downstream mixed flow, reductions in river flow combined with upstream increases in regulated constituents will make exceedances of standards more likely.

5.1 COMMENTS REGARDING INCOMPLETE ANALYSES RELATED TO WATER QUALITY

5.1.1 No Analysis of Antidegradation Regulations and Mulberry and Drake WRFs

SDEIS Section 4.3.10 401, Certification Process and Antidegradation Review

> Statement: *"The WQCC is responsible for issuing Water Quality Certifications under Section 401 of the CWA for projects or actions that are applicable to the provisions of the Colorado 401 Certification Regulation (WQCC Regulation #82: 5 CCR 1002-82). […] The 401 certification process is a permitting requirement separate from NEPA compliance. 401 certification and antidegradation review will be required for any permitted alternative prior to construction. To facilitate the 401 permitting process, additional water quality modeling will be conducted for the FEIS in coordination with the WQCD and the EPA using WQCD protocols. The intent of this effort is to use the results of the water quality analysis conducted for 401 certification in the FEIS and thus, minimize any duplication of effort."*

Comment: The SDEIS does not address the effects of NISP on Mulberry and Drake WRF facilities' compliance with antidegradation regulations, which are based on maintenance of historical water quality and not solely on water quality standards. Fort Collins thus cannot meaningfully analyze NISP's effects in this respect.

NEPA and the CWA require that the Corps address indirect effects of the proposed action. *See* 40 C.F.R. § 1508.8(b). *See also id*. § 230.11(h) (requiring consideration of "secondary effects"). Further, the Corps' guidelines prohibit a discharge that causes or contributes to violations of any state water quality standards. *See* 40 C.F.R. § 230.10(b)(1). Thus, the Corps must conduct additional studies and analyses in these proceedings with respect to the compliance of Mulberry and Drake WRF facilities with antidegradation regulations.

5.1.2 No Analysis of Chlorophyll

SDEIS Section 4.4.3.1.1, Poudre River, Flows and Flooding

> Statement: *"Laporte Reach. Flood flows are predicted to be reduced. […]Fort Collins and Upper Timnath Reaches. There is a predicted 20% to 35% reduction in flow duration at or above 1,000 cfs, as well as a 20% to 40% reduction in the duration of flows in the interval from 140 cfs to 1,000 cfs. […] For the 26-year period of record, 23 flushing events under Current Conditions lasting for 325 days in total would become 16 flushing events under Alternative 2 lasting for 222 days in total."*

Comment: Amounts of attached algae in streams (measured as chlorophyll) are currently regulated by the State of Colorado under Section 31.17 of Regulation 31 of the Water Quality Control Commission, 5 CCR 1002-31, under interim values, and the use of these interim values will be used in the adoption of water quality standards prior to May 31, 2022. Flow velocity exercises strong control over chlorophyll accumulation in stream channels. The SDEIS does not assess the impact of reduction of flow volumes and flow velocities on chlorophyll development. Fort Collins thus cannot judge and meaningfully analyze the effects on Fort Collins.

The Corps must analyze all NISP alternatives' impact on chlorophyll accumulation. This is essential both for NEPA and the CWA prohibition on fills that would cause or exacerbate any violation of water quality standards.

5.1.3 No Quantitative Analysis of Temperature

SDEIS Section S.1.2.2, Planned Activities After SDEIS Issuance

Statement: *"Before FEIS issuance, or issuance of a Record of Decision as noted, the Corps anticipates completing the following activities: […] Complete Phase II water quality and stream temperature modeling in coordination with the WQCD and the EPA using WQCD protocols."*

Comment: The SDEIS states that temperatures within the Poudre River will be higher as a result of the operation of NISP, but does not offer quantitative projections that would allow Fort Collins to meaningfully analyze the likelihood that specific stream sections now in compliance with State standards for temperature for protection of aquatic life will become noncompliant as a result of the project.

As discussed above, an "accurate scientific analysis . . . and public scrutiny are essential to implementing NEPA." 40 C.F.R. § 1500.1. The Corps' deferring analyses violates NEPA's requirement that agencies "will have available, and will carefully consider, detailed information concerning significant environmental impacts, and that the relevant information will be made available to the larger [public] audience." *N. Idaho Cmty. Action Network*, 545 F.3d at 1153. Without temperature data, Fort Collins and other stakeholders cannot meaningfully review temperature impacts. Thus, the Corps must supplement or revise the SDEIS to include a quantitative analysis of temperature for all alternatives, and the Corps must afford Fort Collins and others an opportunity to review and comment on that information. Because this is a critical water quality attribute, appropriate analysis is necessary to comply with the CWA. *See* 40 C.F.R. § 230.10(b).

5.1.4 No Quantitative Analysis of Water Quality Effects Below Glade Reservoir

SDEIS Section S.7.2, Surface Water Quality

Statement: Table S-6. Potential for exceedance of water quality standards.

Parameter	Alternative 2	Alternative 3	Alternative 4
Poudre River above Lincoln Street in Fort Collins (Segment 10)			
Copper	Medium	Medium	Medium
Dissolved Manganese	Medium	Medium	Medium
Poudre River from Lincoln Street to below Boxelder Creek (Segment 11)			
Total Phosphorus	Medium	Medium	Medium
Selenium	High*	High	High
Poudre River from below Boxelder Creek the South Platte River (Segment 12)			
Total Recoverable Iron	High*	High*	High*
Ammonia	High*	High*	High*
Total Phosphorus	High*	High*	High*
Selenium	High*	High*	High*
Segment 1b of the South Platte River			
Total Recoverable Iron	High*	High*	High*
Dissolved Manganese	Medium	Medium	Medium
Ammonia	Medium	Medium	Medium
Total Phosphorus	High*	High*	High*
Sulfate	High*	High*	High*

*Water Quality Standard already being exceeded under current conditions.

SDEIS Appendix F, Section 4.4.1, Glade Reservoir Water Quality Enlargement (FW-06)

Statement: "*Northern Water proposes to evaluate an increase in Glade storage to as much as 192,500 acre-feet to allow for operational flexibility during the late summer period. This would include the following tasks to be completed between the SDEIS and FEIS, so that the Corps permit decision can include a potential water quality enlargement of Glade Reservoir:*

- *Verification through the use of full CTP hydrology and modeling that an increase in storage can off-set the lack of diversion during late summer while still meeting full project yield.*
- *Integration of the detailed water quality modeling with the refined configuration and determination of potential operational strategies for mitigation of effects or environmental enhancement, including the evaluation of temperature thresholds above which NISP diversions may be curtailed.*
- *Validation by the third party contractor that no significant adverse environmental consequences are caused by either the enlargement of Glade or the change in inflow pattern.*"

Comment: The SDEIS forecasts adverse water quality effects of NISP on the Poudre River below the point of diversion for Glade Reservoir but omits quantitative predictions, which are stated to be given only in the FEIS. Therefore, Fort Collins and other affected parties cannot judge or meaningfully analyze whether impairments will lead to new violations of water quality standards as reflected in 303(d) listing of impaired waters by the State of Colorado. Details regarding the proposal to enlarge the capacity of Glade Reservoir to accommodate water quality needs are not given. The changes in stream flows and associated resource impacts from enlarging Glade Reservoir must be fully described and analyzed.

As stated above, NEPA requires that the Corps conduct a quantitative analysis of water quality impacts below Glade Reservoir and provide that information in the SDEIS to Fort Collins and other stakeholders. *See* 40 C.F.R. §§ 1502.22, 1502.9. This analysis is also essential for compliance with the Corps' obligation to avoid causing or exacerbating violations of water quality standards. *See* 40 C.F.R. § 230.10(b).

5.1.5 Water Quality Monitoring Is Not Mitigation

SDEIS Appendix F, Section 4.4.3.2, Water Quality Monitoring

Statement: *"Additional water quality monitoring would be performed to more fully characterize and understand the effects of NISP operations on Poudre River water quality before and after NISP project components are built and implemented, and to meet the water quality commitments of this Conceptual Mitigation Plan. […] Initial data collection […]Long-term monitoring […] The final sites, parameter list, and frequency for the initial data collection effort will be determined between the SDEIS and FEIS based on the analyses and modeling being conducted for the FEIS and State 401 water quality certification process."*

Comment: The only specific action item in the mitigation plan addressing water quality impacts is a water quality monitoring program. Monitoring, without potential actions based on the monitoring, does not compensate for or mitigate unavoidable impacts. The conceptual mitigation plan fails, at this point, to address important water quality issues in Segment 11, where dilution water quantity and quality are critical to compliance with water quality standards and antidegradation rules. Water quality maintenance in this reach requires commitments to minimum flows sufficient to insure adequate dilution of wastewater effluent. Low flow augmentation commitments are based on availability of water at the point of augmentation and not through the downstream reaches. This

problem needs to be addressed explicitly with reference to the two wastewater treatment plants for the City (Mulberry and Drake WRFs).

As stated above, the SDEIS water quality assessment lacks key quantitative analyses. Under NEPA and the CWA, proposed mitigation measures dependent on incomplete environmental impact analyses fail. *Ohio Valley Envtl. Coalition v. United States Army Corps of Eng'rs*, 479 F. Supp. 2d 607, 627 (S.D. W. Va. 2007). Stated another way, the Corps' purported mitigation in the form of monitoring is inherently inadequate because it is based on only a portion of the required water quality analyses. Any mitigation for NISP must directly address the impacts discussed herein.

5.2 COMMENTS REGARDING IMPACTS TO SOURCE WATER QUALITY FOR THE FCWTF

5.2.1 Changes to Hydraulic Residence Time in Horsetooth Reservoir

SDEIS, Sections 2, 3, and 4

Statement: Page 2-41: *"Horsetooth Reservoir releases an average of nearly 60,000 AF to the Poudre River each year."*

Statement: Page 3-27: *"C-BT deliveries to the Poudre River from Horsetooth Reservoir via the Hansen Supply Canal averaged nearly 75,700 AFY for the period including WY 1952-2009 (CDM Smith, DiNatale, and Hydros 2011)."*

Statement: Page 4-41: *"In addition to these releases to the Poudre River and the Poudre Valley Canal, Glade Reservoir under the Reclamation Action Option would release an average of 10,500 AFY for direct delivery to the water treatment facilities for Participants FCLWD, Evans, Eaton, Severance, and Windsor (see the 2014 Operations Report, Section 5.1.1.1). Potential pumping from Glade Reservoir to Horsetooth Reservoir (see Section 4.2.3.3.3) would average about 400 AFY (averaged over 56 years)."*

Statement: Page 4-46: *"Horsetooth Reservoir releases averaged 51,300 AFY, with 49,500 AFY released to the Poudre River and 1,800 AFY delivered to the Poudre Valley Canal via the Windsor Extension. Under NISP Alternative 2 with the Reclamation Action Option, Horsetooth Reservoir releases would be reduced to 21,900 AFY (20,200 AFY to the river and 1,700 AFY via the Windsor Extension)."*

Comment: The planned decreases in the release of water from Horsetooth Reservoir (from 51,300 to 21,900 acre feet per year) will lead to a substantial increase in hydraulic residence time for water in Horsetooth Reservoir. Under operational scenarios proposed in this SDEIS, the historical average residence time of 2-3 years could become about 7 years. Increased residence time for reservoirs in Colorado often is associated with increased algal biomass and change in algal community composition in the upper mixed layer of the reservoir during water column stratification season. *See* Northern Water, 2014 Water Quality Stakeholders Meeting: 2013 Three Lakes Water Quality and Operations, or Why Did Shadow Mountain Turn Green, dated March 4, 2014. An increase in algal production and changes in community composition in Horsetooth Reservoir could potentially result in increases in TOC concentrations, more frequent occurrence of elevated concentrations of taste and odor compounds such as geosmin and 2-methylisoborneol (MIB), as well as an increased likelihood of cyanotoxin production. Each of these issues poses significant concern for the FCWTF and would

potentially require new and/or costly monitoring and treatment solutions that are currently not required, including the use of powdered or granular activated carbon.

As described in Fort Collins' comment regarding SDEIS Section 4.3.4.5 Effects on Water Treatment Plant Operations, the proposed increase in hydraulic residence time in Horsetooth Reservoir was not included in the modeled scenarios for the SDEIS. As such, it is not possible to evaluate the combined effects of increased hydraulic residence time and possible inflows from Glade Reservoir on algal abundance or TOC concentrations, or to estimate the likelihood of algal metabolites production like geosmin, MIB or cyanotoxins. Without this information, the FCWTF remains vulnerable to unexpected and substantial costs associated with new or enhanced treatment costs.

The City has identified ozone/advanced oxidation as the water treatment solution needed to manage regular occurrence of cyanotoxins and/or taste and odor compounds like geosmin and MIB in the Horsetooth raw water supply. *See* CH2M. 2015. Technical Memorandum: Revised Costs for Impacts to Water Treatment Operations Resulting from NISP Operations. August 6, 2015 ("Costs Report"), which is provided with these comments. Capital costs associated with this type of advanced treatment are estimated at $26.9 million, in 2015 dollars, with an annual operating cost of $703,000. Likewise, the ozone/advanced oxidation is the treatment solution proposed for managing persistent taste and odors issues, with the same capital and annual operating costs.

Additionally, the use of granulated activated carbon may be required in the event that concentrations of TOC in Horsetooth Reservoir increase to 5-6 mg/L on a consistent basis and enhanced coagulation fail to reduce TOC to needed levels. The capital costs associated with a new organics removal facility are $72.9 million and annual costs of $2.5 million, in 2015 dollars. *See* Costs Report. Although the application of granular activated carbon is not considered necessary under the scenario of a 0.5 mg/L increase in average TOC concentrations, as reported in the SDEIS, such measures may become necessary in the event that the proposed changes in hydraulic residence time result in TOC concentrations consistently above 5-6 mg/L. As stated previously, the information presented in the SDEIS is not adequate for addressing this likelihood.

Longer hydraulic residence time also can lead to greater extremes of hypolimnetic oxygen loss, which facilitates the release of dissolved iron and manganese from bottom sediments (Dortch 1997). Dissolved iron and manganese precipitate when oxygenated upon release from the hypolimnion. The precipitate forms particles and coatings that interfere with water treatment. Taste and odor problems may also be caused by anoxic water even after aeration. These issues related to prolonged hypolimnetic oxygen depletion would likely result in additional treatment costs from increased chemical usage specifically, pre-oxidation with chlorine dioxide to manage manganese and iron issues at an estimated peak daily cost of $2,109, or a weekly cost of $14,765, and/or the use of powdered activated carbon (PAC) to remove taste and odor compounds. *See* Costs Report.

If, due to NISP, TOC concentrations in Horsetooth Reservoir reach a level that the FCWTF cannot treat without installing additional treatment facilities, Northern must be required to pay for installation and operation of a pretreatment facility to remove some TOC from raw source water before it enters the FCWTF. If taste and odor compounds or cyanotoxin concentrations reach a

problematic level, Northern must deliver treatable water to the FCWTF that can be used until the water quality in Horsetooth Reservoir reaches a treatable status. In addition, if Horsetooth water quality is degraded to the point that it is not usable for more than 6 months, Northern must be required tp pay for constant forced destratification. Mixing could reduce the amount of greenhouse gasses that would normally be released from the reservoir during stratification.

The CWA requires the Corps to take hard look at the potential negative changes in the water quality of Horsetooth Reservoir caused by the proposed action. Specifically, the Section 404(b)(1) Guidelines prohibit any discharge that would cause or contribute to "significant degradation of the waters" or "violations of any applicable State water quality standard . . . ." 40 C.F.R.§ 230.10(b)(1), (c). These impacts include "secondary effects" caused by the project including the impacts discussed above. 40 C.F.R. § 230.10(h). Additionally, NEPA requires the Corps to address "reasonably foreseeable" impacts and emphasizes the importance of taking a hard look at uncertain effects:

> [I]n the ordinary course of business, people do make judgments based upon reasonably foreseeable occurrences. . . . The agency has the responsibility to make an informed judgment, and to estimate future impacts on that basis, especially if trends are ascertainable . . . . The agency cannot ignore these uncertain but probable, effects of its decisions.

46 Fed. Reg. at 18031. Given the potentially significant impacts on water quality in Horsetooth Reservoir, and the potential costs that would be incurred by Fort Collins to address those impacts, the Corps must assess the potential impacts and mitigation measures discussed above.

5.2.2 Hydraulic Residence Time in Glade Reservoir and the PVP

SDEIS Section 2.5.4.1, Glade Reservoir

Statement: *"The modeled hydraulic residence time (the length of time diverted water would remain in the reservoir) would be 4.6 years."*

Comment: Under operating conditions described in the SDEIS, Glade Reservoir will experience long hydraulic residence times. The water quality effects of long residence times in Glade Reservoir are expected to be similar to those described above for Horsetooth Reservoir. As such, Glade Reservoir water has the potential to be higher in certain water quality constituents (TOC, iron, manganese, nitrogen, phosphorus) than water currently released from Horsetooth Reservoir to the Poudre River. Increases in regulated constituents in the river upstream of Fort Collins' permitted discharge points could lead to exceedances of standards in the river and exceedances of effluent limits in the mixed flow downstream of the discharge point. For the downstream mixed flow, reductions in river flow combined with upstream increases in regulated constituents will make exceedances of standards more likely. Furthermore, Glade Reservoir water delivered through the PVP to the Soldier Canyon Treatment Plant may adversely affect Fort Collins' Poudre River water running through the PVP.

Water storage in Glade Reservoir will lead to differential water quality conditions in the upper and lower portions of the water column during the season of water column stratification. A multiple outlet structure will be available for Glade Reservoir so that selective water withdrawal is possible. This measure may not be sufficient, however, to protect the quality of waters released from the reservoir because of the simultaneous occurrence of impairment of the upper water column (high temperature, algae) and lower water column (iron, manganese, organics) during the season of stratification. Release of water from points below the epilimnion of Glade Reservoir during the summer for purposes of maintaining low temperature or avoiding algal biomass in the epilimnion are complicated by the likely presence of substantial concentrations in the release water of dissolved iron and manganese that will precipitate as oxides and hydroxides upon entering the river. (Dortch 1997, Smith 1982). It can be assumed that the engineered release structure will reoxygenate the water, but the problem of chemical precipitation is not dealt with in the mitigation plan.

The mitigation for Alternative 2 must include commitment to and measures ensuring constant destratification of Glade Reservoir in the event that water quality problems resulting from stratification are observed or expected. Mixing could reduce the amount of greenhouse gasses that would normally be released from the reservoir during stratification.

5.2.3 Glade Reservoir Forebay Water Quality Issues

SDEIS Section 2.5.4.1, Glade Reservoir

Statement: "*A forebay and pump station would also be constructed southwest of the reservoir.*"

Comment: The SDEIS describes the building of a forebay in front of the dam, but not the operation of the forebay. Under certain operational scenarios, it is reasonably foreseeable that water could be released directly from the forebay into the PVP and/or the Poudre River. The forebay is a small waterbody that is hydrologically separated from Glade Reservoir. The quality of the water in the forebay will vary greatly based on factors such as hydraulic residence time, degree of drawdown, and quality of source water. Waters of the forebay may be subject to warming, wind generated turbidity, or algal blooms to a degree that would not be expected in Glade Reservoir. As a result, downstream uses could be impaired if water is released directly to the river from the forebay.

If the Corps approves NISP, the Corps must include permit conditions prohibiting any release of forebay water directly into the PVP or the Poudre River under any conditions. If the Corps does not prohibit releases, then it must adequately assess the potential impact releases of the forebay water.

5.2.4 Glade Reservoir Water Quality During the Initial Fill

SDEIS Section 4.3.4.1.1, Projected Reservoir Water Quality, Glade Reservoir

Statement: *"Water quality during initial reservoir filling would be affected by the release of nutrients and organic matter in the soil. During this period water quality may be impaired by high suspended solids, elevated nutrient concentrations, and potentially high concentrations of algae (Lewis 2003)."*

Comment: The SDEIS recognizes that Glade Reservoir, when in the filling phase, may show water quality problems that are associated with early stabilization of the reservoir. The SDEIS commits to withholding water in the reservoir from use for a specific period of time to allow for stabilization of reservoir water quality.

If the Corps approves NISP, it must require as a permit condition that the District commit to measures for extending the withholding period as necessary to prevent impairment of downstream waters to a degree that would not be expected over the long term, i.e., the startup period during which waters are withheld must not be defined by elapsed time, but rather by water quality conditions in the reservoir.

5.2.5 Use of the PVP to Deliver Water From Glade Reservoir

SDEIS Appendix F, Section 3.2.1, Avoid Munroe Canal Diversions (FW-01)

Statement: *"The original Draft EIS considered using the Munroe Canal for two operations associated with NISP. […] The exchange has been eliminated in the SDEIS analysis, and replaced with a new pipeline directly from Glade Reservoir to the Pleasant Valley Pipeline (for Fort Collins-Loveland Water District) and a new pipeline directly from Glade Reservoir to the Soldier Canyon Filter Plant (for Eaton, Severance and Windsor)."*

Comment: The proposed use of the PVP to convey deliveries of water from Glade Reservoir creates potential water quality issues, as described above.

Due to potential degradation of water quality caused by Alternative 2, these releases must be required to be made through a second pipeline rather than through the PVP, so that all water moved through the PVP originates from the Poudre River upstream of the Glade Reservoir release point. This would allow FCWTF to receive raw water supply of appropriate quality for treatment when Horsetooth Reservoir and Glade Reservoir are not a suitable source for drinking water supply. The Corps must also consider the alternative of constructing a pre-treatment facility for releases from Glade Reservoir into the PVP to maintain the existing water quality parameters.

5.2.6 Analysis of TOC Levels in Horsetooth Reservoir

SDEIS Section 4.3.4.5, Effects on Water Treatment Plant Operations, Pages 4-117 and 4-118

Statement: "*The Horsetooth Reservoir water quality model (Hydros 2013) was used to evaluate changes in TOC concentrations for the Reclamation Action Option (ERO and Tetra Tech 2015). The model was used to estimate changes in TOC concentrations in the Soldier Canyon outflow, which would be the raw water supply to the Fort Collins and Tri-Districts WTPs.*"

"The model results for the Reclamation Action Option with and without a pipeline from Glade Reservoir to Horsetooth Reservoir are provided in Table 4-35.

"Table 4-35 shows that for the Soldier Canyon Outflow, which supplies Horsetooth Reservoir water to the Fort Collins and Tri Districts WTPs, average TOC concentrations are predicted to be higher under the Reclamation Action Option for the maximum pipeline volume. However, even for the highest average predicted TOC

concentration of 3.52 mg/L in the Soldier Canyon outflow, this would be only 3.5% higher than the baseline average TOC concentration of 3.40 mg/L."

Hydros Consulting, dated June 4, 2013, "Transmittal of Horsetooth Reservoir Model Simulation Results for NISP

Statement: "*The Horsetooth Reservoir model is a dynamic, two-dimensional hydrodynamic and water-quality model developed in the CE-QUAL-W2 (version 3.6) modeling framework. […] The model was calibrated and validated for the period January 2005 through September 2010.*

"*To allow for simulation of NISP scenarios which include pipeline inflow into Satanka Bay (located at the north end of the reservoir), the original Horsetooth model was modified slightly. Specifically, detail was added to the bathymetric representation of Satanka Bay to create a distinct model branch at this location to allow for inflows. []Bathymetric modifications were purposefully conducted to maintain the area-elevation-volume relationships of the original model. Simulation of observed conditions for the January 2005 through September 2010 period was performed with the modified model and compared to the same-period simulation from the original model. Differences in the water quality and hydrodynamics between the two runs were negligible.*

"*The simulation of observed conditions with the modified model (described above) for the full calibration and validation period (January 2005 through September 2010) served as the 'baseline' run against which all NISP scenario runs are compared in the results files provided to ERO Resources. All NISP scenarios for the Horsetooth Model runs were developed to simulate the same January 2005 through September 2010 time-period with varying inflows, outflows, and Satanka Bay pipeline water-quality assumptions. As such, for all runs, the same meteorology and Hansen Feeder Canal inflow concentrations were applied.*"

Comment: The conceptual approach described within the SDEIS regarding the quantification of the impact on TOC concentrations in Horsetooth Reservoir resulting from the transfer of water from Glade Reservoir is generally sound. However, a review of the modeling and resulting analysis suggest that the presented data and analysis are flawed and misleading, and inappropriately minimize the impact of Glade Reservoir water on expected TOC concentrations in Horsetooth Reservoir, which is a critical source of treated water for Fort Collins.

Per the documentation provided for the SDEIS and referenced as "Hydros, 2013" and "ERO and Tetra Tech 2015," a baseline CE-QUAL-W2 model ("baseline model") of Horsetooth Reservoir was developed and used to determine water quality impacts associated with the possible introduction of water from Glade Reservoir into Horsetooth Reservoir. The documentation of the model (from Hydros, 2013) suggests that the baseline model at times accurately reproduces measured TOC concentrations observed near the surface and reservoir bottom adjacent to the Solider Canyon Dam outlet. There are other times, however, where the baseline model continuously under predicted TOC concentrations at certain locations. Specifically, the baseline model under predicted observations made during the summers of 2005, 2006, and 2007 near the reservoir surface adjacent to Solider Canyon Dam. In 2005, the difference between modeled and observed TOC values appears to exceed 1 mg/L (or nearly 33% of the modeled value). Improved agreement is obtained near the bottom of Solider Canyon Dam (when compared to agreement at the surface). However, the baseline model also under predicts (by 0.5 mg/L or 16% of modeled value) TOC concentrations during the summer of 2005 and 2006. The amount of these under predictions is significant in terms of concentrations and percentages of modeled values.

The magnitude of the under predictions of TOC concentrations in Horsetooth Reservoir range from 0.5 mg/L to 1.0 mg/L. By comparison, the modeled average TOC concentration increase from the introduction of Glade Reservoir water into Horsetooth Reservoir is 3.5% or 0.12 mg/L. Because the modeled average TOC concentration increase is much smaller than the under prediction errors in modeled TOC concentrations, the modeled average TOC concentration increase is not believable or reliable.

In addition, average TOC concentrations should not be utilized to assess the impact of introducing Glade Reservoir water into Horsetooth Reservoir, as doing so masks any large increase event(s) that may occur in the specific water that is introduced into the City's system because such large increase event(s) are not identified in the average value. These large increase events are not evident in the results provided within the SDEIS, and would dictate any alternations needed to water treatment systems before Horsetooth Reservoir water that has been mixed with Glade Reservoir water could be utilized by Fort Collins.

Aside from concerns regarding the accuracy of the baseline model discussed above, Fort Collins has concerns regarding the modified model used to simulate Glade Reservoir inflows into Horsetooth Reservoir. For this discussion, this modified model is referred to as the "proposed-conditions model."

Per the documentation referenced above, the proposed-conditions model is similar to the baseline model discussed above except that it includes model cells representing Satanka Bay, and incorporates inflows from Glade Reservoir into Satanka Bay. Per the proposed-conditions model documentation, the impact of introducing Glade Reservoir water into Horsetooth Reservoir via Satanka Bay was determined by comparing computed Soldier Canyon outflow TOC concentrations from the proposed-conditions and baseline models, using the same January 2005 through September 2010 time period over which the baseline model was calibrated and validated.

This analysis approach is flawed and misleading. It is inappropriate to model the impacts of periodically introducing Glade Reservoir water into Horsetooth Reservoir without also altering the modeled inflows and outflows of water in Horsetooth Reservoir that are expected under Alternative 2, as described in the SDEIS. The results of the comparison of the baseline and proposed-conditions models presented in the SDEIS were generated without reducing the inflows and outflows in Horsetooth Reservoir as expected, but rather, with the exact inflows and outflows observed from 2005 to 2010. As the proposed-conditions model is not fully simulating the conditions to be expected under Alternative 2, the proposed-conditions model results cannot be utilized to assess TOC concentrations to be expected under Alternative 2. The SDEIS does not adequately present results showing how Horsetooth Reservoir TOC concentrations would differ as a result of Alternative 2.

The modeling effort must be revised, as discussed above, to provide sufficient confidence as to the accuracy of the predicted TOC concentrations in Horsetooth Reservoir under the District's preferred alternative (Alternative 2) where water is delivered from Glade Reservoir into Horsetooth Reservoir. Specifically, the under predictions errors in the baseline model must be addressed; average TOC concentrations alone must not be used to evaluate impacts, and instead, event TOC

increases must be considered in evaluating impacts; and the proposed-conditions model must incorporate the modeled inflows and outflows of water in Horsetooth Reservoir that are expected under Alternative 2.

5.3 COMMENTS REGARDING IMPACTS TO THE POUDRE RIVER AND WASTEWATER DISCHARGERS

5.3.1 Augmentation Program and Wastewater Discharges

SDEIS Section 2.5.6, Flow Augmentation

Statement: "*The District proposes to include a flow augmentation program to improve Poudre River streamflows, primarily during winter months when flows are low and NISP would generally not be diverting, in Alternative 2 (both the Reclamation Action Option and the No Reclamation Action Option). […]A method of exchange to return the water to Glade Reservoir would be determined between the SDEIS and FEIS.*"

Comment: Diversions of water under NISP will decrease flows in the Poudre River downstream of the Poudre Valley Canal headgate, including at the permitted points of discharge for the Fort Collins Mulberry WRF and the Drake WRF. The SDEIS offers augmentation of flow just below the Larimer & Weld Canal headgate in cool months (1 November – 30 April) and in September as a means of offsetting decreased flows. Augmentation would extend downstream to the headgate of the Timnath Inlet, including past the location of the Mulberry WRF point of discharge. While the augmentation amount (to maintain a minimum of 10 cfs) is specified for the augmentation point just below the Larimer & Weld Canal, the expected augmentation flows reaching the downstream point of discharge for the Mulberry WRF are not specified, and may be lower than current flows, which would cause increasingly stringent effluent limits for Mulberry WRF, with attendant compliance costs. In addition, termination of augmentation at the Timnath Inlet headgate, which is upstream of the Drake WRF, will reduce the amount of dilution flow available at the Drake WRF. The augmentation is not secure for all months or for dry years and does not have a defined beneficial effect downstream at the discharge points for the wastewater treatment facilities of Fort Collins.

If the Corps approves NISP, it must require as a permit condition a requirement that Northern ensures that river flows immediately above the permitted point of discharge for the Mulberry WRF do not drop below 10 cfs, as measured by a continuous data logger at that location, and ensures that river flows immediately above the permitted point of discharge for the Drake WRF do not drop below 2 cfs, as measured by a continuous data logger at that location.

5.3.2 Use of Cottonwood Trees to Reduce Increase in Water Temperatures

SDEIS Appendix F, Section: 4.3.2, Channel and Habitat Improvements

Statement: "*Channel improvements in this reach would seek to narrow and deepen the current channel to be more consistent with current and future low-flow conditions and increase riparian vegetation, including larger plains cottonwoods that would shade the river channel. The effectiveness of these proposed improvements to cool water temperature would be verified during the detailed water quality modeling."*

Comment: The reach of the Poudre River between the Poudre Valley Canal and the Hansen Supply Canal inflow is identified for mitigation through physical habitat improvement. Temperature, which

is regulated by the State for water quality protection, is one of the objectives for mitigation. As discussed above, water temperature in this cool water reach is expected to increase due to reduced flows, although the extent of temperature changes has not been analyzed by the Corps. The stated mechanism for mitigation of temperature in this cool water reach is the creation of new riparian shading.

There are flaws with this approach. First, this reach of the river is above the natural extent of plains cottonwoods which decrease in frequency as one moves upstream through the Fort Collins reach. Upstream of Fort Collins, the forests are dominated by narrowleaf cottonwood. Second, if part of the mitigation approach is to deepen the current channel, the bank topography will need to be adjusted to maintain river-floodplain connectivity. Without a link between the channel and the floodplain, periodic peak flows cannot support the establishment and survival of cottonwoods. Last, while shading is an important component of maintaining cooler temperatures, there will be a lag time (on the scale of multiple decades) before the trees provide this function. So, at minimum, in the interim, the Corps must require another plan to improve water temperatures. Further, without an assessment of the degree to which water temperature would change, there is no basis for assessing how adequate cottonwood shading would be in mitigating the impact.

The proposal to grow trees and then study the effectiveness through water monitoring *after* permitting represents a flaw prevalent throughout the SDEIS, i.e., inappropriately deferring analysis to a much later date when meaningful consideration should take place now. *See Kern*, 284 F.3d at 1075. NEPA prohibits "postpone[ing] analysis of an environmental consequence to the last possible moment." *Pacific Rivers Council*, 668 F.3d at 623. Further, the proposal to grow trees, without any analysis of the effectiveness of that measure, falls far short of NEPA's requirement that mitigation measures must be "reasonably complete." *See Robertson*, 490 U.S. at 352. It also fails to meet the requirements to avoid violation or exacerbation of water quality standards. *See* 40 C.F.R. § 230.10(b)(1).

The Corps must require a more rigorous and realistic program to reduce increased water temperatures resulting from NISP.

5.3.3 Trichloroethylene Plume at Glade Reservoir Forebay

SDEIS Appendix F, Section 3.4.1, Trichloroethylene Plume at Glade Reservoir Forebay

Statement: *"Trichloroethylene contaminated ground water is present beneath the northwest corner of the proposed forebay …The Corps and Northern Water would develop an agreement prior to construction of the forebay that determines the respective responsibilities of the Corps and Northern Water for implementing these mitigation measures."*

Comment: Since 2008, significant progress has been made in remediating the TCE-contaminated groundwater plume at Missile Site 13. Efforts include installation of six additional monitoring wells, installation of 54 injection wells, subsequent oxidative treatments, and testing groundwater samples for the chemicals of concern. The Corps and its consultant, Tidewater, Inc., are reporting success with oxidative treatments in reducing contaminant levels in the plume (Corps 2014_a).

If the Corps approves NISP, it must require as conditions of a permit a definite obligation and clear definition of respective responsibilities of the Corps and Northern to the continue remediation efforts at Site 13 until repeat testing of the monitoring wells shows that the chemicals of concern in groundwater do not exceed the federal maximum contaminant level.

5.4 RESOURCES FOR SECTION 5

- CH2M. 2015. Technical Memorandum: Revised Costs for Impacts to Water Treatment Operations Resulting from NISP Operations. August 6, 2015.
- Dortch, Mark S. 1997. Water Quality Considerations in Reservoir Management. U.S. Army Engineer Waterways Experiment Station
- Northern Water. 2013. Three Lakes Water Quality and Operations … or why did Shadow Mountain turn green. Water Quality Stakeholders Meeting. March 4, 2014
- Smith, Steven B. 1982. Effects of Water Released from Stratified and Unstratified Reservoirs on the Downstream Water Quality. Arkansas Academy of Science Proceedings, Vol 36.
- U.S. Army Corps of Engineers (Corps). 2014. Final Decision Document for F.E. Warren Air Force Base, Former Atlas "E" Missile Site 13, LaPorte, Colorado. U.S. Army Corps of Engineers, Omaha District. September 24.
- U.S. Army Corps of Engineers (Corps 2014_a). 2014. Proposed Plan. Final. Groundwater Remediation at Former Atlas "E" Missile Site 13. July 2014.
- U.S. Army Corps of Engineers. 1997. Assessing Chemical Constituents in Reservoir Tailwaters. Technical Report W-97-1. August 1997.

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SECTION 6: OPERATIONAL COMMENTS

The SDEIS's description of Alternative 2 includes a proposed flow augmentation program ("Augmentation Program") and certain descriptions of other operations, such as deliveries to NISP Participants. However, the Augmentation Program is flawed, includes incorrect assumptions, and raises significant concerns regarding its operations that preclude the ability to rely on the use of the Augmentation Program as minimization or mitigation. The SDEIS also lacks needed analysis and specificity on various aspects of the proposed operations regarding Alternative 2.

6.1 INCLUSION OF THE AUGMENTATION PROGRAM IN ALTERNATIVE 2 ONLY

SDEIS Section 2.5.1, Introduction/Abstract

Statement: "*Augmenting flows in the Poudre River by releases from a designated 3,600-AF release pool in Glade Reservoir with a target of maintaining a 10-cfs flow below the Larimer-Weld Canal headgate in November through April and September 1 through September 30.*"

SDEIS Section 2.5.6, Flow Augmentation

Statement: "*The District proposes to include a flow augmentation program to improve Poudre River streamflows, primarily during winter months when flows are low and NISP would generally not be diverting, in Alternative 2 (both the Reclamation Action Option and the No Reclamation Action Option).*"

SDEIS Section 2.2.7.4, Winter Flow Augmentation in Alternatives 3 and 4

Statement: "*Infrastructure associated with a Reclamation Action Option was eliminated for Alternatives 3 and 4. There would be no pipeline to deliver water from Cactus Hill Reservoir to an upstream location near the diversion for Greeley's Bellvue Filter Plant or the Hansen Supply Canal outlet. Therefore, Alternatives 3 and 4 would not include a flow augmentation program analogous to the proposed for Alternative 2…"*

SDEIS Appendix F, Section 3.2.4, Low Flow Augmentation Release (FW-04)

Statement: "*To further improve the cold water fishery on the Poudre River from the canyon mouth through Fort Collins, Northern Water would integrate a flow augmentation program that would release water from Glade Reservoir to improve Poudre River streamflow from the canyon mouth through Fort Collins.*"

Comment: Alternative 2 (the District's preferred alternative) includes the Augmentation Program, which includes fall and winter releases from Glade Reservoir. No alternative other than Alternative 2 includes proposals analogous or similar to the Augmentation Program. The alternatives other than Alternative 2 thus lack the proposed avoidance and minimization enjoyed by Alternative 2. The SDEIS contains no analysis to explain why the other alternatives cannot contain proposals analogous or similar to the Augmentation Program. When impacts among alternatives are compared in the SDEIS, Alternative 2 consequently shows fewer negative impacts than other alternatives. This skews the analysis of impacts in favor of Alternative 2. Due to the selective inclusion of the Augmentation Program in Alternative 2, the SDEIS thus fails to properly analyze the various alternatives. In violation of NEPA and the CWA, the Corps has not "objectively evaluate[d] [the] reasonable alternatives" to the proposed action. 40 C.F.R. § 1502.14(a).

The SDEIS justifies the omission of an Augmentation Program for Alternatives 3 and 4 by pointing to the lack of a pipeline between the proposed Cactus Hill Reservoir and the Poudre River.

The SDEIS is unclear as to why such a pipeline could not be constructed to allow augmentation releases. Moreover, the Alternatives 3 and 4 could be formulated to include a Reclamation Action Option, which would then necessitate inclusion of a pipeline between Cactus Hill Reservoir and the Poudre River. As further explained in the comment on SDEIS Section 2.2.7.3 below, including a Reclamation Action Option as part of Alternatives 3 and 4 is reasonable considering the large amount of infrastructure required to deliver water from Cactus Hill Reservoir to Participants under a No Reclamation Action Option. Were a pipeline constructed between Cactus Hill Reservoir and the Poudre River pursuant to a Reclamation Action Option, augmentation releases could be provided by the alternative. To the extent that the Augmentation Program is avoidance and minimization, such proposals are necessary.

The Corps inclusion of the Augmentation Program in Alternative 2 only is arbitrary and demands further explanation. To comply with NEPA's requirement that it "rigorously explore and objectively" evaluate all alternatives, the Corps must assess Alternatives 3 and 4 with proposals analogous or similar to the Augmentation Program. *See* 40 C.F.R. § 1502.14(a).

6.2 INCLUSION OF RECLAMATION OPTION IN ALTERNATIVE 2 ONLY

SDEIS Section 2.2.7.3, Reclamation Action Option in Alternatives 3 and 4

Statement: "*The Corps determined delivery of water by exchange, conveyance and/or storage using C-BT Project infrastructure was not practicable due to the location of the Cactus Hill Reservoir in Alternatives 3 and 4. […] The Corps therefore eliminated the Reclamation Action Option for Alternatives 3 and 4 from detailed analysis in the SDEIS.*"

Comment: The SDEIS eliminates a Reclamation Action Option from Alternatives 3 and 4 citing the difficulties in conveying water from Cactus Hill Reservoir at a distance of 30 miles back to Poudre River. No other justification for eliminating a Reclamation Action Option from Alternatives 3 and 4 is provided. In eliminating the Reclamation Action Option from Alternatives 3 and 4, the SDEIS does not provide a proper comparison of the two action alternatives with the proposed action (Alternative 2), particularly on the basis of project cost.

Despite dismissing the Reclamation Action Option out of concerns with pipeline distance and pumping inputs, Alternatives 3 and 4 propose pipeline routes in excess of 30 miles with multiple pumping stations to deliver water from Cactus Hill Reservoir to Participants, at a cost of $144,536,000 (SDEIS Table 2-12). As proposed in the comment above regarding SDEIS Appendix F, Section 3.2.4, constructing a pipeline between Cactus Hill Reservoir and the Poudre River would allow for releases from Cactus Hill Reservoir to be made back to the Poudre River, and would make practicable the Reclamation Action Option as well as the proposed Augmentation Program. Extending such a pipeline to Horsetooth Reservoir, similar to that proposed for Alternative 2, may be necessary to fully execute the Reclamation Action Option. Such a pipeline would raise water quality issues as discussed elsewhere in Fort Collins' comments. A Reclamation Action Option made available by constructing a pipeline between Cactus Hill Reservoir and the Poudre River would eliminate the need to construct the expansive distribution network proposed in Alternatives 3 and 4. As a result, it is possible that the Reclamation Action Option for Alternatives 3 and 4 would not result in a substantial capital cost relative to the total capital cost for the alternatives.

However, in order to properly compare costs between the Reclamation Action and No Reclamation Action Options for Alternatives 3 and 4, the Corps should disclose a comparative cost analysis.

As stated above, to comply with NEPA's requirement that it "rigorously explore and objectively" evaluate all alternatives, the Corps must assess Alternatives 3 and 4 with a Reclamation Action Option. The Corps must also conduct comparative cost analyses, as discussed above.

6.3 AUGMENTATION PROGRAM CONCERNS

SDEIS Section 2.5.6, Flow Augmentation

Statement: "*Water that is reduced to storage becomes the personal property of the District. The District intends to exercise its statutory right to release stored water for delivery downstream for a decreed beneficial use and to inform the state and division engineers that the water released from storage is to be shepherded downstream to a specified diversion point without being diverted by others, as required by Colorado law (Colorado Revised Status [CRS] 37-87-103)[…] For NEPA analyses, it was assumed that the flows would be re-diverted at the Timnath Reservoir (also known as Cache la Poudre Reservoir) inlet canal headgate […] A method of exchange to return the water to Glade Reservoir would be determined between the SDEIS and FEIS.*"

SDEIS Section 2.5.9.1, Sources of Water for Initial Fill of NISP Storage Reservoirs

Statement: "*Until operations of the SPWCP commenced, Glade Reservoir would be wholly dependent on the Grey Mountain water right.*"

SDEIS Appendix F, Section 3.2.4, Low Flow Augmentation Release (FW-04)

Statement: "*The following provides information on the low flow augmentation release program: … the average annual release to maintain this flow is not increased, and the other aspects of the program are not materially different from those proposed herein.*"

Comment: The Augmentation Program lacks the certainty needed to ensure that it will operate as claimed to achieve its goals, and that the intended avoidance and minimization will be accomplished. As discussed below, this lack of certainty creates the likelihood of legal challenges to the Augmentation Program, and/or a determination by the Colorado State and Division Engineers that Augmentation Program cannot be administered and/or is not lawful. Because of these uncertainties, the Corps cannot rely on the Augmentation Program as currently proposed to make the required findings under Section 404(b)(1) Guidelines. Problems with the Augmentation Program would cause Fort Collins to bear more impacts than determined by the Corps in the SDEIS, with limited recourse to resolve such issues. The following are specific issues regarding the Augmentation Program and proposals to address such issues.

6.3.1 Use of Water that Has Been Diverted to Storage

Comment: The SDEIS statements that "[w]ater that is reduced to storage becomes the personal property of the District" and that "[w]ater which is stored in Glade Reservoir would become the property of Northern Water" are not correct under Colorado law, as the Colorado Supreme Court explained in *Bijou Irrigation Dist. v. Empire Club*, 804 P.2d 175, 184 & n.15 (Colo. 1991). The Court explained that "[a]lthough we have stated that water once diverted becomes the personal

property of the appropriator … this somewhat overstates the scope of the right." *Id*. (citation omitted). "[W]ater diverted by exercise of a storage right must ultimately be applied to the beneficial use for which the water was appropriated." *Id*. at 184 n.15 (citations omitted).

Under Colorado law, the District only has the right to use the water it has diverted, into storage or otherwise, pursuant to the terms and conditions of its water rights. *Id*. *See also, e.g., Santa Fe Trail Ranches Prop. Owners Ass'n v. Simpson*, 990 P.2d 46, 54 (Colo. 1999). This legal error renders invalid the SDEIS analysis of the Augmentation Program, as discussed further below.

If NISP is approved, the Corps must require as a condition of the permit that all water rights proposed for use in the Augmentation Program be confirmed to be lawfully available for such proposed use pursuant to the terms and conditions of the subject water right decrees, Colorado law, and current administrative practices of the Colorado State and Division Engineers.

6.3.2 Proposed Use of the Grey Mountain Water Right for Replacement and/or Recreational Uses

Comment: The District proposes in the SDEIS to use water attributable to its Grey Mountain Water Right in the Augmentation Program by delivering water attributable to that water right to the Poudre River and re-diverting the water at the Timnath Inlet Canal headgate for further use. The Grey Mountain Water Right was originally confirmed as a conditional water right in the decree entered in Case No. 1980CW355, District Court, Water Division 1, with the decreed uses being irrigation, municipal, domestic, industrial, and production of electrical power and energy. *See* 80CW335 Decree at ¶3.I.

A decree continuing the conditional Grey Mountain Water Right was entered in Case No. 1989CW122, District Court, Water Division 1 (which had been consolidated with Case Nos. 1985CW206, 1985CW207, 1985CW208, 1985CW209, and 1985CW210). 85CW206 et al. Decree at ¶4 (identifying Case No. 1989CW122 and the Grey Mountain Water Right) and ¶18 (diligence finding). The decreed uses in that case are the same as stated in Case No. 1980CW355. *Id*. at ¶4.C. A decree continuing the conditional Grey Mountain Water Right was entered in Case No. 2001CW197, District Court, Water Division 1. The decreed uses in that case are the same as stated in Case No. 1980CW355 and Case No. 1989CW122. 01CW197 Decree at ¶7.F.

The Grey Mountain Water Right was changed in Case No. 2003CW405, District Court, Water Division 1, to add Glade Reservoir as an alternate place of storage and to add three alternate points of diversion; no changes to the decreed uses of the Grey Mountain Water Right were approved in that case. 03CW405 Decree at ¶¶4, 7.A. The decreed uses in that case are the same as stated in Case No. 1980CW355, Case No. 1989CW122, and Case No. 2001CW197. 03CW405 Decree at ¶6.b.e. There have been no other changes of the Grey Mountain Water Right. The Grey Mountain Water Right has not been decreed for reuse or successive use.

The most recent decree continuing the conditional Grey Mountain Water Right was entered in Case No. 2011CW242, District Court, Water Division 1, and identifies the decreed uses of the water right as irrigation, municipal, domestic, replacement, recreation, industrial, and production of

electrical power and energy. 11CW242 Decree at ¶7.1.7. In that case as in previous diligence cases (Case No. 89CW122 and Case No. 2001CW197), the District only invoked the Court's jurisdiction to seek findings of reasonable diligence and to continue the conditional Grey Mountain Water Right for another diligence period. *See* C.R.S. §37-92-301(4)(a)(I); *Dallas Creek Water Co. v. Huey*, 933 P.2d 27, 36-37 (Colo. 1997). The Court had no jurisdiction in Case No. 2011CW242to change the uses of the Grey Mountain Water Right, including no jurisdiction to add new uses to the Grey Mountain Water Right. *See* C.R.S. 37-92-302; *Matter of Application for Water Rights v. Columbine Assoc.*, 993 P.2d 483, 489 (Colo. 2000).

The only currently decreed uses of the Grey Mountain Water Right that could potentially relate to the Augmentation Program are replacement and recreation. However, as discussed above, any replacement or recreation use of the Grey Mountain Water Right is not a lawful use of that water right because the Court had no jurisdiction to add such new uses. Such jurisdictional defects can be raised at any time. *E.g., id*. at 488. To the extent that the use of the Grey Mountain Water Right's proposed use in the Augmentation Program is replacement or recreation use, such proposed use may not be administered by the Colorado State and Division Engineers and is vulnerable to a legal challenge, unless the water right is changed in proceedings before the District Court, Water Division 1. C.R.S. §37-92-305(3)(a).

If the Corps approves NISP, it must require as a condition of the permit that the Grey Mountain Water Right may not be included in the Augmentation Program unless and until the District receives judicial approval for a change of use of the Grey Mountain Water Right pursuant to C.R.S. §37-92-305(3)(a), or temporary approval from the State Engineer for a change of use of the Grey Mountain Water Right pursuant to C.R.S. §37-92-308 or successor statutes, such that the Grey Mountain Water Right can be used in the Augmentation Program. Provided that such a proposed change of water right were shown to not adversely affect Fort Collins' water rights, Fort Collins would likely not oppose such a change of the Grey Mountain Water Right. If the Corps must rely on the Augmentation Program to make its LEDPA and other findings, then no action under a permit shall be allowed unless and until the District receives such approvals.

The District could also include other water rights in the Augmentation Program that are currently legally available for the appropriate uses. The District's water rights decreed in Case No. 1992CW130, District Court, Water Division 1, may be such water rights. However, to the extent that such water rights are not or will not be available when needed under the Augmentation Program, any approval of NISP must require the District to acquire ownership of, or the right to use other water rights and to dedicate them to the Augmentation Program. For instance, various senior water rights have been previously changed for various new uses and decreed for storage in Glade Reservoir, which may be a source of water rights for the Augmentation Program. Other water rights are used to import water into the Poudre River Basin, which may be a source of water rights for the Augmentation Program. Further, water diverted during "free river" conditions, when there is no downstream call, could be attributed to a junior and undecreed "free river" water right (and not the Grey Mountain Water Right) and may be available for use in the Augmentation Program.

The above concerns regarding the uses of the Grey Mountain Water Right would also be addressed if the District were simply relinquishing water from storage to the stream or if the water

were being delivered in the Poudre River stream channel for re-diversion (directly or by exchange) for a decreed beneficial use downstream, both assuming that the water so relinquished would reach the desired location(s), as discussed further below.

Whichever other water rights are used, or however the Augmentation Program may be re-formulated, any approval of NISP must require the District to identify and substantiate the legal and physical availability of water under such water rights for use in the Augmentation Program to guarantee that the proposed Augmentation Program will be achievable.

6.3.3 Proposed Re-Use and Successive Use of Water Attributable to the Grey Mountain Water Right

Comment: Even if the Grey Mountain Water Right can be used for replacement or recreation use in the Augmentation Program, its proposed reuse and successive use, as described in the SDEIS, is in violation of the decrees confirming the water right. Water attributable to a tributary water right, like the Grey Mountain Water Right, that has not been delivered into an unconnected stream system can only be used once, unless it is decreed for reuse and successive use. *WSSC v. Curtis*, 733 P.2d 680 (Colo. 1987). *See also Denver v. Fulton Irrigating Ditch Co.*, 506 P.2d 144, 146-47, 179 Colo. 47, 52 (1972) (defining reuse and successive use). If not decreed for reuse or successive use and not delivered into an unconnected stream system, the return flows from the first use of the water can only be re-diverted under a separate water right. *Santa Fe Trail*, 990 P.2d at 54.

The Grey Mountain Water Right is not decreed for reuse or successive use and water attributable to the water right will only be used within the South Platte River basin, which includes the Poudre River basin. Therefore, once water attributable to the Grey Mountain Water Right is used the first time, such as delivering it to the Poudre River for replacement or recreation use in the Augmentation Program, the District has no right to reuse and re-divert it under the Grey Mountain Water Right. The District can instead only re-divert the water under a separate water right. However, no such other water right is identified in the SDEIS.

If the Corps approves NISP, it must require as a permit condition that water attributable to the Grey Mountain Water Right may not be reused or successively used under the Augmentation Program, or otherwise, unless and until the District receives judicial approval for a change of use of the Grey Mountain Water Right pursuant to C.R.S. §37-92-305(3)(a), or temporary approval from the State Engineer for a change of use of the Grey Mountain Water Right pursuant to C.R.S. §37-92-308 or successor statutes, such that water attributable to the Grey Mountain Water Right can be reused and successively used. Provided that such a proposed change of water right were shown to not adversely affect Fort Collins' water rights, Fort Collins would likely not oppose such a change of the Grey Mountain Water Right.

To the extent that the District intends to re-divert water used in the Augmentation Program, the District could include other water rights in the Augmentation Program that are legally available for reuse and successive use. The District's water rights decreed in Case No. 1992CW130, District Court, Water Division 1, may be such water rights. However, to the extent that such water rights are not or will not be available when needed under the Augmentation Program, any approval of NISP

must require the District to acquire ownership of, or the right to use other water rights and to dedicate them to the Augmentation Program. For instance, various senior water rights have been previously changed for reuse. Other water rights are used to import water into the Poudre River Basin, which may be a source of reusable water. Further, water diverted during "free river" conditions when there is no downstream call could be attributed to a junior "free river" water right (and not the Grey Mountain Water Right) and may be available for reuse and successive use.

Whichever other water rights are used or however the Augmentation Program may be re-formulated, the Corps must require the District to identify and substantiate the legal and physical availability of water under such water rights for reuse and successive use in the Augmentation Program to guarantee that the proposed Augmentation Program will be achievable.

6.3.4 No Analysis of Substitutions and Exchanges on Augmentation Program Flows

Comment: The SDEIS statements that CRS §37-87-103 entitles the District to use the natural stream for the delivery of water without others using such water are incorrect. Other water users may divert such water provided that they deliver a substitute supply above the point of re-diversion. *E.g.,* C.R.S. §37-92-305(5); *Empire Lodge Homeowners' Ass'n v. Moyer*, 39 P.3d 1139, 1153-55 (Colo. 2001). As described in the SDEIS, the District currently lacks a legal mechanism to ensure that water proposed to be delivered from Glade Reservoir to the Timnath Inlet Canal headgate is protected from intervening diversions, substitutions, and exchanges. Section 3.2.5 of Appendix F of the SDEIS confirms the District's current inability to protect such flows. The SDEIS contains no analysis of how the District will ensure that such deliveries of water will actually remain in the Poudre River to avoid and minimize the reduction of flows.

To comply with NEPA and the CWA, the Corps must require an analysis be performed to demonstrate that deliveries of water under the Augmentation Program will actually remain in the Poudre River to avoid and minimize the reduction of flows. The Corps must require additional measuring stations to establish that deliveries of water under the Augmentation Program are not diverted and substituted. To the extent that the Augmentation Program constitutes mitigation, under the Section 404(b)(1) Guidelines, the Corps' mitigation must "have been demonstrated to be effective in circumstances similar to those under consideration." 40 C.F.R. § 230.75(d). *See Kentucky Riverkeeper v. Rowlette*, 714 F.3d 402, 412 (6th Cir. 2013) (The Corps' "mere listing of mitigation measures and processes, without any analysis, cannot support a cumulative impacts determination."). Any approval of NISP must require a high level of certainty that the water delivered to the stream under the Augmentation Program will actually reach its intended destination so as to guarantee that the proposed Augmentation Program will be achievable. In violation of NEPA and the CWA, the SDEIS fails to demonstrate that the Augmentation Program would be viable and effective to meet its goals. *See Robertson*, 490 U.S. at 352.

6.3.5 No Analysis of the Ability of the District to Deliver Flows in the Augmentation Program Past All Intervening Headgates

Comment: The SDEIS indicates that water in the Augmentation Program would be delivered to the Poudre River "via a pipeline to the river upstream of the Larimer County Canal headgate." This

would mean that the Colorado State and Division Engineers would need to shepherd such water past the following diversion structures to reach the Timnath Inlet Canal headgate: (1) the diversion structures for the Larimer County Canal headgate; (2) the diversion structures for Watson Lake; (3) the diversion structures for the Jackson Ditch (a.k.a Dry Creek Ditch); (4) the shared the diversion structures for the New Mercer Ditch, Larimer County No. 2 Ditch, Little Cache la Poudre Ditch, and Taylor and Gill Ditch; (5) the diversion structures for the Arthur Ditch; (6) the diversion structures for the Larimer and Weld Canal; and (7) the diversion structures for the Lake Canal. The majority of these diversion structures lack necessary measurement structures to ensure that water can be shepherded past them, especially during periods of low flow or when the ditch is diverting the entire flow of the river.

While the NISP Proposed Conceptual Mitigation Plan (Appendix F, Section 4.4.3) provides for multi-objective retrofits for three of the above diversion structures (the Watson Lake, Terry Lake, and Larimer and Weld diversions) that may allow for streamflow monitoring, other diversions listed above will not have associated streamflow monitoring, and thus cannot be ensured to bypass flows attributable to the Augmentation Program. The SDEIS contains no analysis of how the District will ensure that such deliveries of water in the Poudre River will actually reach the desired downstream location.

To comply with NEPA and the CWA, an analysis must be performed to establish that deliveries of water under the Augmentation Program will be delivered past all intervening headgates so as to guarantee that the proposed Augmentation Program will be achievable.

6.3.6 Augmentation Program During Times of Drought

Comment: The SDEIS indicates that releases of water under the Augmentation Program may not occur under extreme drought conditions when Glade Reservoir storage contents are less than 30% of capacity. According to Figure 3.15 of the SDEIS Operations Plan Report, Glade Reservoir would drop below 30 percent of capacity (or 51,000 acre-feet of the proposed 170,000 acre-feet) in the late 1950s, the mid-1990s and the mid-2000s conditions– indicating that the Augmentation Program may not occur three times during the study period of 1950 through 2005. However, a comparison of pre- and post-augmentation flows (assessed through PPP and final flow data provided by the Corps) indicates the augmentation flows occurred during these same years and were thus included in the impacts analysis, which therefore improved environmental outcomes. It is likely that such drought conditions will coincide with low flows in the Poudre River, including flows less than 10 cfs below the Larimer and Weld Canal headgate. However, by its own proposed terms and conditions the Augmentation Program would not operate when most needed. The failure of the Augmentation Program to address the effects of diversions to Glade Reservoir when the effects are being most intensely experienced undermines the purposes of the Augmentation Program. The impacts from the Augmentation Program must be specifically addressed.

The Corps must require that the Augmentation Program operate at all times, including during extreme drought years when augmentation flows are needed the most, in order to address impacts, as claimed.

6.3.7 No Analysis of Subsequent Exchanges Using Augmentation Program Flows

Comment: The SDEIS states that water released from Glade Reservoir for the Augmentation Program will be returned to Glade Reservoir, possibly through the use of exchanges. However, the actual method of exchange to return the water to Glade Reservoir is not specified in the SDEIS.

The SDEIS fails to explain how such exchanges would occur under the subject water right decrees. For example, the decree entered in Case No. 1992CW130, District Court, Water Division 1, approved certain conditional appropriative rights of exchange, with findings of diligence for those conditional exchanges having been entered in Case No. 2011CW241, District Court, Water Division 1. The sources of water for those exchanges are (1) water diverted under the SPWCP water rights confirmed in Case No. 1992CW130 and (2) water from other reusable sources, provided that such use is allowed by another decree and is agreed to by the sources' owners. As discussed above, water attributable to the Grey Mountain Water Right is not currently legally available for use as a source of water for these exchanges. The SDEIS contains no analysis of these aspects of these unspecified exchanges.

Exchanging augmentation releases back to Glade Reservoir has the potential to reduce Poudre River streamflows along the 12 mile reach through Fort Collins between the proposed augmentation release point and the Timnath Inlet Canal headgate, and may result in impacts to the Poudre River's aquatic environment, which are discussed elsewhere in these comments.

To comply with NEPA and the CWA, the SDEIS must clearly describe the method and frequency of which these exchanges will be conducted, and must consider and quantify the environmental impacts with associated streamflow depletions from all exchanges.

6.4 IMPACTS ON THE PVP

SDEIS Section 2.5.5.2.1, Deliveries to Participants / Reclamation Action Option

Statement: "*Fort-Collins-Loveland Water District (3,000 AFY) would use its own capacity in the existing Pleasant Valley Pipeline by direct connection from Glade Reservoir.*"

Comment: Alternative 2 (the District's preferred alternative) includes a direct connection between Glade Reservoir and the PVP. Fort Collins and the Tri-Districts (the East Larimer County Water District, the Fort-Collins-Loveland Water District, and the North Weld County Water District) share use of the PVP to deliver water to Fort Collins' and the Tri-Districts' respective water treatment facilities. As discussed in other sections of these comments, the water released from Glade Reservoir will be of a lower quality than other water that has historically been delivered through the PVP. As one example, water released from Glade Reservoir may have high levels of TOC. Releases high in TOC from Glade Reservoir to the PVP will degrade the quality of raw water to Fort Collins treatment plant and necessitate more intensive treatment, as discussed below.

Unless the quality of water released from Glade Reservoir and delivered to the PVP is acceptable to Fort Collins, Fort Collins may exercise its rights to withhold approval of such use of the PVP pursuant to Paragraph 3.a of the Allotment Contract with the Northern Colorado Water

Conservancy District, acting by and Through the Pleasant Valley Pipeline Water Activity Enterprise and the City of Fort Collins Water Utility Enterprise for Capacity in the Pleasant Valley Pipeline, dated February 28, 2003.

The measures and alternative analysis required in Section 5.2.5 of these comments apply here as well. The Corps must also analyze how Alternative 2 would work without this connection.

6.5 HOW DELIVERIES TO NISP PARTICIPANTS ARE TO BE MADE

SDEIS Section 2.5.5.2.1. Deliveries to Participants / Reclamation Action Option

Statement: "*Eaton, Severance, and Windsor (5,900 AFY) would be by direct pipeline connection from Glade Reservoir to the Soldier Canyon Filter Plant.*"

SDEIS Appendix F, Section 3.2.1, Avoid Munroe Canal Diversions (FW-01)

Statement: *"The original Draft EIS considered using the Munroe Canal for two operations associated with NISP. […] The exchange has been eliminated in the SDEIS analysis, and replaced with a new pipeline directly from Glade Reservoir to the Pleasant Valley Pipeline (for Fort Collins-Loveland Water District) and a new pipeline directly from Glade Reservoir to the Soldier Canyon Filter Plant (for Eaton, Severance and Windsor)."*

Comment: The SDEIS mentions that the NISP participants of Eaton, Severance, and Windsor would receive water via a direct connection between Glade Reservoir to Soldier Canyon Filter Plant. However, the Corps must provide additional information regarding the pipeline(s), including, but not limited to, its route(s), what land(s) would be disturbed by its construction and use, how the proposed pipeline(s) would be constructed and operated, the socioeconomic impacts of such pipeline(s), and whether environmentally sensitive or affected areas would be involved. To comply with NEPA and the CWA, the SDEIS must evaluate the impacts of any delivery pipeline(s). If the deliveries are proposed to be made through the PVP, Fort Collins' comments above regarding the PVP apply.

6.6 RESOURCES FOR SECTION 6

- Decrees, District Court, Water Division 1: Case No. 1980CW335; Consol. Case Nos. 1985CW206, 1985CW207, 1985CW208, 1985CW209, 1985CW210, 1989CW122; Case No. 2001CW197; Case No. 1992CW130; Case No. 2003CW405; Case No. 2011CW242.

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SECTION 7: CHANNEL STRUCTURE, STORM WATER, FLOODPLAIN, AND HYDRAULIC COMMENTS

Fort Collins is located in the Poudre River basin, and thus, the Poudre River is the primary conduit for drainage, storm water, flood waters, and other flows. As discussed herein, NISP's alterations to, among other things, stream morphology and sediment transport, will adversely affect Fort Collins' use of the Poudre River for these services.

The City of Fort Collins' Strategic Plan recognizes the importance of the Poudre River to environmental health, community safety, recreation and economic health. Strategic Objective 4.1 call for Fort Collins to improve and protect wildlife habitat and the ecosystems of the Poudre River and other urban streams. This plan also recognizes that the Poudre River has multiple and, at times, competing demands from various users, while at the same time being a natural amenity and ecosystem to be carefully nurtured and maintained. The plan thus directs that, given multiple stresses on the ecology of the Poudre River, there will be a need for local and regional investments if river health is to be maintained and/or improved. The plan also identifies that a healthy Poudre River supports the economy of downtown Fort Collins.

The stream morphology and sediment transport analysis in the SDEIS contain some important analyses that were originally omitted from the DEIS. However, these analyses and the conclusions drawn from them are fundamentally flawed because the sediment transport modeling underpinning the new analyses is incorrect, as discussed below. Thus, without further and independent evaluation of hydraulic modeling by the Corps, the impacts of the proposed action cannot be determined.

In addition to errors in the modeling, the SDEIS fails to properly analyze likely extent of channel changes, sediment deposition, and other impacts to habitat quality that are not well supported by the analyses and evidence provided in the SDEIS. These fundamental flaws in the sediment transport analyses result in underestimation of NISP impacts to various river characteristics including channel capacity to convey floods, aesthetics, and physical habitat for aquatic life.

7.1 NO ANALYSIS OF COSTS AND FLOODING RISKS IN FORT COLLINS

SDEIS Section 3.4.2.4, Morphologic and Sediment Transport Conditions Upstream of I-25

Statement: "*Stream morphology in the upstream reaches from the canyon through Fort Collins to the vicinity of I-25 is flood-dominated morphology. […] Deposition and vegetation encroachment will continue in discrete areas – probably at a similar rate to the current unless some unpredicted intrinsic threshold is reached or some other change occurs such as an invasion of reed canary grass or a substantial increase in sediment supply from upstream sources.*"

Comment: The SDEIS fails to address how much additional sediment is expected to accumulate in the Fort Collins reach of the Poudre River following construction of NISP. This information is needed to assess the cost of damages and other impacts to Fort Collins on an annual basis to determine proper compensatory mitigation. Based on historic sediment removal projects in Fort Collins, the cost to remove sediment from the river can vary from $20 to $80 per ton depending on

location, hauling distance, equipment used, and type of material. These efforts also have environmental impacts that must be considered when evaluating the impacts of NISP.

The SDEIS geomorphic analysis fails to properly assess the potential for decreased flood conveyance capacity and increased flood depths associated with channel aggradation, narrowing, and vegetation encroachment within Fort Collins. This is a point that must be addressed with regard to public safety and potential costs to Fort Collins. Fort Collins has an interest in maintaining a healthy and functional river system which retains an open channel capable of transporting storm water and flood flows. The process of sediment deposition without the process of sediment flushing through scouring and erosion will lead to vegetation encroachment and subsequent channel constriction. These changes will significantly change the Poudre River's function as a conveyor of flood water and result in flow obstruction, increased flood stages and possibly greater flood damage in the future.

The SDEIS's characterization that the Poudre River transitions from a sediment "supply limited" to sediment "transport limited" system at its crossing of I-25 is a generalization that fails to address the impacts of NISP on specific reaches of the Poudre River throughout Fort Collins. More detailed analysis and mitigation actions for specific reaches within Fort Collins must be developed prior to approval of NISP. Reduction of runoff peak flows will likely increase sedimentation within Fort Collins, thereby exacerbating flooding risk.

Under NEPA and the CWA, the Corps must take a hard look at the additional sediment accumulation and associated impacts in the Fort Collins reach of the Poudre River that may be caused by the proposed action. It must also determine and document the mitigation measures that would adequately address those impacts. *See* 40 C.F.R. § 230.11. As stated above, unless these measures are properly identified and addressed, the Corps "has not met its legal obligation and any proposed mitigation measures dependent upon an incomplete environmental impact analysis necessarily fail . . . ." *Ohio Valley Envtl. Coalition*, 479 F.Supp.2d at 627.

7.2 LACK OF SUPPORT FOR CONCLUSIONS OF MINOR IMPACTS

SDEIS Section 4.4.3.1.1, Poudre River Flows and Flooding

Statement: "*Widespread 20% to 35% predicted reductions in flows around the 1% to 5% flow range may have an impact on channel forming discharges and channel morphology.*"

SDEIS Section 4.4.3.1.1, Poudre River Sediment Transport

Statement: "*Under Alternative 2, it is possible that the reduced incidence of flows around the current 1- and 2-year flood level would increase the likelihood that colonizing vegetation can become established before it is scoured out by subsequent high flows. Channel contraction can then be driven by vegetation in the absence of abundant sediment.*"

SDEIS Section 4.4.7.1, Impact Summary Poudre River, Table 4-53, Page 4-173

Statement: "*Effects of Alternative 2 on geomorphology and sediment transport may result in a detectable change that is considered to be minor in the reaches upstream of I-25. Downstream of I-25 Alternative 2 effects may result in a clear detectable change that is considered to be moderate.*"

Stream Morphology and Sediment Transport Cache La Poudre River Mainstem, Final Project Effects Report, Section 1.5.1, Trajectory Upstream of I-25, Page 1-8

Statement: "*Despite the relative stability of the existing condition, there is still a propensity to aggradation, constrained in the current condition by the limited availability of incoming sediment compared to the ability of the channel to transport it. Deposition and vegetation encroachment will continue in discrete areas – probably at a similar rate to the current…*"

Comment: The SDEIS generally underestimates the likelihood of sediment deposition, vegetation encroachment, channel shrinking, and lost flood conveyance through Fort Collins. On this issue, the SDEIS contains numerous examples of conclusions that run contrary to presented data and analyses with respect to the current trajectory and likely response of the river channel in Fort Collins. There also are numerous examples of the SDEIS contradicting itself. Under NEPA and the CWA, the Corps' explanation is not "satisfactory" if the "explanation for its decision . . . runs counter to the evidence before" it. *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983).

As one example, the Stream Morphology and Sediment Transport Cache La Poudre River Mainstem, Final Project Effects Report, dated August 15, 2014 ("Effects Report"), at pages 1-7, states that "[u]pstream of I-25 the river channel is larger and steeper but there is also a strong aggradational tendency associated with reduced flows." Yet the Effects Report ultimately concludes that the river through Fort Collins will remain "supply limited" and unresponsive relative to downstream reaches because there is not enough sediment supply to cause any more than "minor" aggradation. In contrast, the Poudre River downstream of I-25 is deemed "transport limited" and more at risk, owing to its relatively high sediment supply (e.g., Table 4-53, p. 4-172 of main SDEIS document).

As another example, the SDEIS identifies widespread 20% to 35% reductions in flows, as quoted above, early in Section 4 of the SDEIS. SDEIS, Section 4.4.3.1.1 at 4-157. However, by the end of Section 4 in the SDEIS, this impact is marginalized on the basis of a supply limited condition upstream of I-25. A supply limited condition does exist upstream of I-25 that does not preclude episodes of high sediment loading, such as after a wildfire or slope instability somewhere in the watershed. Nevertheless, the reduction of high flows by NISP will clearly impact the ability of the channel to flush excess sediment through Fort Collins when these events do occur. More specifically, the SDEIS concluded that "[f]or the 26-year period of record, 23 flushing events under Current Conditions lasting for 325 days in total would become 16 flushing events under Alternative 2 lasting for 222 days in total." SDEIS, Section 4.4.3, page 4-158. This reduced flushing potential under NISP will impact channel conditions, particularly after high sediment producing events, resulting in changes in channel morphology. And yet the discussion in this section concludes with a statement that the effects of Alternative 2 on geomorphology and sediment transport is "minor in the reaches upstream of I-25." (Table 4-53, page 4-173).

As one further example, the SDEIS identifies the possibility that reduced flows will increase vegetation and channel contraction, as quote above, early in Section 4. SDEIS, Section 4.4.3.1.2 at 4-160. However, by the end of Section 4 this possible impact is largely overlooked given the conclusion of "minor" impacts (Table 4-53, page 4-173). With the substantially reduced flow

conditions under NISP, vegetation encroachment will occur on sand and gravel bars that were previously more frequently inundated. The supply limited condition upstream of I-25 may reduce the potential of fluvial sediment deposits on exposed bars that would facilitate vegetation encroachment, however, some sediments will still accumulate (including Aeolian sediment) and vegetation encroachment will occur in the Fort Collins reach under NISP.

The above conclusions from the SDEIS are not supported by evidence and are in conflict with general principles of stream morphology. First, aggradation or deposition of sand and fine sediment depends on the supply of sediment relative to the capacity of the river to transport the supplied sediment, not just the supply of sediment. If capacity to move sediment is sufficiently reduced, a "supply limited" channel will shift to transport limitation and sediment accumulation will accelerate. Second, the vast majority of the sand and coarse sediment load that is supplied to the Timnath and Windsor reaches of the Poudre first flows through Fort Collins. Third, Alternative 2 would decrease the sediment transport capacity of the river through Fort Collins to a level below that currently found in the Timnath reach that extends four miles downstream of I-25. The tables below summarize modeling results compiled from the Effects Report to compare current conditions in Timnath and Windsor with Alternative 2 conditions in Fort Collins.

Excerpt from Table 3.2 Exceedance Probability Discharge, Alternative 2 vs Current Conditions (Effects Report p 3-5):

Location	Node	CTP Scenario	Exceedance	Flow (cfs)
Fort Collins	17	Alt 2	1% flow	2023
Fort Collins	20	Alt 2	1% flow	2037
Fort Collins	23	Alt 2	1% flow	2089
Timnath	32	Current	1% flow	2200
Timnath	34	Current	1% flow	2297
Windsor	35	Current	1% flow	2358
Fort Collins	17	Alt 2	2% flow	1348
Fort Collins	20	Alt 2	2% flow	1316
Fort Collins	23	Alt 2	2% flow	1285
Timnath	32	Current	2% flow	1603
Timnath	34	Current	2% flow	1674
Windsor	35	Current	2% flow	1711

Excerpt from Table 3.11 Reach Averaged Sediment Transport Potential using SIAM – Alternative 2 vs Current Conditions (Effects Report p 3-32):

Difference between Current average transport of sand and gravel in Fort Collins as compared to Current in Timnath	15%
Difference between Current average sand transport in Fort Collins as compared to Current in Timnath	18%
Difference between Alt 2 average transport of sand and gravel in Fort Collins as compared to Current in Timnath	-10%
Difference between Alt 2 average sand transport in Fort Collins as compared to Current in Timnath	-12%

Note: Data in the table above compares 6 out of 7 SIAM reaches in Fort Collins (omitted outlier reach FC 3) with Timnath A reach which extends 4 miles below I-25.

These SIAM modeling results indicate that Alternative 2 would reduce sediment transport capacity of the Poudre River in Fort Collins to levels below the transport capacity currently witnessed in Timnath. The Poudre River in Timnath immediately below I-25 is described in the Stream Morphology and Sediment Transport Cache la Poudre River Mainstem Baseline Report, dated May 2013 ("Baseline Report"), as being dominated by fine sediment deposition which reinforces vegetation encroachment and loss of channel flood conveyance. (Note that the SIAM analysis still uses the Meyer-Peter Mueller transport equation which underestimates differences in sediment transport capacity for river bed particles near the threshold of motion). Ultimately, the SDEIS presents no meaningful evidence to support the conjecture that the Poudre River in Fort Collins will sustain only "minor" aggradation, and remain supply limited given reductions of sediment transport capacity of approximately 30-35% in some reaches (Table 7.12 on p. 7-33 in the Effects Report). Instead, the SIAM hydraulic modeling results indicate that the Poudre River in Fort Collins is on the cusp of shifting to a flow and sediment regime similar to current conditions in Timnath downstream of I-25.

The SDEIS only addresses the risk of lost flood conveyance downstream of I-25 (SDEIS main report p. 4-159). This implies that effects in Fort Collins will be negligible despite increased risk of sediment accumulation, channel shrinking, woody vegetation encroachment, and increased potential of debris impacts to flood conveyance at bridges and other hydraulic structures. This implicit conclusion is not supported with any empirical or modeling evidence in the SDEIS documentation. Although Alternative 2 will likely result in increased vegetation encroachment and reduce channel conveyance capacity in the absence of periodic channel maintenance flows, it would not reduce the magnitude of the most extreme flow events delivered to the Fort Collins river segment (e.g., 50-100+ year floods). This means that 100 year and larger flood stages could appreciably increase and create a public safety and cost issue for Fort Collins. Additional analysis is needed to address the risk of lost flood conveyance in Fort Collins.

NEPA requires an "accurate scientific analysis." 40 C.F.R. § 1500.1. "For this reason, agencies are under an affirmative mandate to 'insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements …" *Envtl. Defense v. Corps of Engineers*, 515 F. Supp. 2d 69, 78 (D.D.C. 2007). To address these deficiencies, the Corps must conduct further analyses in a revised DEIS or supplement to the SDEIS. Under NEPA and the CWA, the Corps "must articulate why it has made its decision with sufficient clarity that others affected by the decision and the Courts can understand it." *Crutchfield v. United States Army Corps of Engineers*, 154 F. Supp. 2d 878, 899 (E.D. Va. 2001).

7.3 INCORRECT ANALYSIS OF STREAM MORPHOLOGY AND SEDIMENT TRANSPORT

Effects Report, Section 3.6.2, Spells Analysis at Representative Cross Sections for Flows that Initiate Motion of Bed Material, Page 3-9

Statement: "*The spells analysis suggests that the time between occurrences of bed material motion is not generally increased under Alternative 2, so to the extent that colonization of vegetation is dependent on the existence of a stable substrate, no significant change in the rate or extent of new colonization is expected.*"

Comment: SDEIS analyses of sediment mobilization use inappropriate methods to estimate the flows at which river bed flushing and rejuvenation occur. The equation from Ackers and White (1973; p.6-10 of Baseline Report) was not intended for this application nor calibrated for the prevailing grain sizes in the Poudre River in Fort Collins. The equation is used to adjust shear stress output from HEC-RAS modeling. This erroneous application of shear stress "partitioning" biases the results such that it appears that there is little sediment flushing occurring under baseline conditions, and ultimately masks the net reduction in sediment flushing that occurs under Alternative 2.

To investigate this bias, Fort Collins re-ran the HEC-RAS model used in the SDEIS analyses and computed four standard estimates of shear stress using main channel shear, hydraulic depth and friction slope, maximum depth and friction slope, and a well-known standard relationship for estimating grain shear in gravel bed rivers. All these accepted methods result in significantly greater sediment flushing and mobilization potential compared to values reported in the SDEIS. *See* Bledsoe, B. (2015). Technical Memorandum: Northern Integrated Supply Project - Supplemental Draft EIS Flushing Flow Analysis.

This one source of bias in shear stress estimates produces errors averaging 52% with some errors exceeding 80% at the SDEIS "representative" cross-sections that were selected in the Fort Collins reach. Furthermore, the selection of single "representative" cross-sections to represent several thousand feet of river channel in the SDEIS is not explained and justified. Based on analysis of HEC-RAS model outputs, some of these sections appear to not be representative of reach wide conditions due to their hydraulic characteristics proximity hydraulics structures (see for example the "representative" cross-section at station 231,351 which is located immediately upstream of a bridge in Fort Collins).

The Corps must conduct additional studies using appropriate methodologies to address the deficiencies described above, specifically with respect to using standard estimates of shear stress using main channel shear, hydraulic depth and friction slope, maximum depth and friction slope, and a well-known standard relationship for estimating grain shear in gravel bed rivers, as opposed to using the equation from Ackers and White identified above.

7.4 INCORRECT DATA ON GRAIN SIZE

Effects Report, Section 3.6.2, Spells Analysis at Representative Cross Sections for Flows that Initiate Motion of Bed Material,Ppage 3-9

> Statement: "*The spells analysis suggests that the time between occurrences of bed material motion is not generally increased under Alternative 2, so to the extent that colonization of vegetation is dependent on the existence of a stable substrate, no significant change in the rate or extent of new colonization is expected.*"

Comment: The grain size data that were chosen to estimate NISP effects on river bed flushing and mobility are biased toward the coarsest material relative to data obtained through more intensive substrate monitoring conducted by Colorado State University ("CSU"). By utilizing the coarsest available grain size data (collected using sampling methods that yield less accurate estimates than

the CSU samples), the SDEIS analyses are further biased (in conjunction with the first point in the paragraph above) toward underestimation of differences in how often and effectively the river bed is cleaned by current flows versus Alternative 2 flows.

The CSU grain size data were provided to the Corps and NISP consultants and are acknowledged and reported in the Baseline Report (Figure 3.8, p. 3-13 of Baseline Report). However, these data do not appear in subsequent grain size plots and analyses. As a result of the combined influence of underestimated shear stresses and selection of very coarse grain sizes, as described in the previous comment, the SDEIS generally contends that extreme flows are required for river bed cleaning in Fort Collins. By contrast, standard methods indicate that sediment can be flushed and the river bed rejuvenated with flows of 2,000 to 3,500 cfs at most locations. Bledsoe, B. (2015). Technical Memorandum: Northern Integrated Supply Project - Supplemental Draft EIS Flushing Flow Analysis. This is important because Alterative 2 can divert 1,000 cfs. This amount of flow diversion would be the difference between flushing and not flushing the river bed in many years. These errors propagate through all the other analyses of physical-biological linkages (e.g., modeling future trout habitat or the risk of algae proliferations). The lack of bed mobility has broad implications to the Poudre River ecosystem as discussed throughout the comments herein.

NEPA requires that the Corps conduct additional studies using appropriate methodologies to address the deficiencies described above, specifically with respect to the use of CSU grain size data and the determination of flushing flows.

7.5 AUGMENTATION PROGRAM'S ABILITY TO MAINTAIN THE ENVIRONMENT

SDEIS Appendix F, Section 3.2.4, Low Flow Augmentation Release (FW-04)

Statement: "*To further improve the cold water fishery on the Poudre River from the canyon mouth through Fort Collins, Northern Water would integrate a flow augmentation program that would release water from Glade Reservoir to improve Poudre River streamflow from the canyon mouth through Fort Collins.*"

Comment: The Augmentation Program is narrowly conceived. An extensive body of science is clear that a range of flows from low to high is necessary for maintenance of the environment. At present, the plan only proposes the maintenance (at most times) of 10 cfs.

There is no proposal for impacts to flushing flows, which might include periodic larger flow releases, and/or releases after a major sediment producing event in the watershed such as wildfire or landslide activity. High flows are essential to reduce adverse impacts that will occur from sediment deposition, channel narrowing from vegetation encroachment, and reduced biological functioning of the river through Fort Collins.

Although the proposed Augmentation Program is welcome, 10 cfs is not sufficient for its purposes. According to widely accepted instream flow methods such as Colorado Water Conservation Board's R2CROSS approach, 10 cfs is substantially below flow levels required to maintain the environment to a reasonable degree. Dr. Kevin Bestgen, a fisheries expert at CSU, has several years of trout monitoring data collected from the Poudre River in Fort Collins that support at least a 20 to 30 cfs base flow in fall/winter. (Fort Collins' Ecological Response Model (as discussed

in Section 10 of these comments) is informed with this information, and its purpose is to identify probable ecological responses to a range of potential future changing conditions related to streamflows and important secondary factors affecting the river system. It defines clear quantitative targets for low and high flows that are a necessary part of the conversation on mitigation.)

Flushing/bypass flows for mobilizing coarse substrates would reduce the extent of fine sediment deposition and accumulated algae, as well as decrease the likelihood that physical habitat will continue to degrade to a level that produces additional, detectable biological impacts. In the absence of flushing flows, existing physical habitat will be negatively affected in the future as the river channel and its substrate characteristics (e.g., extent of interstices clogged with fine sediment, amount of algae) evolve with ongoing changes in water management.

The Augmentation Program ignores the fact that the above-described response will occur irrespective of base flows because such low flows are incapable of rejuvenating the river bed to maintain habitats required by trout and aquatic insects.

As currently formulated, the Augmentation Program would not avoid or minimize the diversions under the Project which occur during periods of high flows thereby reducing flushing flows. The Augmentation Program would instead maintain certain flows during periods of low flows. It appears that the Augmentation Program was conceived to mitigate and compensate for certain effects of NISP at low flow, and not to avoid and minimize its critical effects on flushing flows.

NEPA requires that the Corps conduct further analyses to address the deficiencies described above, specifically with respect to the ability of the Augmentation Program to maintain the environment with only the maintenance of 10 cfs (at mot times) and no flushing flows. Further, under NEPA and the CWA, the Corps must require measures to minimize the impacts to flushing flows. *See* 40 C.F.R. § 1508.20. *See also* 40 C.F.R. § 230.10. The Corps must require clarification and substantiation of the assertion that the Augmentation Program is avoidance and minimization, as opposed to mitigation.

7.6 NEED TO ADDRESS FLOODING AND STORM WATER ISSUES

SDEIS Appendix F, Section 4.3.1, Stream Channel and Habitat Improvement Plan (AG-01)

Statement: "*Northern Water would provide funding for a stream channel and habitat improvement plan for the Poudre River from the Poudre Valley Canal to its mouth at the South Platte River. The stream channel and habitat improvement plan would address and mitigate Poudre River water related resources, including aquatic, stream morphology, water quality, riparian and special status species. […] NISP commits to spending up to $1.0 million to develop the stream channel habitat and improvement plan. This funding is in addition to other commitment made in this Conceptual Mitigation Plan.*"

SDEIS Appendix F, Appendix A, Table A-1

Statement: "*Item No. AG-03 Implement and fund Poudre River Adaptive Management Program ($5 million + $50,000/yr for 20 years).*"

Comment: Channel contraction and vegetation encroachment from NISP will likely have significant adverse effects on base flood elevations and the resulting extent of flood inundations during large recurrence interval floods such as, the 100- and 500-year flood events. Fort Collins review of the SDEIS indicates a high probability that the capacity of the Poudre River channel to convey floodwater will be materially reduced under the NISP proposed action; therefore, new river modeling, planning and prevention measures will need to be put in place to ensure the safety of the citizens of Fort Collins. Unless addressed at this time, subsequent costs of designing, constructing and maintaining additional flood protection facilities or modifying existing structures would be borne by the citizens of Fort Collins. The mitigation plan states that NISP commits to spending up to $1.0 million to develop the stream channel and habitat improvement plan. As noted above, additional evaluation is needed before approval of the Project in order to better understand possible impacts to the floodplain and determine mitigation alternatives as well as costs and funding for the mitigation.

The District proposes to develop the stream channel habitat and improvement plan. The adequacy of such a plan is speculative at this time because it has not been developed. Because the Corps has not adequately addressed the effects of sedimentation in Fort Collins, the extent of the need for mitigation is uncertain. Further, details of that plan are unknown at this time and the $1.0 million budget's adequacy is arbitrary and capricious without further information. Further, there is no certainty that the any of the recommendations from that plan will be funded and implemented.

With the actual mitigation activities being uncertain, the proposed mitigation activity of funding the "Poudre River Adaptive Management Program" for an amount ranging from $5-6 million ignores the potential need for more significant mitigation actions and caps the amount provided and the time frame for the mitigation program.

In the SDEIS, the Corps must ensure that environmental effects will not be "overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast." *Skinner*, 903 F.2d at 1540. As discussed above, NEPA and the CWA require that the Corps provide in the SDEIS additional information on the stream channel habitat and improvement plan. If the Corps approves NISP, it must require as condition of the permit that the District fund any recommendations from the plan and adequate mitigation.

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SECTION 8: AIR QUALITY AND CLIMATE CHANGE COMMENTS

Fort Collins has various concerns related to air quality and climate change impacts and issues in the SDEIS. Climate change is of significant importance to Fort Collins, as noted in Fort Collins Climate Action Plan. *See* http://www.fcgov.com/climateprotection. As discussed in detail below, the SDEIS does not include all sources of air pollution or greenhouse gases ("GHGs") and does not evaluate whether all federal, state, and local air quality regulations and rules will be met as a result of implementation of the Project. The Corps' assessment of the air quality and climate change impacts is not a mere formality. The SDEIS must provide a "full and fair discussion" of those indirect impacts. 40 C.F.R. § 1502.1. This "comprehensive 'hard look' mandated by Congress and required by statute must be timely, and it must be taken objectively and in good faith, not as a exercise in form over substance, and not as a subterfuge designed to rationalize a decision already made." *Metcalf v. Daley*, 214 F.3d 1135, 1142 (9th Cir. 2000). Further, the conformity regulations promulgated pursuant to the Clean Air Act create separate procedural and substantive requirements that the Corps must meet. *See* 40 C.F.R. Part 93 (conformity regulations). However, the SDEIS defers such analysis to an uncertain point in the future.

In violation of NEPA and the Clean Air Act, the SDEIS does not fully analyze these impacts. Because of the Corps' inadequate assessment, the air quality and climate change impacts are understated. Additionally, Fort Collins and other stakeholders cannot fully or meaningfully analyze these impacts and their effects. Revised and additional analyses are required.

8.1 COMMENTS REGARDING INCOMPLETE ANALYSIS RELATED TO AIR QUALITY

8.1.1 No Analysis of Impacts from Increased Traffic

SDEIS Section 3.14.4.1, North Front Range Transportation and Air Quality Planning Council, Page 3-177

> Statement: "*A project must come from a conforming transportation plan and improvement program (40 CFR 93.115) before a conformity determination can be made for it. The design and concept for the proposed project must be adequately defined and must remain consistent with the project's definition in the conforming RTP and TIP. If the project changes in concept or design during the planning process, or if it was not originally included in the RTP and TIP, the regional conformity analysis would need to be revisited before the project can proceed.*"

Comment: The air quality analysis for the realignment of U.S. 287 did not account for the estimated 439,300 annual visitor day increase for recreational use at Glade Reservoir and its long-term impact on vehicle miles travelled ("VMT") in the ozone nonattainment area. It is important that this traffic volume increase be communicated to the North Front Range Metropolitan Planning Organization, the Air Pollution Control Division of the Colorado Department of Public Health and the Environment, the Colorado Department of Transportation, and the Upper Front Range Transportation Planning Region because it will alter the results of the air quality evaluation and the regional ozone conformity analysis.

NFRMPO's conformity analysis depends on a detailed traffic analysis conducted for the entire area covered by the MPO. This includes assigning employment and traffic generators to each of the traffic analysis zones ("TAZs") covered by the model, including the TAZ in which the proposed Glade Reservoir is located. There is no indication in NFRMPO's RTP and conformity analyses for 2035 or 2040 that any of the recreational traffic for the proposed Glade Reservoir has been included. *See e.g.,* NFRMPO, Upper Front Range 2035 Regional Transportation Plan (2008); North Front Range Land Use Allocation Model (June 17, 2015).

The modeling of emissons associated with the recreational VMT should also make adjustments to the vehicle mix to reflect the trucks hauling boats and campers which will increase future air emissions and further impact ozone level predictions. If the assumption is that this represents a shift of visitor days from Horsetooth Reservoir or other reservoir/lakes, then the annual economic benefit from recreation at Glade Reservoir of $13.2 million in SDEIS Section 5.20.2.3.1 needs to be modified. Further, the analysis should also account for increased VMT associated with longer trip lengths to Glade. Per 40 C.F.R. § 93.156(b), the ozone conformity determination must be prepared and made available to the public for review and comment before it is finalized.

The VMT estimates need to be revised to include increased traffic to Glade Reservoir and this information should be transmitted to all appropriate agencies listed above. Fort Collins and other stakeholders must be afforded the opportunity to review and comment on this information. 40 C.F.R. § 93.156(b). A regional ozone conformity determination needs to be conducted only after all air quality impacts from this project have been quantified and included in the conformity determination, and this information must be provided to Fort Collins pursuant to the Clean Air Act.

SDEIS Section 4.13.3.1.1, Glade Reservoir, Page 4-331

Statement: "*Changes in traffic volumes from reservoir construction would be similar to the effects of constructing the Cactus Hill Reservoir described in the No Action Alternative.*"

Comment: The description of construction traffic for the Cactus Hill Reservoir in Section 4.13.2.1 for the No Action Alternative states that construction traffic and heavy vehicles necessary for site development would likely remain on-site for the duration of construction and would not contribute to daily traffic. The construction phase of Glade Reservoir is estimated to be 5 years, and during this time, movement of heavy vehicles for removal of construction and demolition waste would be expected. These activities were not included in the 2013 Air Quality Analysis Memo (GEI 2013) as part of the modeling effort although these emissions will likely contribute to increases in ozone in the nonattainment area.

The Corps must revise or supplement the SDEIS to include additional analyses of the priority pollutants for movement of construction and demolition waste to address the deficiencies described above.

SDEIS Section 4.14.1, Methods, Page 4-337

Statement: "*The realignment of U.S. 287 was included in the STIP for regional ozone conformity determinations by NFRMPO as discussed in Section 3.14.4.1.*"

Comment: The estimated 439,300 annual visitor day increase for recreation at Glade Reservoir and its long-term impact on VMT in the region have not been considered in the conformity analyses for any conforming Regional Transportation Plan (RTP) or the Transportation Improvement Program (TIP) by NFRMPO. As a result, the emissions associated with these vehicle trips must be included in the general conformity analysis.

The RTP and TIP must include increased vehicle traffic and the regional ozone conformity determination by NFRMPO should be revisited due to the absence of this data. Further, the general conformity analysis to be developed by the Corps must include the emissions from these vehicle trips if they have not been modeled in the NFRMPO conformity analysis approved by FHWA.

SDEIS Section 4.14.3.1.1, Glade Reservoir, Page 4-339

Statement: "*The reduced vehicle emissions from a shorter U.S. 287 may be somewhat tempered by steeper grades associated with a portion of the proposed realignment.*"

Comment: The increased traffic associated with recreational use at Glade Reservoir will include trucks, hauling boats, and campers, that when considered in VMT modeling, will increase, not decrease, vehicle emissions. Vehicle emissions would significantly increase resulting from the large VMT increase for recreation; the resulting air quality impacts will include long-term direct and indirect effects; and impact is expected to be at least moderate because the effects would result in clearly detectable change with measurable effects.

The Corps must account for all of the vehicle emissions associated with new recreational trips in its general conformity analysis. The modeling to support this general conformity analysis must include appropriate emissions factors to reflect the vehicle mix associated with boat hauling, campers and other recreational vehicles. Aside from the general conformity analysis, the Corps must disclose the traffic and emissions impacts of this recreational traffic in a revised SDEIS to comply with NEPA.

8.1.2 Analysis Missing Numerous Air Pollution Sources

SDEIS Section 4.14.1, Methods, Page 4-336

Statement: "*Air quality can potentially be affected by short-term direct effects associated with construction of the alternatives (e.g., emissions from construction equipment, workers' vehicles, delivery vehicles, and fugitive dust) or by long-term indirect effects such as changes to transportation (e.g., the realignment of U.S. 287) or from project operations (e.g., emissions associated with pumping).*"

Comment: The SDEIS air quality analysis, including the supporting analysis (2013 GEI), omitted numerous long-term sources of emissions of criteria pollutants and particulates and did not consider any human health or environmental impacts from air toxics. The following significant sources of air emissions were missing from the air quality analysis, such that the analysis underestimates emissions and air quality impacts:

- Criteria pollutant and particulate emissions associated with large VMT increases for recreation at Glade Reservoir.

- Criteria pollutant emissions associated with the new recreational activities at Glade the Corps seeks to claim credit for in its recreational and economic analyses, including boats, jet skis, generators and other sources of non-road mobile source emissions. The emissions of these off-road sources can often be quite high, because they have not been subject to as stringent emissions regulations as on-road vehicles.
- Criteria pollutant emissions associated with pumping during long-term Project operations (e.g., NO_x ozone precursors).
- Air toxics sources:
  - VMT increase for recreation to Glade Reservoir and potential for long-term human health impacts.
  - Construction emissions direct health impacts on local residents.
  - Construction emissions indirect impacts such as deposition of air toxics onto soils and surface waters where they are taken up by plants and ingested by animals and eventually magnified up through the food chain.
- Emissions from vehicle exhaust and fugitive dust emissions from proposed mitigation plan activities such as:
  - Channel and habitat improvements (Appendix F, Section 4.3.2, Page 68).
  - Revegetation efforts to support establishment of native wetland and riparian species on exposed sediment (Appendix F, Section 4.3.4, Page 79).

The Corps must include in a revised or supplement to the SDEIS, as well as its draft and final general conformity analyses, additional quantitative analyses of air quality sources to address the deficiencies described above. The conformity analysis must account for the criteria pollutant emissions identified in the first three bullets above.

SDEIS Section 4.14.1, Methods, Page 4-336

Statement: "*The assessment of predicted effects on air quality is presented in detail in the 2013 Air Quality Analysis Memo (GEI 2013).*"

Comment: The Air Quality Analysis Memo (GEI 2013) presents an incomplete analysis of air quality impacts from NISP for the following reasons:

- The evaluation does not look at the total of all direct and indirect emissions to determine exceedance of the general conformity de minimis thresholds in 40 CFR § 93.153.
  - Only short-term emissions from construction activities were considered for compliance with National Ambient Air Quality Standards ("NAAQS").
- The evaluation of air quality impacts from U.S. 287 realignment does not consider the significant long-term change in VMT expected due to travel to access the new recreation at Glade Reservoir.
- It does not include emissions associated with recreational sources at Glade Reservoir and emissions associated with the electricity necessary for pumping in all alternatives.
- A comprehensive air quality analysis would quantify and evaluate the impacts of additional pollutants beyond the six criteria air pollutants addressed in the SDEIS. The Clean Air Act also regulates hazardous and other air pollutants that can impact human health and the environment.

The Corps must include in a revised or supplement to the SDEIS, and the general conformity analyses, additional evaluations of these air quality impacts to address the deficiencies described above.

SDEIS Section 4.14.6, Unavoidable Adverse Impacts, Page 4-342

Statement: "*During the general conformity process, the CDPHE Air Pollution Control Division (APCD) would review NISP to determine if NISP conformed to the SIP for NO_x. During its conformity analysis, the APCD would determine if the Project's estimated emissions are included in the state's emission inventory.*"

Comment: The analysis of air quality impacts (GEI 2013) did not consider long-term emissions of NO_x, SO2, CO, and particulates associated with the annual electricity requirement of 61,302,050 kWh for pumping for Alternative 2 with no reclamation and 48,135,987 kWh annually for pumping for Alternative 2 with reclamation in determining NAAQS compliance.

Estimated NO_x emissions for pumping would be 74 tons/year for pumping for Alternative 2 with no reclamation and 58 tons/year for pumping for Alternative 2 with the Reclamation Option. These estimates were calculated using the 2014 regional marginal emissions factors and need to be included during the ozone conformity analysis to determine compliance with NAAQS.

Additional analyses of priority pollutants from these vehicle emissions should be completed to address the deficiencies described above.

SDEIS Section 4.14.6, Unavoidable Adverse Impacts, Page 4-342

Statement: "*Unavoidable long-term non-construction related impacts on air quality may occur periodically associated with the exposed shorelines of reservoirs that may cause fugitive dust emissions.*"

Comment: The SDEIS and supporting air quality analysis (GEIS 2013) only estimate fugitive dust emissions from construction activities and do not attempt to estimate fugitive dust emissions from exposed shorelines at Glade Reservoir. NISP hydrologic modeling on Glade Reservoir water levels and is available to estimate frequency and extent of reservoir draw down from which an estimate of fugitive dust emissions can and must be developed. These data are needed to determine the significance of impacts from fugitive dust.

The Corps must include in a revised or supplement to the SDEIS, and its general conformity analysis, additional analyses of priority pollutants from these missions to address the deficiencies described above.

SDEIS Section 5.14.2, District's Preferred Alternative (Alternative 2), Page 5-237

Statement: "*Most direct effects on air quality would occur with the construction of Glade and Galeton Reservoirs and associated facilities and the realignment of U.S. 287.*"

Comment: Long-term direct impacts from NO_x from increased VMT and a shift in vehicle mix resulting from recreation at Glade Reservoir, as well as the emissions from boats, jet skis and other recreational equipment, were not evaluated. Also missing was a quantitative analysis of long-term

direct effects of fugitive dust resulting from low water levels in Glade Reservoir during drought periods, and an analysis of direct impacts from air toxics. These are considered direct effects according to Section 4.1.1.1 Direct and Indirect Effects, of the SDEIS because they occur at the same time and place as the activity and impact a large number of recreational users. The Corps must include in a revised or supplement to the SDEIS additional analyses to address the deficiencies described above.

8.1.3 Inadequate Air Quality Analysis May Lead to Violation of NAAQS For Ozone

SDEIS Section 4.14, Air Quality, Page 4-336

Statement: "*The marginal nonattainment designation does not impose any new planning requirements on Colorado at this time; however, the nonattainment area must meet the standard before 2015 or new requirements may be imposed.*"

Comment: The Environmental Protection Agency ("EPA") lowered the 8-hour ozone standard from 0.084 ppm to 0.075 ppm in 2008. In 2010, EPA reconsidered the 2008 standard and proposed a further tightening of this standard to a range between 0.060-0.070 ppm with several subsequent delays in implementation to date. Regardless of where within the range EPA sets the new ozone standard, meeting it will require unprecedented efforts for Colorado according to the Ozone State Implementation Planning 2010 Progress Report to the Governor. This report also states that ozone State Implementation Plan (SIP) planning is presently the Regional Air Quality Council's highest priority. Stringent requirements from stationary sources, transportation, and other source categories are expected and should be considered likely requirements for implementation of NISP.

The Corps must include in a revised or supplement to the SDEIS a regional ozone conformity analysis taking into account the lowering of ozone standards since the original NAAQS analysis. A lower ozone standard will increase the chances of NAAQS noncompliance.

SDEIS Section 4.14.3.1.1, Glade Reservoir, Page 4-339

Statement: "*NFRMPO determined that a regional ozone conformity analysis was not needed because the new route would be shorter than the existing alignment.*"

Comment: The impact of increased VMT and changes in the vehicle mix from Glade Reservoir recreational users were not included in any regional ozone conformity determination by the North Front Range Metropolitan Planning Organization. Therefore, the realignment of U.S. 287 was not adequately defined. 40 C.F.R. § 93.115 requires the regional conformity analysis to be revisited before the Project can proceed. The regional ozone conformity analysis needs to be revised to include all air pollutant sources.

SDEIS Section 5.14.5, Climate Change, Page 5-238

Statement: "*Given the predictions of increased levels of ground-level ozone in already-polluted areas due to climate change, short-term construction emissions from any of the alternatives could contribute to short-term ozone exceedances when combined with other emissions in the area. This would be a moderate cumulative effect because the effect would be short-term associated with construction and short-term meteorological events.*"

Comment: This analysis did not factor in the long-term increases in VOCs and NO_x associated with increased VMT for recreation at Glade Reservoir, emissions from recreational equipment, and for operational pumping of water. These emissions would occur throughout the life of the Project and thus would be long-term. Frequent exceedances of ozone standards are anticipated when long-term NISP emissions are combined with other regional emissions, higher ozone levels from increased temperatures due to climate change, and expected lowered ozone standards. The cumulative impacts likely qualify as major impacts defined as effects that would be readily apparent with substantial consequences (e.g., frequent ozone exceedances in the nonattainment area).

Further, the conformity rules prohibit even short-term violations or exacerbation of the conformity rules. The Corps will need to demonstrate conformity consistent with the criteria of the general conformity rule. The SDEIS defers this analysis to some unknown point in the future. The regional ozone conformity analysis needs to be revised to include all air pollutant sources.

8.1.4 Determination of Air Quality Impacts and Their Significance Did Not Consider Requirements of All Air Quality Regulations

SDEIS Section 4.14.7, Impact Summary, Page 4-344

Statement: "*During construction, all alternatives would have estimated average annual emissions of NO_x greater than the conformity de minimis level of 100 tons/year for the ozone nonattainment area.*"

Comment: An evaluation of air quality impacts should be based on meeting all regulatory requirements of the Clean Air Act, not just meeting NAAQS. The Corps must consider the following factors to ensure compliance with all federal, state, and local air quality regulations:

1) If the effects would cause an air quality standard to be violated;
2) Activities or emissions that would result in a cumulatively considerable net increase of O_3 in the nonattainment area;
3) Activities that expose sensitive receptors to substantial pollutant concentrations;
4) Fugitive dust emissions from demolition activities that could impair visibility in a Federal Class I area located within 100 km of the proposed activities such as Rocky Mountain National Park (Clean Air Act, Section 169A); and
5) Activities or emissions that would be inconsistent with Colorado's Revised Regional Haze Plan (Colorado Department of Public Health and Environment ("CDPHE") 2011).

The Corps must include in a revised or supplement to the SDEIS additional analyses to address the deficiencies described above. Specifically, the above criteria must be added to the SDEIS for determining air quality impacts and their significance.

SDEIS Section 5.14.2, District's Preferred Alternative (Alternative 2), Page 5-237

Statement: "*The increases in emissions are considered a minor cumulative effect because they would be short-term and the alternative would need to undergo a general conformity analysis that would consider other regional contributions to ensure that the region remains in compliance with NAAQs.*"

Comment: The air quality analysis failed to consider all long-term sources of NO_x emissions (e.g., travel for recreation at Glade Reservoir, recreation at the Reservoir, and operational water pumping). The direct and indirect effects of the short-term and long-term NO_x were therefore not quantified. A comprehensive analysis would likely result in at least moderate effects (e.g., clearly detectable change with measurable effect as defined in Section 4.1.1.3, Intensity and Magnitude of Effect of the SDEIS). Between an insufficient analysis of all emission sources and with the recent tightening of ozone standards, the Corps must require a regional ozone conformity analysis. The Corps must include in a revised or supplement to the SDEIS additional analyses to address the deficiencies described above.

8.2 COMMENTS REGARDING INCOMPLETE ANALYSIS RELATED TO GREENHOUSE GAS EMISSIONS

8.2.1 Analysis Missing Numerous Greenhouse Gas Emission Sources

SDEIS Section 4.14.1, Methods, Page 4-337

Statement: "*The estimated long-term greenhouse gas (carbon dioxide) emissions that could result under each alternative were based on the projected energy requirements for pumping for the alternatives (BBC 2014).*"

Comment: The methods used for estimating greenhouse gas ("GHG") emissions are inadequate for determining NISP GHG increases or impacts for the following reasons:

- All GHGs are referred to as CO_2 emissions. This indicates that additional GHGs with higher global warming potentials such as CH_4, and hydrofluorocarbons ("HFCs") were omitted, and as a result, total GHG emissions are underestimated.
- Significant sources of GHGs from the large VMT increase to and from Glade Reservoir for recreation were omitted.
- The Alternative 2 evaluation must include increases in GHG emissions from boats, jet skis, and other equipment used in the reservoir.
- Increases in emissions associated with waste disposal from recreational users were not included in the analysis.
- There is a requirement for additional wastewater treatment associated with several proposed alternatives that would result in increased emissions of GHGs (CO_2, CH_4, and N_2O) for new and existing wastewater treatment facilities. These have also been omitted from the analysis.

The long-term effects from all the GHG sources that were omitted from this analysis should have been included in the analysis because they can be determined using existing national and international GHG methods and protocols and because they would significantly change the conclusion of the analysis.

The Corps must include in a revised or supplement to the SDEIS additional analyses to address the deficiencies described above. Specifically, the SDEIS must include a more detailed inventory of all GHG sources and a description of methods and calculations is needed to determine GHG impacts.

SDEIS Section 5.14.2.1, Long-Term Emissions of Carbon, Page 5-237

Statement: "*The cumulative effects of the carbon dioxide emissions on climate change are unknown.*"

Comment: The physical link between increasing temperatures and increasing concentrations of GHGs has been documented by a large body of research.[3] The U.S. National Climate Assessment,[4] a report compiled by a team of over 300 experts who collected, evaluated and integrated observations and research on climate change in the U.S., is available to estimate impacts to human health and the environment. Hence, there is no basis for claiming that the cumulative impacts of GHG emissions are unknown. Although a detailed, quantitative evaluation of the cumulative impacts of increased GHG emissions from NISP on the various resources considered in the SDEIS may be premature, the Corps needs to acknowledge the potential for impacts such as increased global temperatures resulting from NISP's GHG emissions. The Corps must include in a revised or supplement to the SDEIS additional analyses to address the deficiencies described above.

SDEIS Section 5.14.6, Impact Summary, Page 5-239

Statement: "*The estimated electrical energy used by the alternatives would be about 0.1% of the energy used in Colorado in 2012 (Section 4.22). This contribution to climate change would be a minor cumulative effect because the effect would be relatively small compared with the regional total annual emissions of GHGs.*"

Comment: The estimation of GHG emissions in the SDEIS only quantifies one source of GHG emissions–from CO2 emissions from electrical energy use for pumping water. This is an incomplete estimate of total GHG emissions for the Project alternatives and leaves out:

- The CO_2, N_2O, CH_4, and HFC emission contributions from increased ground transportation for recreational use at Glade Reservoir;
- Emissions of other GHGs (N_2O) from electricity use for pumping;
- The CO_2, N_2O, and CH4 emissions from disposal of short-term construction and demolition wastes
- The CO_2, N_2O, and CH4 emissions from long-term solid waste disposal from recreational users at Glade Reservoir; and
- The increases in CO_2, N_2O, and CH_4 emissions associated with increased wastewater treatment for several alternatives.

There are numerous national and international protocols (e.g., ICLEI Community Protocol, World Resources Institute (WRI) GHG Protocol, etc.) for estimating GHG emissions from multiple emission sources. Furthermore, it is not valid to compare electrical energy use for pumping for NISP to that of the electricity use of the entire state of Colorado during 2012 and then extrapolate impact on climate change based on this comparison. There are local and regional differences in the

[3] 2007. IPCC WGI Fourth Report: Climate Change 2007: The Physical Science Basis, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers, http://www.offnews.info/downloads/SPM2feb07.pdf.

[4] Mellilo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: *Climate Change Impacts in the United States: The Third National Climate Assessment.* U.S. Global Change Research Program, 841 pp. doi:10.7930/JoZ31WJ2.

GHG emissions from electricity depending on if the source is clean (e.g., renewable energy). There is a state-level GHG emissions estimate (not provided in the SDEIS), but there is no known "regional total annual emissions of GHGs." This determination of a minor cumulative effect is not based on valid or transparent data.

The Corps must include in a revised or supplement to the SDEIS an analysis of the total GHG emissions that includes all major GHG sources and uses valid comparisons. Additionally, the Corps must provide an adequate factual basis for its determination of minor cumulative effect. The Corps cannot rely on "conclusory assertions that an activity will have only an insignificant impact on the environment." *Ocean Advocates v. U.S. Army Corps of Eng'rs*, 402 F.3d 846, 864 (9th Cir. 2004).

8.2.2 Claimed Minor Impacts on Greenhouse Gas Emissions

SDEIS Section 4.14.7, Impact Summary, Table 4-96. Impacts to air quality, Column Predicted Annual Carbon Dioxide Emissions for Project Operation at Full Utilization, Page 4-343

Statement: "*Alternative 2 Reclamation Action Option: Construction over an estimated 9.1 years would have a short-term minor impact on air quality.*"

Comment: Annual carbon dioxide emissions for Project operation at full utilization of 37,259 metric tons for Alternative 2 with Reclamation Action Option do not constitute a minor impact on air quality from a climate change perspective. Moderate effects are defined in Section 4.1.1.3 Intensity and Magnitude of Effect in the SDEIS as effects that would result in clearly detectable change with measurable effects. This amount represents 70% of the 2014 GHG emissions from Fort Collins' entire municipal operations (2014 Comparative Municipal GHG Report) and 80% of the 2013 GHG emissions from Colorado State University (one of the 3 top GHG sources within Fort Collins city limits (see reporting via EPA map located at: http://www.epa.gov/ghgreporting/). For comparison, under the EPA's Mandatory GHG Reporting Rules, this level of emissions constitutes a major source. The Corps' characterization of these emissions as "minor" when the EPA characterizes lower levels to be "major" is arbitrary and capricious. The Corps must include in a supplement to the SDEIS additional analyses to address the deficiencies described above.

8.3 CUMULATIVE EFFECTS

SDEIS Section 5.14.6, Impact Summary, Table 5-54, Page 240

Statement: "*When combined with RFFAs and climate change, construction would have a short-term minor impact on air quality. Exposed reservoir shorelines could periodically contribute to local fugitive dust. Operations would contribute to the increase in the regional emissions of carbon dioxide. The cumulative effects on air quality would be minor because the incremental increase in carbon dioxide emissions would be relatively minor compared with the regional total annual emissions of GHGs*."

Comment: This summary is missing a comprehensive evaluation of the cumulative impacts of criteria air pollutants, air toxics, particulates, and all the relevant greenhouse gases over the lifetime of the Project. It fails to consider the residence time of any of these pollutants in the atmosphere and the full range of impacts on human health and the environment. This section and table is missing

numerous emission sources detailed in other comments by Fort Collins. The incomplete assessment is not adequate to make a determination of air quality. A more comprehensive set of air quality criteria should also be evaluated to determine the significance of impacts. Additionally, it is not valid to compare a partial Project GHG emissions inventory to a "regional total annual emissions of GHGs" that does not exist nor is referenced in the document. The Corps must include in a revised or supplement to the SDEIS additional analyses to address the deficiencies described above.

8.4 FUGITIVE DUST EMISSION CONTROL PLAN AND ADDITIONAL MITIGATION MEASURES FOR VEHICLE EMISSIONS

SDEIS Appendix F, Section 3.3.4, Air Quality (AQ-01), Page 50

Statement: "*To minimize and control fugitive dust, Northern Water would develop and implement fugitive particulate emission control plan that identifies specific steps that would be taken to minimize fugitive dust generation.*"

Comment: Additional mitigation measures must be implemented to control criteria and other air pollutants including:

- The fugitive particulate emission control plan should incorporate the following to the maximum extent feasible:
  - All haul roads would be covered in gravel with minimal silt content.
  - High winds restrictions to involve no earthmoving activities performed when local winds speeds exceed 30 miles per hour.
  - Implement engineering controls to prevent off-property transport.
  - Reduce vehicle speeds by establishing a maximum speed limit or install traffic calming devices to reduce speeds to a rate that prevents off-property transport of dust entrained by vehicles.
  - Unload truck beds and loader or excavator buckets slowly and at the lowest height possible.
  - Dust control measures should be incorporated to the maximum extent feasible during blasting operations. The following measures should be used during blasting activities:
  - Conduct blasting on calm days to the extent feasible. Wind direction with respect to nearby residences and sensitive environmental receptors should be considered.
  - Design blast stemmings to minimize dust and to control fly rock.
  - Install wind fence for control of windblown dust.
- If one or more of the suggested air quality significance criteria are met (proposed by the Fort Collins in the Comment to SDEIS Section 4.14.7 Impact Summary, Page 4-344), the following mitigation measures for mobile sources should be implemented:
  - Any off-road construction equipment (e.g., loaders, excavators, etc.) must be equipped with engines that meet the model year (MY) 2015 emission standards for off-road compression-ignition (diesel) engines. Older model year engines may also be used if they are retrofit with control devices to reduce emissions to the applicable emission standards.
  - Any on-road construction equipment (e.g., pick-up trucks at the construction sites) must be equipped with engines that meet the MY 2000 or on-road emission standards.
  - Any trucks used to transport materials to or from the construction sites must be equipped with engines that meet the MY 2010 or later emission standards for on-road heavy-duty

engines and vehicles. Older model engines may also be used if they are retrofit with control devices to reduce emissions to the applicable emission standards.

Implementation of these various engine control measures would substantially reduce NO_x and PM_{10} emissions; however, the extent of the reduction would vary based on the size (horsepower), age, and type of equipment. Controlling emissions from equipment operating on the construction site, including both off-road construction equipment and on-road pick-up trucks could reduce NO_x and PM_{10} emissions by over 80%. Controlling emissions from on-road heavy-duty diesel trucks could also reduce NO_x emissions by approximately 20% or more.

8.5 RESOURCES FOR SECTION 8

- CDPHE, 2014. Colorado Greenhouse Gas Inventory – 2014 Update Including Projections to 2020 & 2030.
- City of Fort Collins, 2014 Comparative Municipal GHG Report.
- Fort Collins Climate Action Plan, dated 2008.
- Fort Collins Climate Action Plan: Framework, dated 2015.
- Fort Collins Climate Action, dated 2014.
- ICLEI, 2013. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, V 1.1.
- IPCC, 2007. Climate Change 2007: The Physical Science Basis, Summary for Policymakers, International Panel on Climate Change, Geneva, Switzerland, p. 2-18.
- Mellilo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: *Climate Change Impacts in the United States: The Third National Climate Assessment.* U.S. Global Change Research Program, 841 pp. doi:10.7930/JoZ31WJ2.
- Resolution 2015-030.
- WRI, Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC), An Accounting and Reporting Standard for Cities.

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SECTION 9: RECREATION AND AESTHETICS COMMENTS

The Poudre River is a major recreational attraction in Fort Collins, attracting approximately over 500,000 visitor days a year. (SDEIS at page 3-195). These visitors' fish, hike, bicycle, boat, picnic, and view wildlife. The fishing is so good in the downtown reach of the river that creel counts for Segment B are consistently higher than any other reach on the Poudre River, including the canyon reach (personal communication, Kurt Davies, former Colorado Parks and Wildlife Poudre River fisheries biologist). Over many decades, Fort Collins has spent tens of millions of dollars beautifying, acquiring land, building recreation amenities, and restoration natural habitat. (City of Fort Collins Natural Areas Master Plan and Cache la Poudre River Natural Areas Management Plan Update). Fort Collins owns three parks on the River and over 1,800 acres of natural areas. In 2014, City Council adopted a Downtown Poudre River Master Plan that describes a vision for continuing to improve the most heavily visited reach of the River from Shields Street to Mulberry. This Master Plan describes a proposed whitewater park just below the College Avenue Bridge. The park includes storm water and habitat improvements and is estimated to cost approximately $8.5 million of which $7 million have been secured to date.

9.1 IMPACTS TO BOATING

SDEIS Section 4.16.3.3, Segment B

Statement: "*Segment B is popular for boating (canoeing and kayaking) and is the location of a proposed whitewater park. Target flows for quality boating opportunities are at or above 150 cfs. Compared with Current Conditions, Alternative 2 would result in an average reduction of 3 to 7 boating days per month (a total of 19 fewer days over the May-August period), resulting in a moderate to major adverse effect on boating opportunities in Segment B. Augmented winter flows in Alternative 2 would result in minor beneficial effects on recreational fishing opportunities in Segment B…*"

SDEIS Section 4.16.6, Unavoidable Adverse Impacts

Statement: "*Flow changes in Alternatives 2 and 3 would adversely affect boating and fishing opportunities along the Poudre River through Fort Collins (Segment B).*"

SDEIS Section 4.16.1

Statement: "*The 150 cfs threshold was based on comments on the DEIS from a local boating group on the minimum flows that would be needed to allow reasonable passage by canoe through Fort Collins; a 100 cfs threshold was previously used in the DEIS.*"

SDEIS Appendix F, Section 2.2.1, Summary of Effects

Statement: "*Reduced streamflow during the summer would result in a minor to moderate adverse effect on river-based boating in Segment B…*"

Comment: The SDEIS notes in Section 4 that there will be moderate to major adverse effect on boating opportunities in Segment B associated with Alternative 2. However, in Appendix F, that effect is inconsistently characterized as "minor to moderate." The inconsistency reveals a lack of the meaningful analysis required by NEPA.

Fort Collins does not agree with the characterization of boating impacts to Segment B as only minor or moderate. With boating days reduced by one-third on average, clearly this is a major effect, as described by the SDEIS's own terms. (See page 4-351 "Major effects would result in readily apparent effects with substantial consequences").

Paragraph 4.16.3.3 is unclear as to how many days at 150 cfs will be reduced. The SDEIS states that "Alternative 2 would result in an average reduction of 3 to 7 boating days per month." If this sentence is referring to all months it could be read to mean the loss of 36 to 84 days a year.

The SDEIS describes 150 cfs in Segment B as the minimum flows necessary for "reasonable" passage by canoe. Canoeing at 150 cfs is possible but that is the low end of the threshold (personal communications with local boaters). Between 75 and 100 cfs, the Poudre River through Fort Collins is just passable by inner tubes. The SDEIS should more definitively describe what "reasonable" means with respect to boating in Segment B.

The SDEIS notes minor beneficial effects to fishing due to winter time augmented flows in Segment B, although in a subsequent paragraph (see SDEIS Sections 4.16.3.3 and 4.16.6 respectively) it inconsistently notes that Alternative 2 would adversely affect fishing. However, as noted elsewhere in these comments, the SDEIS has failed to adequately analyze impacts to aquatic biological resources. Therefore, it is not yet possible to accurately characterize the impacts to fishing.

The Corps must include in a revised or supplement to the SDEIS an adequate analysis of the impacts on boating opportunities in Fort Collins, as described above. Further, the Corps must provide factual bases for its conclusions.

9.2 IMPACTS TO RECREATIONAL EXPERIENCES

SDEIS Section 4.16.3.3, Poudre River

Statement: "*Under Alternative 2, changes in streamflows are not expected to result in discernable visual impacts on recreational experiences along the Poudre River, or the availability of land-based recreational activities such as trail use, wildlife viewing, and photography. Likewise, wildlife-related recreation along the mainstem…would be unaffected*"

Comment: As noted elsewhere in these comments, Fort Collins has extensive concerns with the analyses of impacts to riparian and wetland vegetation. Moreover, Fort Collins asserts that the impacts will be greater than those described by the SDEIS, as described above. Over time, it follows that the degradation to the environmental resources of the river are likely to result in degradation to the user experience beyond a negligible or minor impact.

The SDEIS appears to conclude that there will be little to no impact to recreation activities (other than boating) along the Poudre in Fort Collins (SDEIS Table 4-100, page 4-360). However, based on a study commissioned by Fort Collins in 2008 ("Estimating Benefits of Maintaining Peak Instream Flows", Dr. John Loomis) a reduction in peak flow of 50% would reduce visitation to the river by approximately 33%.

The SDEIS describes a very large range of financial value associated with visits to the Poudre River Trail and visits to Natural Areas along the river. Figures for visits to Natural Areas range from approximately $2 million to approximately $14 million annually (SDEIS 3-196). Thus, the median value is $8 million. At approximately 500,000 visitors a year, that works out to $16 per visitor. Although it is not known precisely how many visitors are present in Natural Areas during May, June and July a safe assumption is that at least one-quarter of total annual visitors (approximately 125,000) are present during these months. Thus, a reduction of 33% of these visitors (approximately 42,000) at $16 a visit would represent an approximately $670,000 annual loss. While these figures may contain a margin of error, they are conservative and likely underestimate impacts, and suggest that there would be tangible economic losses related to flow depletions.

The Corps must include in a revised or supplement to the SDEIS additional analyses of the impacts on recreational experiences. Additionally, the Corps must explain its determination in the face of the contradictory evidence offered by Fort Collins. The Corps fails to comply with NEPA if it "offers an explanation which runs counter to the evidence . . . ." *Sierra Club v. U.S. Army Corps of Eng'rs*, 295 F.3d 1209, 1216 (11th Cir. 2002).

9.3 AESTHETIC IMPACTS

SDEIS Section: 4.18.3.3 Poudre River, Pages 4-373 to 374

Statement: "*Alternative 2 is predicted to have weekly average river stage declines of 0.5 foot or greater during the May through September period for 19% of the period of record. The increased frequency of predicted reductions in stage greater than 0.5 feet (almost twice as frequent as the other segments) in a segment of the river that is highly used, would likely be noticeable to many viewers familiar with the river in this segment ....*"

Comment: The SDEIS needs to provide a better assessment of the impacts of NISP on the visual resources of the Poudre River (specifically within Fort Collins), including the river channel, and wetland and riparian vegetation, based on the acknowledged reduced flow levels. However, the Corps must describe specifically how the aesthetics could change, such as the reduction of diversity and density of vegetative cover, reduction of wildlife, exposure of rip-rap and man-made structures and other factors due to the reduction of river flows. Data must be developed. For example, photo simulations and surveys could be conducted to evaluate the public's perception of lower river flows and the effects this could have on the visitor's experience and future urban and recreational development along the river corridor. Under NEPA, the Corps must require additional mitigation measures to address the deficiencies described above.

9.4 MITIGATION OF VISUAL IMPACTS

SDEIS Appendix F, Section 2 Mitigation Goals and Objectives, Page 16

Statement: "*This section provides an overview of effects for the key environmental resources affected by NISP, and a summary of mitigation approaches that were identified by Northern Water.*"

Comment: In violation of NEPA, the Corps has "failed entirely to consider an important aspect of the problem." *State Farm*, 463 U.S. at 43. The Corps cannot ignore visual impacts of the proposed action. Thus, the Corps must include in a revised or supplement to the SDEIS additional analyses of visual impacts and provide adequate mitigation measures to address the deficiencies described above.

9.5 AUGMENTATION PROGRAM AND MITIGATION

SDEIS Section 4.16.6, Unavoidable Adverse Impacts

Statement: "*The District's proposed mitigation will be reviewed by the Corps to determine whether unavoidable adverse impacts would remain with the implementation of the District's proposed mitigation.*"

SDEIS Appendix F, Section 2.1.2, Mitigation Approach

Statement: "*Glade Reservoir provides an opportunity for low-flow aquatic resources mitigation. […] Modification of diversion structures to allow fish migration and enhance channel characteristics would…benefit aquatic resources….*"

Comment: Fort Collins supports efforts to enhance winter base flows, which may provide a minor benefit to the fishery in Segment B. Based on the Poudre River Ecosystem Response Model, 20 to 30 cfs is an optimal base-flow regime for the sport fishery. (As noted elsewhere in these comments, it is not clear that Northern will be able to deliver the proposed augmentation flows due to water rights issues.)

Fort Collins supports efforts to modify intervening diversion structures to improve habitat characteristics. As noted elsewhere in these comments, the Conceptual Mitigation Plan proposes improvements to three structures to bypass flows. There are, however, a number of other structures that lack the infrastructure to bypass flows (See Operational Comments regarding SDEIS Section 7.3.5).

As noted elsewhere in these comments, Fort Collins has concluded that flushing flows of 2,500 to 3,500 cfs increase the likelihood that "multiple factors supporting reproduction of both trout and aquatic insects are…maintained over decadal and longer time scales." (See Fort Collins comments in Section 7 of these comments and the Poudre River Ecosystem Response Model). SDEIS Appendix F, however, does not include any flushing flows.

In general, the SDEIS does not establish that the current mitigation plan will adequately address the negative Poudre River recreation impacts; particularly those impacts to recreation caused by reduced peak flows. Fort Collins has concluded that it will not, based on the data presented. Furthermore, flat water recreation or other forms of recreation located at Glade Reservoir do not compensate for the loss of water-based recreation in Fort Collins because such flat water recreation is of a different nature than recreation on a dynamic, healthy river.

It is also unclear how the Corps derived the flatwater visitation values for the Glade Reservoir and whether these add to visitor numbers that would have already existed elsewhere or

simply shift visitation between lakes. If the latter, it is inappropriate to claim any net recreational or economic benefits.

The SDEIS must include avoidance, minimization, and mitigation measures that address flushing flows. The Corps must also require compensatory mitigation for the major loss of boating days on Segment B.

9.6 RESOURCES FOR SECTION 9

- Cache la Poudre River Natural Areas Management Plan Update, June 2011
- City of Fort Collins Ecosystem Response Model.
- City of Fort Collins Natural Areas Master Plan, October 7, 2014.
- City Plan, Fort Collins, February 15, 2011.
- Downtown River Corridor Implementation Program, July 18, 2000.
- Fort Collins Natural Areas Map, October 2014
- Poudre River Downtown Master Plan, October 2014.
- Estimating the Economic Benefits of Maintaining Peak Instream Flows in the Poudre River Through Fort Collins, Dr. John Loomis, April 2008

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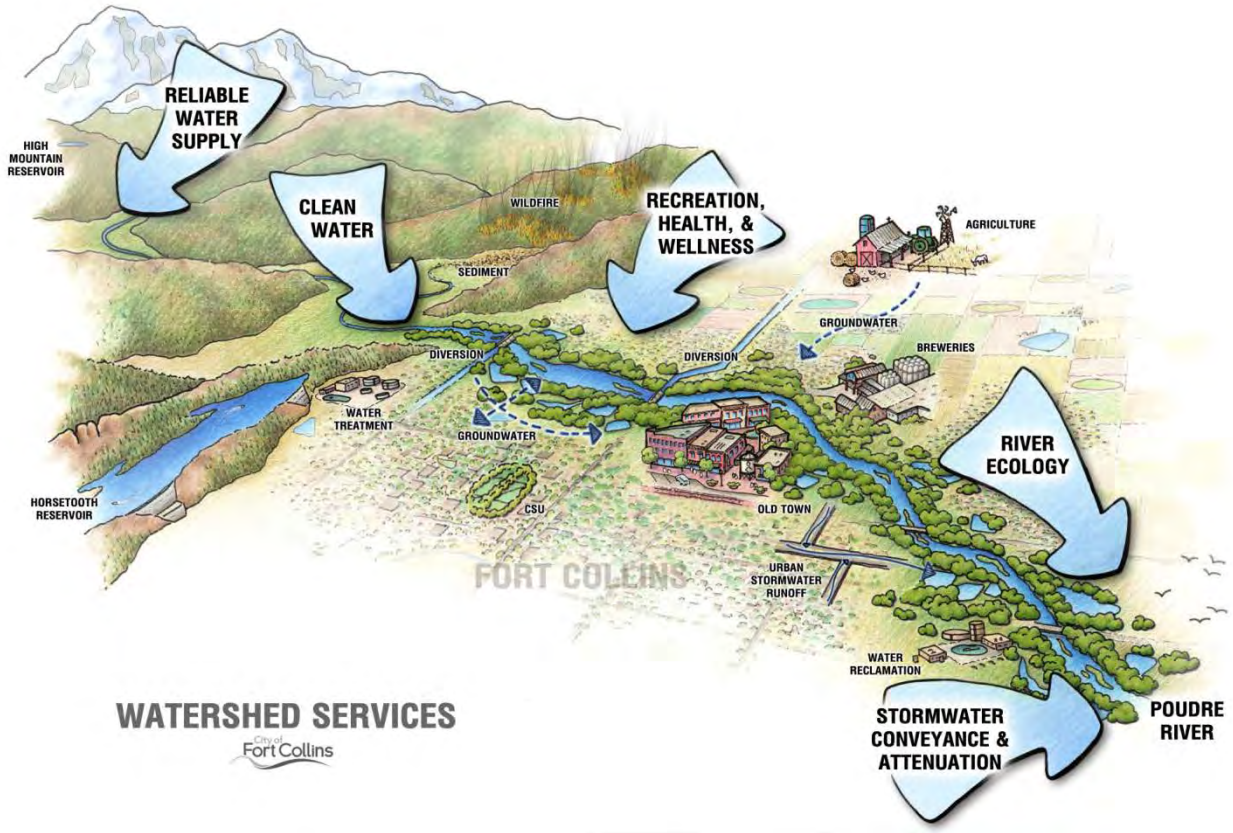
SECTION 10: BIOLOGICAL RESOURCES COMMENTS

Fort Collins has invested substantially in the Poudre River corridor through town, and thereby in its biological resources, which includes aquatics and fisheries, wetlands and riparian areas (including their ground water aspects), and wildlife. Fort Collins (including through its Natural Areas and Parks Departments and Stormwater Utility) owns and manages nearly 75% of the floodplain in town as undeveloped lands. The trout populations within Fort Collins are as high as some of the most productive areas for the river. *See* Fish Survey, Colorado Parks and Wildlife, Cache La Poudre Fish Survey and Management Information. These investments provide extensive recreation and educational opportunities, conservation of natural habitats and species, flood attenuation, pollutant filtration and serve as catchments for urban stormwater catchments (City of Fort Collins, 2011). A degradation of these resources, a likely outcome of NISP, would substantially and negatively affect these valued investments and assets. The SDEIS's analyses of wetlands and riparian areas raise various concerns as discussed in detail in the following subsections.

10.1 THE POUDRE RIVER IS NOT ON AN INEVITABLE DOWNWARD TRAJECTORY AS CLAIMED IN THE SDEIS, AND THE ECOLOGICAL RESPONSE MODEL AND RIVER HEALTH ASSESSMENT FRAMEWORK CAN BE USED AS TOOLS

Comment: Fort Collins has conducted various studies on the Poudre River designed to increase the understanding of current and potential future conditions. As the owner of water, wastewater, and stormwater utilities, Fort Collins is constantly conducting studies related to the functions of these enterprises. As a landowner, municipality, and steward of the land and water for current and future residents, Fort Collins has also sought to better understand the Poudre River beyond the scope of these vital utilities through conducting studies on other aspects of the river. Several of those studies are identified in and provided with these comments. In particular, studies have been designed to further understand site specific issues (such as land use in the floodplain), drivers (such as inundation of the riparian zone) and thresholds (such as sediment mobility flow thresholds) that influence the condition of ecological components and also to understand the system as an integrated sum of its parts.

The future of the Poudre River is of interest to Fort Collins not only for the intrinsic value of a healthy ecosystem, but also for the role a healthy ecosystem plays in the provision of other watershed services such as high quality drinking water, wildlife habitat, the basis of the aquatic ecosystem, recreation opportunities, and protection of public safety and infrastructure, all of which contribute to a healthy Fort Collins economy and livelihood. The condition of these watershed services has a direct financial impact on the City, as well as deeper impacts that are less easily quantified, though no less valuable.



The SDEIS inaccurately describes the Poudre River as having an ecosystem that has already passed a biological threshold and that is on a boundlessly declining trajectory. The SDEIS concludes that important ecological processes such as sediment mobility and support of riparian functions are not currently occurring and therefore additional reductions are "*predicted to reinforce or accelerate the well-established trajectory*" (SDEIS Section 4.9.9 Table 4-69) (emphasis added). Based on this proposition, the SDEIS concludes that any negative impacts from the proposed actions of NISP are minor or imperceptible, and not significant when considered against this supposed inevitable trajectory towards an impoverished system. However, neither NEPA nor the CWA allow agencies to disregard the impacts of proposed actions by assuming that environmental resources will be lost regardless.

Fort Collins disagrees with the notion espoused in the SDEIS that the Poudre River is on a trajectory of inevitable decline. Although many changes have occurred to the Poudre River over the past 150 years since the early days of water development, Fort Collins' perspective, supported by numerous observations and data, is that today's ecosystem still retains many functional elements that are key building blocks of a resilient and healthy system that continues to provide valued services. Moreover, as discussed in this Section 10, Fort Collins believes that a series of flawed analyses in the SDEIS underestimates the impacts of NISP, mischaracterizes the trajectory, and omits an evaluation of the aggregate impacts of the Project. As a consequence, the SDEIS incorrectly concludes that there will be minor or negligible impacts to the biological and watershed services and resources associated with the river.

The following reports and supporting analyses are submitted as evidence further substantiating the concern that the SDEIS mischaracterizes the trajectory.

The **Ecosystem Response Model** ("ERM") is a probability-based integrative ecosystem model developed to show likely changes and trends across various flow scenarios. The original report was produced in 2014 and provides the full project description http://www.fcgov.com/naturalareas/eco-response.php. With the release of the SDEIS and CTP hydrology, the ERM was rerun. New results are provided in the ERM Supplemental Report (City of Fort Collins, 2015). In preparing this work Fort Collins does not intend the ERM or its results to supplant the various in-depth studies undertaken as part of the SDEIS. Nevertheless, results of the ERM provide a meaningful holistic evaluation of the Poudre River ecosystem, an ecosystem which, contrary to conclusions made from various individualized studies in the SDEIS, maintains many key ecologic functions.

The **River Health Assessment Framework** ("Framework") was developed as a tool to clearly define the Fort Collins' vision of a healthy and resilient river through recommended ranges for system metrics (http://www.fcgov.com/naturalareas/riverhealth.php). As with the ERM, the Framework is not intended to supplant the various in-depth studies undertaken as part of the SDEIS. The Framework also sets forth a methodology for assessing and communicating about river conditions and functions. The Framework uses a scholastic A through F grading scale to grade different metrics, which represent various components of the river system. Grades of B and above signify a resilient component of the system. Grades of C identify at risk components, while grades of D and below represent impaired or vulnerable components. The closer any single metric gets to the C- to D+ threshold, the more at-risk it becomes.

Though each component receives a separate grade, these components work synergistically to support a more robust, functional ecosystem with greater resilience to future disturbances, stochastic events, and short-term or localized human-caused impacts. In other words, each metric contributes to an overall system that has good function, or conversely may be at greater risk. Therefore, a grade of a B or an A for one metric supports other metrics. Conversely, a grade of D or F would indicate impairment or imminent vulnerability which may have broad implications for whole system

Even though current conditions have not been fully assessed using this tool, much is known for various metrics through existing datasets and extensive working knowledge of the river. Preliminary evaluations indicate that current conditions generally range from grades of B to C, with a few metrics falling below a C. Given the expected response of the Poudre River to a decline in flows, and if flows are reduced by NISP as indicated in the SDEIS and discussed herein, a number of the metrics are expected to trend downward from their current condition. (Please see the Framework report for the best understanding of current conditions by river segment).

A few important themes emerge from the ERM and the Framework. The Poudre River will show a response to declines in peak flows in particular. Current flows still meet key sediment mobility thresholds which positively influence all aquatic life dependent on clean riverbeds. The preferred alternative decreases the return interval for these flows and will negatively affect overall channel structure, critical aquatic habitat and maintenance of channel capacity. The extent of all

riparian habitat types and ecological processes is directly correlated to peak flows. A measureable narrowing will occur across the riparian landscape.

The SDEIS must not consider the Poudre River as being on an inevitable downward trajectory, as discussed in this Section 10. *See State Farm*, 463 U.S. at 43 (explanation is not "satisfactory" if the "explanation for its decision . . . runs counter to the evidence before" the agency.). Fort Collins has identified that NISP poses significant challenges to the future condition of the Poudre River, with these concerns based, in part, on the ERM and the Framework. These tools also describe various opportunities for maintaining and improving the functions and processes that underpin the Poudre River's biological and healthy conditions. Thus, the ERM and the Framework can serve as effective guideposts and decision support tools as NISP and other consumptive projects are proposed and evaluated in the Poudre River basin.

10.2 COMMENTS REGARDING COTTONWOOD ESTABLISHMENT

10.2.1 Incorrect Assumption that Cottonwood Forests Are in Decline

SDEIS Summary S.6.4.2, Page S-32

Statement: "*flows that are no longer effective in establishing new stands of plains cottonwood*"

SDIES Summary S.7.6, Page S-45

Statement: "*The plains cottonwood woodlands along the Poudre River are on a trajectory of decline. Nonnative woody vegetation (e.g., green ash, Russian olive, and Siberian elm) are predicted to increase as a result of the current trajectory.*"

Comment: The summary for the analysis (Table 4-69) frequently relies on an assertion that the downward trajectory of cottonwood woodlands along the Poudre River will continue with or without Alternative 2. This argument has not been substantiated and directly contrasts evidence from Fort Collins' restoration successes and research projects (Shanahan, 2014, City of Fort Collins, 2015a, City of Fort Collins, 2015b). Moreover, the impacts identified in the SDEIS need to be quantified and not just described qualitatively. A direct response of narrowing (and reduction in the probability for cottonwood recruitment leading to age class distributions skewed toward older forests) is expected when peak flows are chronically reduced as well as a parallel reduction in the probability for cottonwood establishment (Nilsson and Svedmark, 2002). A data-based impacts analysis is possible through spatial comparison of flow events likely to support various ecological processes and habitat types.

Furthermore, it is in the City's interests to work towards restoring the system that supports the keystone native woody species. Forests dominated by native species, as compared to non-native species, are more adapted and therefore more resilient to natural disturbances on this type of system. A particularly unique situation may occur on the Poudre if we accept the premise that green ash will dominate the riparian forests (as described herein). With the arrival of the emerald ash borer to Colorado, the forests along the Poudre River are likely see a significant loss or degradation due to die off the ash (http://www.ext.colostate.edu/pubs/insect/eab_threat_urbanforests.pdf).

Rather than assume that the future decline of cottonwoods is inevitable, the impetus for Fort Collins' research and management has been to better understand the most effective actions for supporting self-sustaining cottonwood populations. Restoration efforts focused on topographical changes have proven highly productive for cottonwood establishment, as discussed in this Section 10. *See State Farm*, 463 U.S. at 43 (explanation is not "satisfactory" if the "explanation for its decision . . . runs counter to the evidence before" the agency.). In particular, the Fort Collins Natural Areas Department staff has found that when excessive shading and steep banks are restored, moderate flood events readily leads to extensive cottonwood recruitment. Hence, these types of efforts and observations made by Fort Collins contradict the SDEIS assertion of a baseline downward trajectory of cottonwood woodlands, indicating an incomplete disclosure of the baseline conditions in the SDEIS.

The analysis must be revised to include a quantitative (and spatial) analysis of the effects of all NISP alternatives on cottonwoods, and consider the role of floodplain topography as well as flows.

10.2.2 Inappropriate Analysis Based on Future Conditions

Wetlands and Riparian Resources Effects Report for the Mainstem of the Cache la Poudre River ("Resources Report"), Section 4.1.1, Trajectory for inundation of Riparian and Wetland Resources, Page 16

Statement: "*Part of the historical and future trajectory for the riparian and wetland resources of the Mainstem includes a continuation of the trend of less frequent inundation of wetland and riparian resources along the Mainstem*."

SDEIS Section 4.9.1.1, Resource Trajectory, Page 4-212

Statement: "*the trajectory of the wetland and riparian resources along the mainstem has been affected by historical and contemporary physical and hydrologic changes that have established a trajectory that is expected to continue under Current Conditions hydrology […] wetland and riparian plant communities along the mainstem will likely gradually shift to plant communities with species adapted to a drier environment and less tolerant of or dependent on flooding or shallow ground water levels…*"

Comment: The characterization of the trajectory of the riparian resource and phrase "trend of less frequent inundation" seems to indicate there will be ongoing hydrologic changes. Whereas other portions of the SDEIS perform analyses based on the current hydrologic conditions, the analysis of the riparian resource seems to be based on assumed future conditions, which are presumed to be worse than current conditions. This is not appropriate and downplays the effects of NISP. The analysis must be revised to base riparian analyses on current hydrologic conditions and not presumed future conditions.

10.2.3 Incorrect Conclusion That Current Flows Are the Primary Limitation

SDEIS Section 4.9.1.1, Resource Trajectory, Page 4-212

Statement: **"***The combination of flood flows that are no longer effective in establishing new stands of plains cottonwood, extensive stands of smooth brome and reed canarygrass that compete with cottonwood seedlings and nonnative woody vegetation that is establishing at rates equal to or greater than plains cottonwood,*

establish a trajectory for a future Poudre River riparian corridor that will likely be very different from the past and current riparian corridor."

Comment: As noted in comments below on the Resources Report, the primary cause for compositional changes to the riparian forest lies in physical constrictions of the river, banks, and floodplain. Nowhere in the SDEIS or supporting documents do data or ecologically-based logic demonstrate that current flows are a limitation. In contrast, as noted elsewhere in these comments, moderate flow events (such as the 5 year flow) can and do support cottonwood recruitment. *See State Farm*, 463 U.S. at 43. Further, intense, high flows cause mortality (through scour and burial) of brome and reed canarygrass in some years.

Furthermore, while this transition may be occurring on the landscape, it is arbitrary and incorrect to detach changes in flows due to NISP from this trajectory. The body of research on riparian ecology consistently relates flow regimes with trends in cottonwood populations. Flooding plays an essential role in the recruitment of cottonwood and a reduction in flooding invariably negatively affects cottonwood recruitment. Such will be the impacts from NISP and those impacts must be identified and analyzed. The analysis should be revised to reflect the impacts described above.

10.2.4 Incorrect Conclusions Regarding the Crossing of a Biologic Threshold

SDEIS Section 4.9.8, Unavoidable Adverse Impacts, Page 4-250

Statement: "*The 2012 Wetlands and Riparian Resources Baseline Report concluded that the mainstem had crossed a biologic threshold that limits the recruitment of plains cottonwood and is in the process of altering the composition of the riparian woodlands.*"

Comment: The data presented in the Resources Report does not support this conclusion, as discussed further below. In fact, the word "threshold" does not appear in the Resources Report. The analysis should be revised to remove references to a biologic threshold.

10.2.5 Incorrect Conclusions Regarding Green Ash

Resources Report, Section 5.3.1, Vegetation Trends, Nonnative Species, Page 26

Statement: "*Table 4. Ranking of Nonnative Species at each Poudre River Riparian Vegetation Study Site.*"

Comment: In the above-referenced table, the green ash species is recorded as a "4," being infrequently observed the lowest category for all six study sites. This data contradicts the oft-repeated conclusion throughout the SDEIS on the trajectory of this resource that the green ash species is likely going to replace cottonwoods and become the dominant species. By contrast, Table 5 (page 28) of the Resources Report reports young green ash (<2 dbh) receiving a ranking of #1 for Watson Lake and Martinez Park. The SDEIS Section 4.9.1, page, 4-212 suggests the upper two sites will continue to be dominated by narrowleaf cottonwood. These findings and inconsistent conclusions must be corrected.

10.2.6 Incorrect Conclusions Regarding Cottonwood Recruitment

Resources Report, Section 5.3.3 Size Class Distribution of Woody Vegetation, Page 29

Statement: "*Only three species, box elder, narrowleaf cottonwood, and plains cottonwood, were recorded in the two largest size classes that included individuals greater than 18 inches dbh. … At Martinez Park, although green ash occurred with the highest frequency, most of the individuals occurred in the smallest size class. … The Archery site had the fewest number of individuals compared to the other five sites. … Green ash was rarely recorded at the Archery site….*"

Comment: This discussion from the SDEIS is linked to the data in Table 6 (page 30) which shows, as the discussion suggests, only cottonwood, boxelder and crack willow species occur in the largest size classes. The data clearly shows that only cottonwoods demonstrate an inverse J-curve distribution of size classes. This type of distribution indicates ongoing recruitment and survival for cottonwoods. The issue with cottonwoods is that in these sites they are not demonstrating large recruitment events, but they are demonstrating continued modest recruitment.

The lack of older/larger green ash may indicate a transition is just beginning whereby green ash will become more dominant but it also may indicate green ash is not surviving past smaller/younger age classes. Ignoring this underlying uncertainty has led to incorrect conclusions**.** The analysis must be revised to properly analyze and acknowledge ongoing recruitment and survival for cottonwoods.

10.2.7 Inaccuracies Regarding Cottonwood Recruitment and Moderate Flow Events

Resources Report, Section 5.8.1, Establishment of Plains Cottonwood, Page 50

Statement: "*Cottonwood seedling recruitment is episodic and relatively rare even along free-flowing streams (Mahoney and Rood 1998)…. If river stages decline too rapidly, drought stress produces substantial seedling mortality (Scott et al. 1993). Along meandering rivers, successful establishment is characteristically associated with medium to large floods. Researchers have also determined that it is moderate and large flood events that directly enable cottonwood recruitment, whereas smaller flood events are often insufficient for cottonwood replenishment.*"

Comment: The use of the term "moderate flood event" is inconsistent and ill-defined throughout the report. It is used in Section 4.2.2 of the 2014 Technical Report (Riparian Effect) as follows: "the moderate flows of 580 to 1900 cfs do not currently inundate riparian and wetland areas with enough frequency to support or renew riparian areas and at most sites NISP will not substantially reduce the frequency of inundation by these moderate flows." The term "moderate flows" must be defined. The analysis must be revised to properly consider cottonwood recruitment and moderate flow events, as described above.

10.2.8 Disregard of Non-Major Recruitment Events

Resources Report, Section 5.8.2, Establishment of Plains Cottonwood Along the Poudre

Statement: "*An examination of cottonwood age classes in the Fort Collins reach of the Poudre River found the last major recruitment year was 1983 (Shanahan 2011a). The lack of natural lateral migration of the*

Poudre River has manifested a riparian forest that is no longer connected to the high flows and flooding with which the forest historically evolved (City of Fort Collins 2011)."

Comment: The SDEIS focuses on the last major recruitment event on the Poudre River in 1983. Fort Collins' experience suggests that armoring, and associated constraints on the channel and banks, as well as an altered species composition, most limits successful regeneration. The widespread recruitment observed at restoration sites following the 2014 spring flows (which peaked at ~6,000 cfs in late May) demonstrates the accuracy of this concept. This contradicts conclusions in the SDEIS, which state that the current flow regime is the major limiting factor.

The above image from McMurry Natural Area provides evidence of the potential for current flows to establish cottonwoods when the right physical conditions are present. 2015 seedlings are smaller (in the foreground) and 2014 saplings are seen on slightly higher ground (in the middle of the picture). *See State Farm*, 463 U.S. at 43 (explanation is not "satisfactory" if the "explanation for its decision . . . runs counter to the evidence before" the agency.). The analysis must be revised to address the role of moderate flood flows as well as topographical limitations to cottonwood recruitment.

10.3 COMMENTS REGARDING AQUATICS AND FISHERIES

10.3.1 Lack of Temperature Analysis

SDEIS Section 4.3.2.2, River Temperature

Statement: "*Thus, all NISP alternatives would be expected to increase stream temperatures at times in some reaches of the Poudre River. Additional detail on the conceptual understanding of the system and qualitative anticipated effects of NISP alternatives on stream temperature are provided in Hydros (2014a).*"

Comment: The SDEIS includes only a qualitative review of water temperature data with a subjective discussion of potential changes with NISP. The lack of a quantitative analysis of change in water temperature does not allow an evaluation of impacts to the aquatic species. The conclusions of "minor or moderate" impacts to aquatic resources and fisheries are not supported without quantification of the amount of change.

The Hydros 2014 Stream Temperature Report ("Hydros Report") is qualitative only with no quantification of change in temperature with the proposed alternatives, which GEI cites for water temperature impacts to fish and macro invertebrates. However, Hydros conducted dynamic water temperature modeling for the Windy Gap Firming Project EIS and CWA Section 401 certification. Miller Ecological also conducted dynamic water temperature modeling for the Moffat Collection System EIS and CWA Section 401 certification. No adequate basis is provided for the lack of such an analysis for NISP.

The change in Daily Maximum ("DM") and Mean Weekly Average Temperate ("MWAT") are derived from an hourly water temperature model. The CDPHE has protocols to determine the antidegradation analysis for the project from the modeled data. The anti-degradation calculation first calculates a Baseline Allowable Increment ("BAI"), which is 15% of the value between the baseline water temperature (current conditions) and the temperature threshold (either DM or MWAT). For example, if the baseline water temperature is 1.0 C away from the threshold then any change in water temperature greater than 0.15 C is considered a significant degradation. The analysis is complex to complete both the modeling and the antidegradation analysis.

The Baseline Allowable Increment ("BAI") for water temperature like other water quality constituents is 15%. The 15% translates to 0.15 C change for every 1.0 C lower than either the DM or MWAT threshold. The incremental change decreases the closer the water temperature gets to the threshold. If NISP results in an increase in water temperature, then the BAI may be smaller for Fort Collins when the Corps completes the analysis for the Halligan Project.

The lack of quantification of water temperature does not allow Fort Collins to meaningfully analyze NISP's impacts to aquatic resources in the Poudre River corridor. The change in water temperature is perceived to be small. However, even a small change in water temperature can result in a significant impact. The impact could be to the aquatic resources or to water treatment facilities in meeting discharge requirement, or both.

The full analysis of water temperature must be completed prior to release of the final EIS. Adequate review of the modeling approach and data sets should be allowed for participants in the Common Technical Platform. For example, Fort Collins should be provided with interim products to review the applicability and adequacy of the analyses. Mitigation for any approved alternative should include a requirement designed to offset any water temperature increase. The mitigation could be release of some amount of cold or cool water to offset the water temperature increase. The current mitigation is conceptual and does not include a sufficient detail and analyses to meet the applicable legal requirements.

10.3.2 Approach to Impacts on Aquatic Biological Resources

SDEIS Section 4.12, Aquatic Biological Resources

Statement: "*This section summarizes the predicted potential aquatic biological resources effects of the NISP alternatives. Fish, benthic invertebrate, periphyton, and aquatic plant communities and their habitat represent the components of the aquatic environment of interest for the project. […]*"

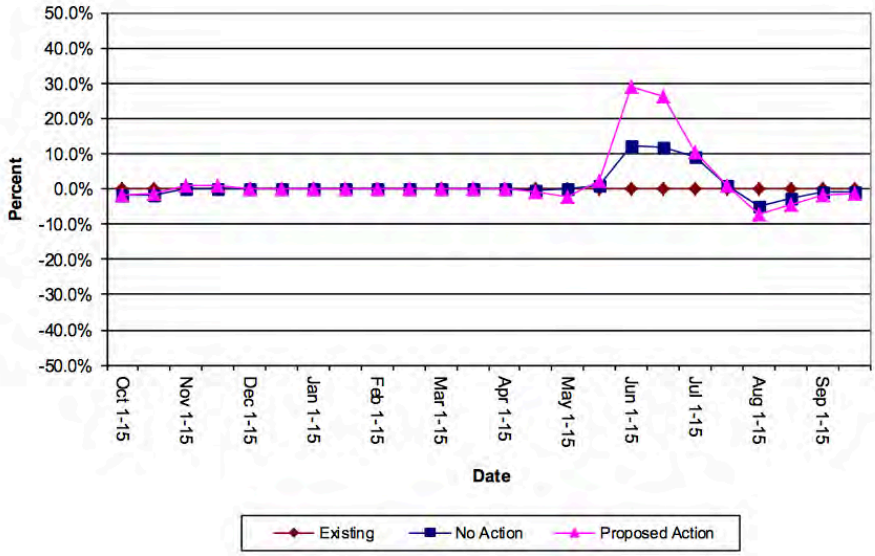
Comment: The conclusions for impacts of the NISP alternatives on aquatic habitat are based on an overly simplistic approach to calculation of changes to aquatic habitat. The change in fish habitat is based on synthetic graphs of 20%, median and 80% habitat constructed from a 25 year daily habitat time series. The annual graphs are then summarized into minimum, maximum and average habitat values. The percent change between the single average value derived from a 25 year daily simulation is used to determine the level of impact. This oversimplification of a detailed analysis does not allow the evaluation of inter- and intra-annual changes in habitat, which affect the fish species. (Annear et al. 2004). Further, there is no means to directly compare a habitat value with a specific discharge.

Page 4-314 of the SDEIS discusses changes in habitat with changes in flow. However, there is no means to verify any of the statements since computational data for habitat-flow time series is not presented in the supporting aquatic resource technical documents. For example, the recent EIS for the Windy Gap firming project included the basic habitat time series data by water year type as part of the technical supporting documentation (see following example Figure 3-101, Windy Gap Firming Project FEIS). The display of habitat by water year type or actual year allow the reader to make a direct comparison of habitat change between alternatives.

The aquatic habitat analysis up through the development of habitat versus flow determinations follows the standard approach used in instream flow studies. (Bovee et al. 1998, USGS 2001). The divergence from the standard approach is in the calculation of habitat over time. The use of a synthesized habitat values based on recurrence and then a single average value derived from the synthesized data masks the relationship of habitat over time. This approach does not allow a full analysis of impacts to the aquatic resources within Fort Collins, especially in the downtown corridor, which is highly valued.

The analyses and conclusions must be revised in these proceedings to address the deficiencies described above

Figure 3-101. Percent change in adult brown trout habitat from existing conditions on the Colorado River below Windy Gap for an average water year.



10.4 COMMENTS REGARDING ANALYSES OF WETLANDS AND RIPARIAN AREAS

10.4.1 Lack of Defined and Objective Standards

SDEIS Section 4.9.2, Methods, Page 4-213

Statement: "*Moderate effects would result in a clearly detectable change, with measureable effects. Moderate is used when beneficial or adverse effects would be noticeable, and the existing wetlands, riparian resources, or other waters would likely be lost. Moderate effects typically are long-term. Major effects would result in readily apparent effects with substantial consequences. Major is used when permanent impacts on large areas (10 acres) of wetlands, riparian areas, or other waters would occur.*"

SDEIS Section 4.12, Aquatic Biological Resources Methods

Statement: "*The overall impact was categorized as negligible, minor, moderate, or major according to professional judgment by taking into account the individual impacts to the components of the aquatic environment based on the magnitude of the changes, the risk of crossing an ecological threshold, the changes in habitat availability for other species and life stages in that segment, and the predicted changes to other relevant aspects such as water quality, temperature, channel geomorphology, sedimentation, and riparian vegetation.*"

Comment: The reliance on professional judgment without distinct metrics defined to determine the relative change between alternatives precludes replication of the conclusions in the SDEIS regarding of the level of effect. The subjective determination of impact makes it difficult to determine if any proposed mitigation is adequate to minimize the impact from an alternative. The above are

examples of the vague, qualitative language and standards used throughout the SDEIS. The SDEIS does not identify solid, scientific basis or objective standards for the proffered definitions.

For instance, regarding the statement from SDEIS Section 4.9.2 above, the permanent loss of wetlands is considered only a "moderate" effect despite its permanent nature. Also, the determination of "major" effect as one greater than 10 acres of permanent loss appears arbitrary without any reference to a reason for this delineation. In this arid region, riparian habitats and wetlands represent a small portion of the arid landscape and yet provide critical support for a majority of wildlife and increase overall richness in the region (Merritt et al. 2010, Naiman et al. 1993, Webb and Leake, 2006). Given the importance of these habitats, a reference or explanation for these definitions is required.

The analyses must clearly set forth all definitions and standards and the bases therefore. To the extent that this has not been completed in the SDEIS, the subject analyses must be revised accordingly.

10.4.2 Inconsistent Identification of Acres of Effected Wetlands

SDEIS Section 4.9.9, Impact Summary, Page 4-250

Statement: "Table 4-68 *Summary of unmitigated effects on wetlands and waters. 9 acres permanent impacts under Alternative 2.*"

2014 Riparian Effects Technical Report, Section 4.3.3, Page 41

Statement: "*The mapped potentially sensitive vegetation classes for Segments A through F are presented for varying distances from riverbanks in Table 14. For the entire length of the Mainstem there are about 220 acres of the potentially sensitive vegetation classes. Segment B is about 6 miles long and has about 10 acres of potentially sensitive vegetation within 100 feet of the river.*"

Comment: The SDEIS and its supporting reports appear to inconsistently quantify the number of effected wetlands, specifically for Alternative 2 in Segment B and with the result of reducing the number below the potentially-arbitrary threshold of 10 acres. This value is presented as 10 acres (a major effect) in the Resources Report and as 9 acres (a moderate effect for Segment B) in the SDEIS and summaries.

The analyses must correct or explain this discrepancy and the reasons therefore. The analyses must also apply all thresholds and standards in a consistent and objective manner. To the extent that this has not been completed in the SDEIS, the subject analyses must be revised accordingly.

10.4.3 Inconsistencies in the Riparian and Wetland Analyses

SDEIS Section 4.23, Summary, Page 4-415

Statement: "Table 4-109 *Wetlands from Poudre River flow changes (indirect effects).*"

Comment: Background on this analysis is provided in the Resources Report. On page 25 of that report, it states "the repeated stress of numerous years with prolonged groundwater declines could lead to loss of wetlands; however, most herbaceous wetlands would recover in subsequent years when the hydrologic support returns." If wetland hydrology is lost for a prolonged period of time, but returns occasionally (and infrequently such as during wet years or precipitation driven flood flows), this should be considered a permanent impact.

The summary table provided at the end of Section 4 of the SDEIS is the most succinct and comprehensive presentation of impacts of the alternatives in the SDEIS. However, this table omits the riparian areas despite having identified minor to moderate impacts throughout Table 4-69. Without explanation, this is arbitrary and suggests that the impacts from Alternative 2 are fewer and less severe that the underlying analyses indicate.

Table 4-69 also summarizes conclusions on river stage, alluvial groundwater, inundation, and other flood related functions analyses which are all linked to groundwater and soil saturation in the riparian zone. They should, at a minimum show common trends and scale of responses. However, Table 4-69 presents inconsistent and sometimes opposing results. For example, the results for Alternative 2 for "River Stage" are a moderate effect on Segment B whereas for "Alluvial Groundwater" a negligible effect is anticipated. Similarly, regarding "Inundation" there will be negligible impacts whereas for "Other Flood-Related Functions" (directly related to inundation) moderate effects are predicted. It is confusing for these pairs of analyses to show results that span from imperceptible to long term loss of resources.

Additionally, the last line on Table 4-109 describes "Other Flood-Related Functions." A determination of moderate effect is made for Alternative 2. However, the only reference to this conclusion comes from a single sentence on p. 4-218 (Indirect Effects Common to all Alternatives): "Reductions in inundation would potentially have some level of effect on these functions or the frequency at which these functions are provided." The conclusion lacks a basis. It is important as these processes support critical resilience factors such as pollutant filtration and floodwater attenuation. It msu be supported by something more than a single, conclusory sentence that is apparently without basis.

These contrasts and vacillations over the impacts to wetlands and riparian areas do not enable Fort Collins, other stakeholders, and ultimately, the Corps, to meaningfully analyze the impacts to these resources.

The analyses must consistently treat all alternatives. To the extent that this has not been completed in the SDEIS, the subject analyses should be revised accordingly. This confusion over the timing of impact of Alternative 2 persists throughout the Riparian and Wetland Conclusions, as discussed elsewhere in these comments.

10.4.4 Failure to Adequately Consider Long-Term Changes Resulting from NISP

Resources Report, Section 3.4, Wetland Functions, Page 12

Statement: "*Of the nine fundamental variables, only water source, water distribution, water outflow, chemical environment, and geomorphology are expected to potentially change in the short term for riverine wetlands as a result of the NISP alternatives*."

Comment: It is not clear why the above-referenced analysis only considers short-term changes. NISP would cause a permanent change in the flow regime of the Poudre River that will affect wetland conditions and related functions. Long-term changes to hydrology and vegetation variables, and the related changes in functions, must be fully analyzed.

10.5 COMMENTS REGARDING GROUND WATER ANALYSES AND ISSUES

10.5.1 Inaccurate Assumptions about Ground and Surface Water Interactions

SDEIS Section 3.5.3, Poudre River, Page 3-85

Statement: "*The river loses water to alluvial groundwater where the river crosses very permeable former channels and regains water when the river crosses former channels farther downstream. (ERO 2012b).*"

SDEIS Section 3.5.3.4, Poudre River Study Sites, Page 3-89

Statement: "*Water level observations at the six transects show a range of relationships between the alluvial ground water and river stage. […] In these areas, if alluvium receives recharge from a rising river stage, the alluvium discharge this water back to the river within a very short period.*"

SDEIS Section 4.5.1, Methods, Page 4-177

Statement: "*Using the largest predicted stage reduction at each study site for each of the action alternatives, and river stage-ground water relationships developed for each monitoring well, graphs were constructed with predicted reduction in depth to ground water as a function of distance from the river for the action alternatives (ERO 2013b).*"

Comment: The description of river losses on the Poudre River in the SDEIS oversimplifies such patterns and establishes inaccurate assumptions for the subsequent impact analysis of Fort Collins' wetlands and riparian resources.

The analysis disregards key aspects of the alluvial exchange processes, it should be revised, e.g., to consider:

- The alluvium throughout the river corridor is quite permeable, and alluvial recharge is more widespread and complex than flow through "former channels" implies.
- River gain-loss patterns are influenced by streambed heterogeneity, variations in streambank material, channel geometry, saturation, evapotranspiration, and local groundwater and surface water elevation. As a result, the volume of water recharging the alluvium and its residence time will vary depending on differences in hydraulic head between the river and surrounding aquifer (per Darcy's Law). These head differences are in turn influenced by

numerous local factors such as ditch diversions, supplemental recharge, etc. which vary on subreach and site-specific scales.

- Even brief transient recharge is important for ecosystem processes, such as nutrient processing, and should not be discounted.

10.5.2 Shortcomings in the Data Used for the Ground Water Analysis

SDEIS Section 4.5.1 Methods, Pages 4-176 to 4-177

Statement: "*As part of additional studies performed for the SDEIS, a hydrologic investigation of the mainstem of the Poudre River was conducted from 2009 through 2011. […] The 2012 Ground Water Report (ERO 2012b) provides details for the six transects that were established along the Poudre River, data collection methods, and discussion and interpretation of the results. […] Using the largest predicted stage reduction at each study site for each of the action alternatives, and river stage-ground water relationships developed for each monitoring well, graphs were constructed with predicted reduction in depth to ground water as a function of distance from the river for the action alternatives (ERO 2013b).*"

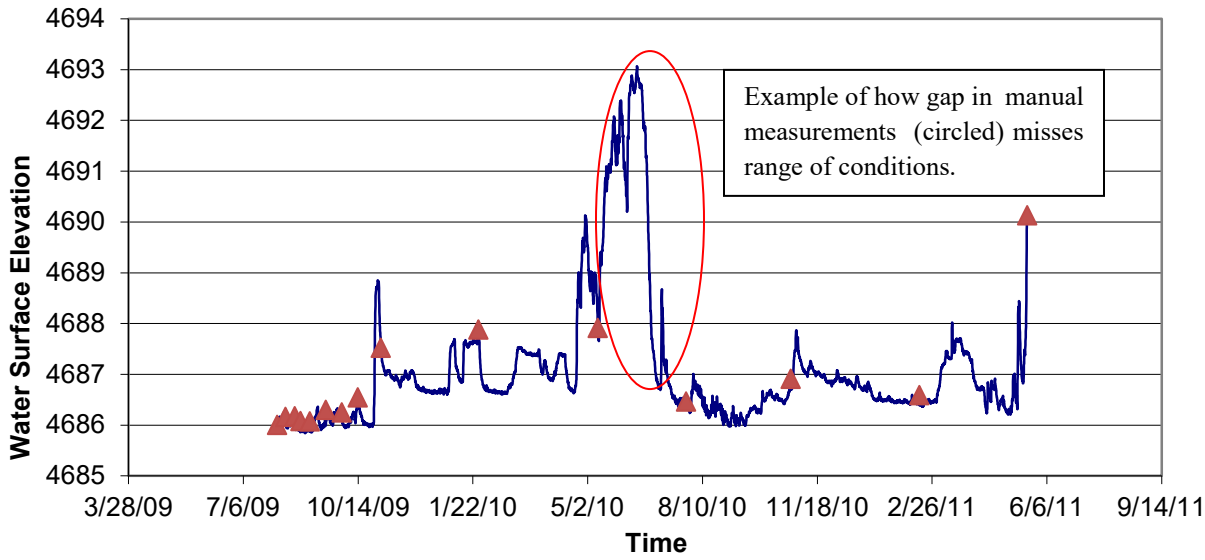
Comment: Data used to establish the river stage-ground water relationships appear not to be representative, complete, or consistently interpreted as described below.

As identified in Fort Collins' comments to the Draft Baseline Ground Water Technical Report in August 24, 2011, which are part of the administrative record in these proceedings, ground water wells at Lee Martinez Park may not be representative of the segment because they are located in areas that are supported by supplemental ground water recharge due to their proximity to a flooded gravel pit having a water surface that is maintained at an elevation about 10 feet higher than the river due to the inflow of "salvaged water." The SDEIS and the 2013 Ground Water Effects Analysis support the City's concerns from 2011. While it is true that upgradient groundwater recharge may occur in numerous other places along the river, the magnitude of these influences on the water table varies. For example, variation in groundwater levels is evident within the Martinez transect itself, where piezometers located at similar distances from the river but on opposite sides respond quite differently. During the EIS study, for example, the differences in reported ground water elevations for L3 and L4 – which are relatively equidistant and across the river from each other – was an average of 0.87 foot and ranged from 0.27 foot (9/16/09) up to 6.21 foot (5/11/09). These local variations in the aquifer make it questionable to apply relationships established based on distance from the river in one location to another location, even in the same segment.

The SDEIS is inconsistent by first stating that groundwater monitoring at the study sites should be considered "as a whole," but then eliminating data from two of the six transects because the observed measurements did not fit the anticipated patterns for distance from the river relationships. According to the Wetlands and Riparian Effects Technical Report, page 8, "Because a clear relationship of change in ground water levels and river stage with distance was not apparent at Eastman park and 59th Avenue, an average of the four other sites was calculated to estimate the percent change of ground water based on stage changes at various distances." The rationale for applying transect data from one location to another is not sufficiently justified, and if one-third of the study results do not fit within the hydrogeologic conceptual model and analysis method, it suggests the model and method need to be refined.

The datasets used to establish the river stage-ground water level relationships are incomplete because continuously recorded data from loggers were not available for all wells or river stage locations. Widely-spaced, manual readings (and weekly average readings) do not capture the full range of relationship between river and groundwater. This is an important consideration because Lee Martinez Park did not have a river logger, so the river stage-ground water relationship was based on sporadic manual readings that cannot accurately reflect the relationship. To demonstrate the type of data that can be missed see the figure below (Modified Figure 13 from the ground water technical report) which compares manual readings (red triangles) to continuous logger readings. The circled period of record demonstrates how the entire groundwater peak was missed by the manual readings in spring 2010.

Figure 13. 59th Street - Well 59-3



It is also unclear how accurate river stage-groundwater relationships could have been established for "each monitoring well," when half (14) of the 28 wells and two of the six surface water stations were not equipped with continuous data loggers. Additionally, for two of the reaches, piezometer data were not used and instead averages from the other four sites were applied, and by definition using an average will not show maximum effects.

Rather than discount or replace site-specific data with averages from other segments, river subreaches could be characterized based on hydromorphic classifications (e.g., based on similar geometry, boundaries, upgradient influences) and relationships could be developed and applied based on their classifications. Site-specific data could be used, at a minimum for comparison, with each pieziometer having its own water table fluctuation relationship, despite the fact it may not be linear.

SDEIS Section 4.9.4, Indirect Effects Common to Action Alternatives, Page 4-219

Statement: "*The effects of decline in river stage on alluvial ground water levels greater than about 100 ft from the river are predicted to be generally less than the 0.5 ft impact threshold.*"

SDEIS Section 4.5.7, Impact Summary, Page 4-187

Statement: "*As discussed above, reductions in alluvial ground water levels were used to predict resource effects and are addressed in those sections of the SDEIS. The predicted reductions to ground water levels in the alluvium would be similar for all action alternatives. Within 50 ft of the river, ground water level differences between the alternatives would be a maximum of about 0.5 ft. The difference in predicted reductions in ground water levels between alternatives would decrease as a function of distance from the river (4-59).*"

Comment: The basis for the statement in Section 4.9.4 is unclear. According to Figure 4-59, changes in depth to ground water greater than one foot were predicted at each of the graphed sites beyond the 100 foot distance from the river. Therefore, the 100 foot distance from the river appears to be unfounded, and groundwater impacts occur at further distances.

Furthermore, based on the data collection and analysis methods that were used, it is unknown if impacts greater than 0.5 foot and/or beyond 50 foot from the river may occur. The impact analysis using the distance from the river function does not address times and locations where the river influence extends further out due to factors such as river configuration and more permeable alluvial deposits. Impacts at greater than 100 feet from the river in some segments should be more fully evaluated.

10.5.3 Misinterpretation of Data

SDEIS Section 4.5.3.2, Poudre River Segments, Page 4-182

Statement: "*…The effect of these buried channels can be seen on Figure 4-59 where predicted ground water level reductions are out of character with distance from the river and neighboring monitoring wells.*"

Comment: The observed influence of the river at greater distance from the river is not "out of character" but rather reflects the character of many places along the river. The alluvium is very heterogeneous with permeable pockets of material, not just channels, known to occur throughout the deposits. It is not surprising for river influence to occur at greater distances from the river than the analysis expected, and it is not out of character. These observations demonstrate the limitations of assessing impacts to wetlands and riparian areas based on the distance from the river approach. This interpretation should be re-evaluated.

SDEIS 4.5.3.2.1 Poudre River Segments, Segment C, Page 4-183

Statement: *"Similar to Segment B, the reductions in ground water levels decrease in a relatively short distance from the river."*

Comment: The reduction in groundwater levels in this segment is not similar to Segment B, so this statement appears to under report the effects. At 200 feet from the river in Segment C, there is still a 1-ft decline in ground water for the three alternatives, which is twice the impact observed in Segment B at the same distance (where only 0.5 foot decline is observed, probably due in part to the upgradient recharge as previously discussed). This interpretation should be re-evaluated.

SDEIS Section 4.9.4, Indirect Effects Common to Action Alternatives, Page 4-219

Statement: "Table 4-70 in Section 4.9.9 summarizes the predicted depths to the alluvial ground water level for the action alternatives. None of the declines in groundwater levels within the cottonwood woodlands are predicted to be greater than 2.5 ft below the deepest annual water table depth during the growing season. Effects on the cottonwoods associated with declines in river stage of 2 feet or greater are predicted to be limited to periodic short-lived stresses because the estimated declines in alluvial ground water levels are predicted to occur infrequently (i.e. not predicted to be sustained) and are generally predicted to occur in May at the beginning of the growing season when soil moisture conditions are typically favorable for supporting cottonwoods without dependence on shallow ground water levels."

Comment: Impacts of ground water declines in riparian areas appear to be underestimated for multiple reasons. There appears to be insufficient basis to claim that the maximum declines will be limited to periodic short-lived stress. The frequency, duration, and impact of declines will be influenced by the change in the volume of water storage and availability in the riparian zone (e.g., which could be done using a daily water budget approach). There is no discussion of the effects of change in the volume of riparian water storage over time, e.g., to address impacts when there is already a groundwater deficit due to drought years or extended incremental declines in recharge. Reliance on May precipitation and soil moisture to offset impacts is inherently uncertain and should not be justification for discounting negative effects. Further, May precipitation already affects the system and is not a new measure to offset NISP diversions. The ecological significance of some key exchange processes between rivers and ground water are not evaluated. For example, saturated soils during alluvial recharge play an important role in nitrogen processing (and can provide a nitrogen pulse at a critical time in the growing season) when e.g., anaerobic conditions trigger microbial denitrification. This interpretation should be re-evaluated.

10.6 COMMENTS REGARDING ANALYSES OF POUDRE RIVER WETLANDS

10.6.1 Inappropriate Assumption of Changes in River Stage of 0.5 Feet or Less

SDEIS Section 4.5.1 Methods, Pages 4-176 to 4-177

Statement: "*This approach was taken because most of the reductions in river stage are predicted to be 0.5 ft or less (Appendix A of the 2014 Wetland and Riparian Effects Report) and therefore would have had only minor reductions on associated alluvial groundwater levels. A maximum effect scenario was of interest because alluvial ground water levels can influence cottonwood woodlands and reductions in ground water levels below the annual water table low (Section 4.3.1 of the 2014 Wetland and Riparian Effects Report.)*"

Resources Report, Section 4.2.2, River Stage, Page 21

Statement: "*Changes of 0.5 foot or greater in river stage during the growing season was selected as the threshold for potential impacts because herbaceous wetlands would likely start being affected by groundwater declines of greater than 0.5 foot. Declines in ground water elevations during the growing season of less than 0.5 foot are well within the range of normal fluctuations that are already occurring as observed in monitoring wells at the riparian vegetation study sites (ERO 2012a).*"

SDEIS Section 4.9.2.1.1, Impact Thresholds, Poudre River Stage, Page 4-214

Statement: "*....were reviewed for changes in river stage of 0.5 foot or greater during the growing season... A threshold of 0.5-foot decline in river stage was used to determine potential effects on herbaceous and shrub wetlands. Herbaceous wetlands are potentially the most sensitive communities to declines in alluvial ground*

water levels. The Corps' technical standard for wetland hydrology is that the wetland site is inundated (flooded or ponded) or the water table is 12 inches or less below the soil surface for 14 or more consecutive days during the growing season at a minimum frequency of 5 years in 10 (50% or higher probability) (Corps 2005). Assuming an average midpoint of 0.5 foot for ground water levels for wetlands, a decline of less than 0.5 foot in ground water levels would still meet the threshold for wetland hydrology."

Comment: Using the 0.5 foot decline combined with a mid-point of 0.5 foot ground water level below ground surface is an inappropriate threshold for assessing wetland impacts for a maximum effects analysis, and the basis for this approach is neither justified nor logical. A wetland with an initial water table near the 1 ft depth would be impacted by declines of less than 0.5 ft. If, for example, a wetland has a water table depth of 11.9," then a decline of less than 0.2 foot could cause a shift from wetland to non-wetland hydrology. Therefore, a maximum effects analysis should evaluate impacts from a lower starting elevation in herbaceous wetland areas (especially based on the assumption that in a dry year the water table will likely be starting out at a worst case scenario).

Section 4.2.2 is the first location in the SDEIS that this threshold is identified. However, no basis for this threshold is provided; and such a threshold is not a convention in wetland science. The response of vegetation and soil microbiota to changes in ground water levels and fluctuations is different in different textured soils, on sites with stable versus variable water tables, and on plants with different root morphologies and physiological responses. The SDEIS ignores the context and range of possible responses for the Poudre River. The statement that the 0.5 foot of fluctuation and decline falls within normal ranges of fluctuations is not relevant since the alternatives do not affect these short-term fluctuations, but rather, they compound them and cause a long-term decline of average ground water depths amidst ongoing smaller fluctuations. This will cause significant and long-term changes in wetland hydrology, which will cause changes in vegetation composition and structure, soil microbial processes, and habitat quality.

The assumption that river stage declines exceeding 0.5 foot for greater than 10% of the period of record may adversely impact wetlands is flawed as discussed above. It would be more realistic and less arbitrary to base the approximate average depth of groundwater for wetlands on the type of wetland plant community present along the corridor. For example, *Typha* (cattail) and *Scirpus* (bulrush) would have groundwater at approximately ground level (fully saturated soil column and possibly standing water), a community dominated by *Carex nebrascensis* would have groundwater at approximately six inches to one foot, and a *Salix exigua* dominated system may have ground water at depths of greater than one foot (Henszey et. al., 2004). Thus, certain communities are more vulnerable to changes in depth to ground water and seasonal fluctuations in ground water.

Any wetland community with the average groundwater table deeper than six inches may no longer be able to support wetland plant communities and wetland functions with a reduction in groundwater less than 0.5 foot. For example, cattail marshes would likely see a shift in species composition whereas drier wetlands like those dominated by *Carex nebrascensis* may be completely lost (Henszey et. al., 2004).

The analysis should be revised and corrected so as not to include the assumption of uniform response to altered wetland hydrology as discussed above. If no alternate approach is applied,

examples of other federal permits or peer reviewed research that has used this approach should be provided to help the reader understand the basis for the conclusions reached.

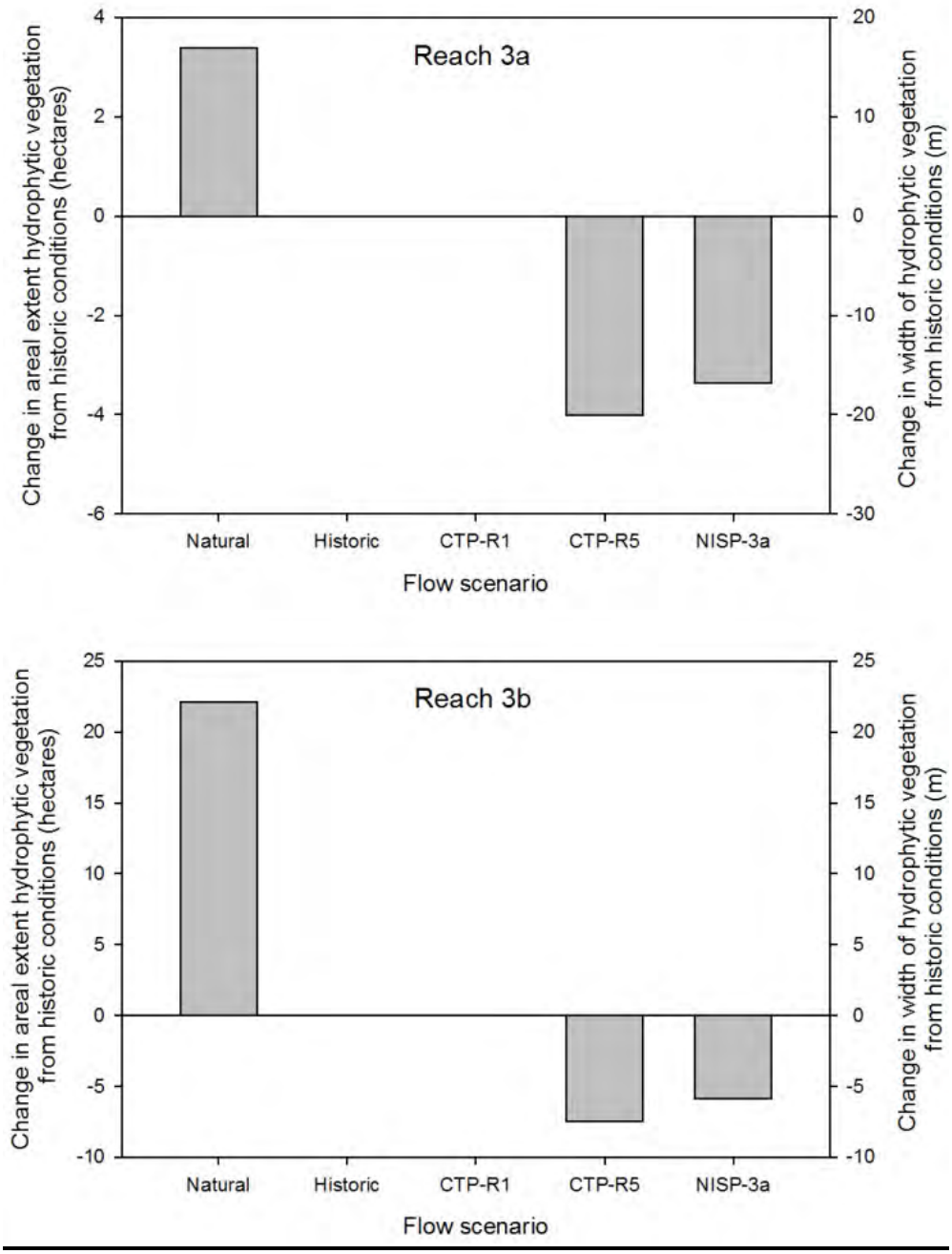
10.6.2 Inappropriate Assumption of Changes of a Duration of 10% or Less

SDEIS Section 4.9.2.1.1, Impact Thresholds, Poudre River Stage, Page 4-214

Statement: "*At 10% or less the effect would be negligible because 10% represents an average of 2 weeks during each year of the growing season and the Corps' technical standard for wetland hydrology is that the wetland is inundated…for 14 or more consecutive days…..*"

Comment: If a site currently has wetland hydrology for two weeks per year (thereby just marginally meeting the USCOE standard for jurisdicaitonal wetland), then a shift of less than 10% of the period (such as one week per year) will cause the site to be inundated less than the two-week criteria in the USCOE definition. Altering hydrology, by definition, will indeed cause changes in the inundation duration. This is a cause and effect linkage that cannot be contested. The changes will effect wetlands acorss the entire gradient, but more so for those wetlands just inside the two week of inundation criteria.Such an averaging approach misses a considerable area of wetlands that will be affected and results in an underestimation of impacts. Hydrology is what distinguishes wetlands and riparian areas from adjacent uplands. The effects of altered flows well established in the literature (e.g., Merritt et al. 2010). Reduced peak flow, and reductions in inundation duration will cause narrowing and decreased extent of riparian areas and areal loss of wetlands.

Further, Fort Collins has run the CTP hydrology through its ERM vegetation model and has made the following findings. (Please see Appendix B5 Riparian Vegetation of the Poudre River Ecosystem Response Model for methods.) The results of this modeling are shown in the following graphic. The graphic illustrates the expected reduction in the width of hydrophytic vegetation in two reaches of the river from about the Larimer and Weld diversion to the Lake Canal in Martinez Park. Clearly the preferred alternative would have substantial long-term impacts to this band of vegetation. The analysis should be revised to not include the subject assumption as discussed above.



10.6.3 Inappropriate Assumption Regarding a Shift in Wetland Vegetation

SDEIS Section 4.9.2.1.1, Impact Thresholds, Poudre River Stage, Page 4-215

Statement: "*Stage declines of this magnitude during the growing season are predicted to results in a shift in species at wetlands dominated by obligate wetland species (i.e. cattail and threesquare bulrush) to those that tolerate greater fluctuations in river stage such as reed canarygrass. Since most wetlands along the banks of*

the mainstem are dominated by reed canarygrass and sandbar willow, two species that can tolerate greater range of groundwater levels effects are predicted to be minor and likely not perceptible along Segment B."

Comment: The overall basis of the wetlands analyses lies in whether any given wetland is going to shift from a wetland supporting hydrology that meets the definition of a wetland given the Corps' standards. The argument in the SDEIS shifts here, as cited above, to explain any potential impact to focus on species. However, this shift in focus does not change the fact that the subject wetlands will be lost as a result of NISP. Further, shifts in hydrology that favor generalist and stress tolerant species like reed canary grass is undesirable as this is a non native species that is persistent and competes for resources and space with desirable native riparian species.

Further, the statements made about shifts in species are based upon speculation rather than data and information. The SDEIS cites no analyses, no species distribution modeling, or other objective assessment to support the statements. There has been no consideration of context. For instance, species distributions might shift toward the channel. No evidence is provided to support the statement that most wetlands are reed canarygrass and sandbar willow.

The analysis should not include the above statements unless they are supported by an analysis, modeling, or other objective assessment. To the extent that this is not completed, such statements should not be included in the analysis.

10.6.4 Failure to Consider Permanent Shift in Poudre River Flows

Resources Report, Section 4.2.2, Stage Effects on Herbaceous and Shrub Wetlands, Page 24

Statement: "*Many types of wetlands in the West experience periods of drought and water stress each growing season but are resilient when supportive hydrologic conditions return. The repeated stress of numerous consecutive years with prolonged ground water declines could lead to the loss of wetlands; however, most herbaceous wetlands would recover in subsequent years when the hydrologic support returns.*"

Comment: The preferred alternative causes an absolute shift (decline) in groundwater levels. Even if wetlands in the western United States experience periods of drought and could recover, there is a quantifiable change that would occur under the preferred alternative. This explanation seems to be excusing the impacts rather than identifying them. A longer period of drought to a wetland can lead to a reduction in wetland condition (loss of functions, shifts in species composition) and/or a change or loss of the wetland plant species (often resulting in noxious weed invasion) Occasional return of the hydrology does not enable the plants to spontaneously return and favors non-native, weedy, ruderal plant species over native, perennial species.

The analysis should be based on the correct assumption that the changes to the Poudre River flow regime from NISP are permanent, and use this information to accurately describe and analyze wetland impacts. The analyses and interpretations should be revised accordingly.

10.6.5 Inappropriate Reliance on CDOW Mapping

Resources Report, Section 5, Existing Conditions Methods, Page 17

Statement: "*About 53 percent of the CDOW mapping within the area defined as the riparian corridor was field reviewed from publicly accessible sites or by remote sensing, and inaccuracies were changed to the appropriate category. Of the areas reviewed, about 49 percent of the CDOW-mapped areas were changed to another category.*"

Comment: The analysis and conclusions depends on the CDOW riparian mapping dataset. The fact that field verification of this data set reports only 51% accuracy is of significant concern and undermines its use in the SDEIS and supporting reports. This is not a scientifically defensible level of confidence. Furthermore, the minimum mapping unit for this methodology is 0.5 acre which would indicate small patches of wetlands, as expected in northern Colorado, may be missed or mischaracterized.

In 2011/2012 the Environment Protection Agency and Fort Collins provided comments on the initial draft of this technical report. Both sets of comments expressed concern regarding the high level of inaccuracy and uncertainty found during field review. The other option suggested was to rely instead on the U.S. Fish and Wildlife National Wetlands Inventory ("NWI") mapping data set.

The Corps responded that the CDOW mapping "will be used to describe the general extent, distribution, and composition of riparian vegetation along the mainstem of the Poudre River." Instead, the CDOW mapping seems to be the source of data for quantifying potentially impacted wetlands along the Poudre River. The NWI dataset recently completed along the Poudre River is the best data available for the subject wetlands. Additionally, Fort Collins Natural Areas has ongoing updated habitat mapping for restoration planning

10.6.6 Failure to Identify the Data Source for the Acres of Wetlands Impacted

Resources Report, Section 3, Methods, Page 4

Statement: "*Mapping of the vegetation was conducted on two levels: detailed mapping at the six riparian vegetation study sites …and broader vegetation mapping along the Mainstem from Colorado Parks and Wildlife…to describe general habitat types along the Mainstem*"

Comment: The purpose of the above-identified analysis is to provide a prediction of the acreage of wetlands impacted. It is unclear which data source was used to extrapolate the final conclusions of the acres of wetlands impacted. Indirectly, it seems the Colorado Department of Wildlife ("CDOW") mapping project was the source. However, this is not expressly stated anywhere in the SDEIS or the technical reports. Furthermore, as noted above, Fort Collins requested the GIS files for wetlands and riparian areas impacted for all alternatives from the Corps. The dataset provided by the Corps includes no wetland polygons along the Poudre River adding to the confusion.

The analysis should clearly and expressly identify the data source and analysis used to identify the acres of wetlands impacted by NISP. The analysis should be revised to use the NWI dataset.

10.7 COMMENTS REGARDING EFFECTS TO RIPARIAN HABITATS AND ECOLOGICAL PROCESSES

10.7.1 *Inappropriate Application of the Definition of Wetlands to Cottonwood Woodlands*

SDEIS Section 4.9.2.1.3, Inundation, Page 4-216

Statement: "*For the purposes of the effects analysis, cottonwood woodland sites predicted to be inundated in at least 13 years (half of the years of the period of record) under Current Conditions were assumed to receive some amount of hydrological support from inundation based on the Corps' technical standard for wetland hydrology that the site is inundated (flooded or ponded) or the water table is 12 inches or less below the soil surface for 14 or more consecutive days during the growing season at a minimum frequency of 5 years in 10 (>50% probability) (Corps 2005).*"

Comment: The application of Corps definition of wetland hydrology to analysis of impacts to riparian habitats (non-wetlands) is incorrect and inappropriate. No explanation is provided in the SDEIS for the use of wetlands hydrology in this context. The impact assessment methodology and analyses should be revised to more accurately reflect the hydrology of riparian woodlands, as discussed above.

10.7.2 Inappropriate Exclusion of Certain Riparian Forests

SDEIS Section 4.9.2.1.2, Alluvial Groundwater, Page 4-220

Statement: "*Inundation has the potential to provide supportive hydrology for wetland and riparian vegetation; however, inundation of many of the locations within the Poudre River study sites under Current Conditions occurs infrequently. […] For all action alternatives, the riparian and wetland locations inundated in more than half of the years under Current Conditions hydrology, and thus potentially more dependent on frequent inundation, are not predicted to have a substantial decrease in the number of years in which inundation occurs.*"

Comment: Periodic inundation is precisely what makes a riparian forest unique from an upland forest and other types of wetted habitats. (Naiman and Decamps, 1997). To suggest that sites that receive inundation less than 50% of the years will not experience an effect underestimates the extent of important, functioning riparian areas.

For those sites that are inundated "frequently," which would more accurately be referred to as wetlands, a significant reduction in peak flows caused by Alternative 2 would also be expected to cause a shift (narrowing) of riparian vegetation on the landscape. Table 4-71 indicates 8 data points were used to assess a 2,500 acre study area. This is an insufficient sample size for extrapolating such a conclusion. The SDEIS does not address this result. The analysis should be revised to include all riparian forests, as described above.

10.7.3 Incorrect Conclusions of Impacts to Riparian Forests

SDEIS Section 4.9.5.3.3, Preferred Alternative, Inundation, Page 4-229

Statement: "*Segment B. The plains cottonwood woodland locations within the Martinez Park study site, representative of Segment B, have minimum inundation flows of about 2,000 to 3,200 cfs (Table 4-71). Under Current Conditions, these locations would be inundated in about 4 to 11 years of the period of record. The*

number of years in which inundation would occur is predicted to be reduced by 1 to 5 years at these locations. None of these locations would be inundated in more than half of the years of the period of record under Current Conditions. Under Alternative 2, the estimated reduction in inundation is predicted to have a negligible effect on cottonwood woodlands in Segment B because under Current Conditions, the cottonwood woodlands are not inundated with enough frequency to provide consistent hydrologic support."

Comment: For those sites that are inundated "frequently," a significant reduction in peak flows a caused by Alternative 2 would also be expected to cause a shift (narrowing) on the landscape and all the complex functions and vegetation types supported by the peak flows. (City of Fort Collins, 2015a, City of Fort Collins, 2015b, Shanahan et al., 2014). In contrast to this expected result, all narratives related to this inundation analysis for Segment B conclude the effects will be negligible. An example in central Fort Collins: The quote above for the impacts of Alternative 2 references Table 4-71. This table shows three points (LMT2.1-3) will have reduced frequencies of inundation from 42% of the years to 23% of the years. This will have an impact on the probabilities for many of the aforementioned processes to occur. Please see the 5 year flow -analysis (please refer to Section 10.7.6) and the plant guilds analysis (presented in Section 10.6.2) as evidence substantiating the importance of "infrequent" flows and the likely narrowing of all processes and habitat types reliant on moderate flows. The analysis should be revised to include all riparian forests, as described above.

10.7.4 Incorrect Conclusions Regarding Impacts of Recent Flooding on Riparian Forests

SDEIS Section 4.9.4, Indirect Effects Common to Action Alternatives, Page 4-217

Statement: "*Flooding on the Poudre River mainstem in 2010, 2011, and 2013 provided the opportunity to review how flood flows and inundation affect wetland and riparian resources. Post-flood reviews of the mainstem determined that most of the vegetation and riverbanks of the reaches reviewed appeared to be unaffected by the floods. […] There were no observable effects on vegetation from the inundation outside of the active channel or stream banks other than the flattening of herbaceous vegetation and the accumulation and piling of woody debris. […]*

"*Flows of this magnitude did not create substantial areas of either newly deposited sediments or eroded areas beyond the active channel and riverbanks that could provide potential suitable substrate for colonization by riparian vegetation. The floods in early June of 2010 and 2011 occurred during the normal time for peak flows that can facilitate the establishment of new cottonwood stands. Very few areas of post-flood cottonwood seedlings were observed and the few areas of cottonwood seedlings that were observed occurred within and adjacent to the active channel where the cottonwood seedlings are vulnerable to inundation, channel erosion, and aggradation.*"

Comment: Fort Collins Natural Areas Department staff's observations contradict the above statements presented in the SDEIS. For example, Sterling, Homestead, and McMurry Natural Areas have all experienced substantial deposition of fine-grained materials in much of the riparian habitat as a result of high flow events between 2010 and 2014. Furthermore, not all floodplain functions associated with inundation are readily observable and the observations from a sample of sites and years should not overrule well established and accepted riparian scientific principles. Even the SDEIS outlines the processes known to occur with inundation, yet the narrative uses field review exclusively for ignoring these readily acknowledged ecological processes (See SDEIS Section 4.9.4).

In areas undergoing restoration where shading and thatch is not a limitation, extensive and significant establishment of new cohorts of native woody vegetation is occurring regularly and in direct response to flood flows. These areas include Sterling, McMurry, and Homestead Natural Areas. The following three photos show natural establishment and recruitment of native vegetation (specifically cottonwood and coyote willow) following recent high flow years at the McMurry Natural Area along the Poudre River. Following the wetter springs of the past few years (2010 through 2014), Fort Collins Natural Areas Department staff has observed an increase in several uncommon and desirable plants. For example, clammyweed (*Polanisia dodecandra*) was established at Springer Natural Area, more goldensmoke (*Corydalis curvisiliqua subsp. occidentalis*) and an increase in violas, which support rare butterflies have also been observed in response to the wet years. At the same time dieback of smooth brome close the river's edge and generally an overall robust growth for all riparian vegetation was observed each of the wet years that have occurred between 2010 and 2015.

Another high prolonged flow year occurred in the spring of 2014. The previous two photos show observations by Fort Collins Natural Areas Department staff from the air in June, 2014. The first photo above shows the Sterling Natural Area and the second photo shows the McMurry Natural Area. Each identify depositional zones (pockets of fine material seen throughout the riparian areas), with the red circles identifying areas of significant fine sediment movement and deposition.

Inundation even for brief periods drives numerous functions that distinguish riparian habitat from upland terrestrial habitats. Some of the ecological and hydrological functions and processes can be difficult to observe and the observations from a sample of sites and years should not overrule well established riparian processes. Even the SDEIS outlines the processes known to occur with inundation yet the narrative uses field review exclusively ignoring the readily acknowledged ecological processes (See SDEIS Section 4.9.4).

The analysis should be revised to include the observations described above and to include a more in-depth analysis of impacts to the other floodplain processes associated with inundation.

10.7.5 Incorrect Conclusions Regarding the Response of Cottonwoods to the Diversion of Peak Flows

Resources Report, Section 4.3.1 Changes in Ground Water Levels for Cottonwood Woodlands, Page 35-38

Statement: "*Scott et al. (1999) noted that over a three-year period in medium-grained alluvial sands, sustained declines in the water table of greater than 3.1 feet resulted in 88 percent mortality of plains cottonwood. […]*

"*Effects to the cottonwoods associated with declines in river stage of 2 feet or greater are predicted to be limited to periodic short-lived stresses because these estimated declines in alluvial ground water levels are predicted to occur infrequently (i.e., not predicted to be sustained) and are generally predicted to occur in May*

at the beginning of the growing season. […] Most of the declines in ground water levels are predicted to occur in May when soil moisture conditions are typically favorable for supporting cottonwoods without dependence on shallow ground water levels. May in Fort Collins is typically the wettest month of the growing season with an average of 2.74 inches of precipitation (18 percent of the annual average) […] The combinations of relatively high precipitation and low temperatures at the beginning of the growing season provide soil moisture levels that could support cottonwoods without shallow ground levels compared to the rest of the growing season […] Some or all of the following effects may occur infrequently to cottonwoods […] when ground water levels temporarily decline below the estimated deepest annual water table depth of 6.85 feet for the cottonwood woodlands:

- *Delayed leaf out (lengthened dormancy at beginning of growing season)*
- *Yellowing and loss (abscission) of leaves*
- *Reduced branch growth*
- *Branch die-back*

"*Effects from the 1-2 ft stage declines and subsequent ground water level declines are predicted to be negligible.*"

Comment: The SDEIS states that Scott et al. (1999) concludes that a sustained decline in ground water levels of 3.1 feet results in 88% cottonwood mortality whereas the declines as a result of NISP can be as much as 2.5 feet and equate to no mortality, only "short-lived stresses." This conclusion is not valid.

This conclusion is explained by saying that "most" of the declines would be in the wettest month, May. However, there is no evidence to suggest that reducing the peak flow would have no adverse effect on cottonwood woodlands. It is true that cottonwood trees are more vulnerable to water stress when temperatures are higher, when the canopy if fully leaved-out, and when less of the root system is in contact with the water table, all of which occur late in the growing season. Depending on position in the riparian zone, trees positioned at higher and drier sites will be more vulnerable to a 2.5 foot decline in peak streamflow than those nearer to the river and at a lower elevation. The vegetation is distributed along a gradient; the gradient is driven by the hydroperiod, inundation frequency, and depth to groundwater (as well as variability in these factors). Reducing the peak flow by diverting large volumes of water in the spring will have an effect on riparian vegetation. (Poff et al., 1997). Unequivocal statements about the cottonwood forests responding in a unified and single way to flows result in incorrect and arbitrary conclusions. The analysis should be revised to more accurately reflect the effects of the removal of peak flows, as described above.

10.7.6 Failure to Analyze Ecological Services

Resources Report, Section 5.8.9, Other Ecological Functions Associated with Flooding

Statement: "[T]*he degree to which the ecological services are provided vary with frequency, duration, and extent of flooding and are not discussed in this technical report because they have not been the focus of scoping or comments on the NISP DEIS and can vary greatly from site to site.*"

Comment: The evaluation of environmental impacts includes any changes to the natural environment as a result of the Project. The reduction of peak flows in the Poudre River will diminish the provision of valued ecological services. The statement in the SDEIS that these processes can vary greatly from site to site is precisely why it is important to analyze them. SDEIS

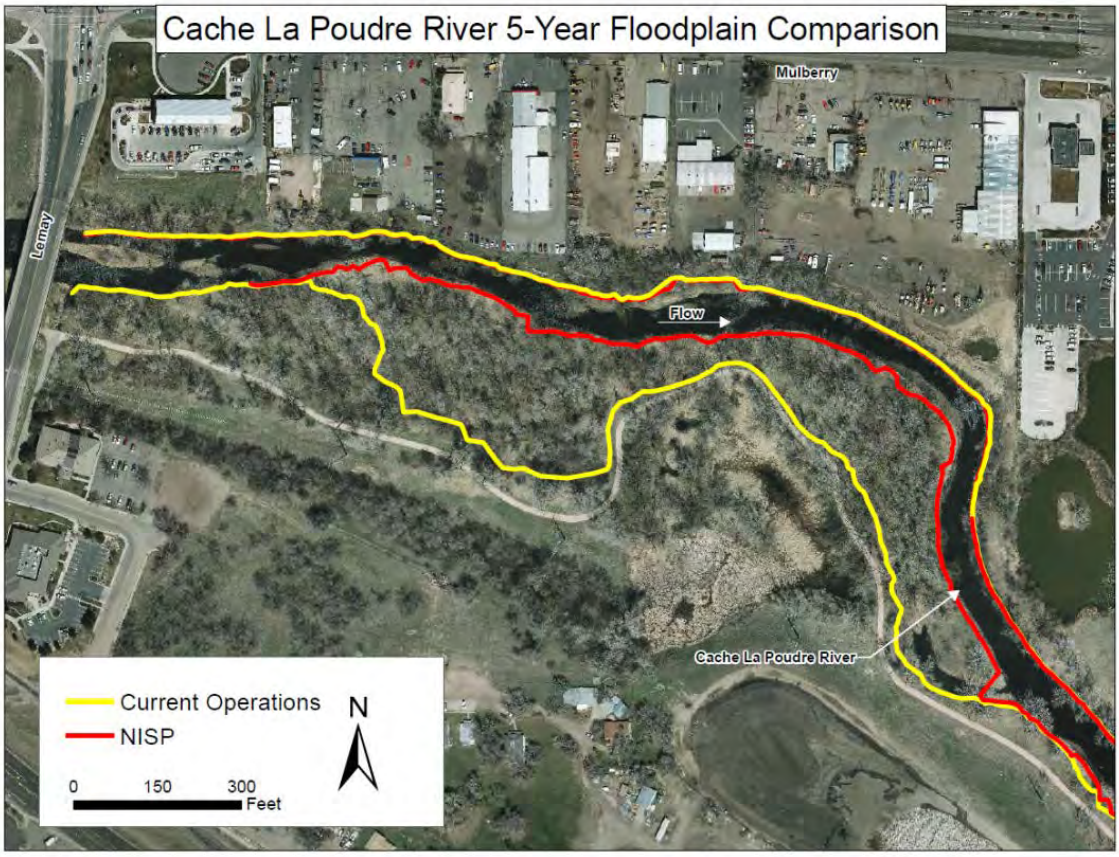
Section 4.9.4 describes this topic well and illustrates how ecological services are fundamentally important to river and riparian habitat dynamics. Understanding and disclosing how these ecological services would be affected are important aspects of the this NEPA analysis.

The areas inundated with a frequency at or greater than 20% of the time (the 5 year floodplain) could be considered as a possible surrogate for understanding changes to these services. The 5 year flow was used in both the RHAF and ERM Supplemental Report as an indicator of the positive relationship between important functions of the riparian forest and river-floodplain connectivity to moderate flows.

Fort Collins and its consultants calculated the 5 year flow at the USGS gage at the Lincoln St. gage using methods described in USGS bulletin 17b for historic, current conditions and Alternative 2 flow scenarios (see ERM Supplemental Report, Current Conditions and Alternative 2and USGS, 1982). Respectively this flow is 3,486, 3,018, and 2,366 cfs. According to these flow values, this "moderate flow" appears within range of flows most affected by the preferred alternative.

	Historic (3,486 cfs)	Run 1 Current Conditions (3,018 cfs)	Run 3a Preferred Alternative (2,366 cfs)	Percent change from Run 1 to Run 3a
Transition: (Canyon Mouth to Shields)	49.2	41.9	30.0	28.5
Urban: (Shields to Boxelder confluence)	86.4	70.5	56.5	19.8
Warm: (Boxelder to County Road 32E)	169.1	134.5	91.7	31.8

The first three columns in this table present the average width (in meters including both sides of the river) of the 5-year floodplain for three RHAF river segments under various 5 year flow scenarios. The percent change from Current Conditions to the Preferred Alternative can be calculated as a way to present the expected change in ecologic services. This methodology and these river segments, are explained the RHAF (City of Fort Collins, 2015a). Due to bank armoring and channel constrictions the riparian forest is narrow for significant lengths in each of these river segments. In contrast, the sections with more natural low-lying floodplain topography are more likely to receive the benefits of inundation. For example, as portrayed in the photo below, the river section downstream of Lemay Ave. currently inundates the forest under the 5 year flow. WithNISP the 5 year flow will not extend into the forest at all.



The analysis should be revised to provide a spatial assessment of inundation alterations and the effects to the riparian environment, as described above.

10.8 COMMENTS REGARDING WILDLIFE ANALYSES

10.8.1 Inadequate Analyses of Impacts to Wildlife

Comment: The SDEIS analysis for wildlife primarily addresses the direct impacts at or near the site of the reservoirs. Indirect impacts for wildlife along the Poudre River rely on the Riparian and Wetland analysis, which have weaknesses as discussed in this Section 10, and therefore are not a reasonable perspective from which to analyze impacts to wildlife. The general conclusion that the project would likely affect the overall abundance of wildlife but would not alter species composition and distribution; and that species would likely adapt to the new habitat conditions is not supported by any additional information and is inconsistent with fundamentals of wildlife biology. The wildlife analyses and conclusions should be revised, in conjunction with revisions to the wetlands and riparian area analyses, to address the deficiencies described above.

10.8.2 No Basis for Assertion of Adaption of Species

SDEIS Section 4.10.3.2, District's Preferred Alternative, Poudre and South Platte Rivers, Page 4-272

Statement: "*The predicted changes in vegetation would occur slowly over a long period of time and would likely be negligible and imperceptible given the dynamics of riparian areas. Wildlife using these habitats typically use a wide range of aquatic, wetlands, and riparian habitats and would likely adapt to the new habitat conditions that currently occur within the riparian areas of the rivers.*"

Common: The changes to the flow regime under the preferred alternative will begin abruptly once the Project is constructed and the ripple effect through the system will not be "slow" given plants, especially herbaceous plants, respond to real time conditions. There will be a slower response to woody vegetation, however drought stress could cause decadence to some stands within years rather than decades.

To say wildlife will adapt to the changes fundamentally mischaracterizes the expected outcome. As vegetation changes it is likely to cause a concurrent change in wildlife species composition and diversity. Species that "adapt to the situation" will likely be those species common to urban settings and not the suite of riparian dependent species.

The wildlife analyses and conclusions should be revised, in conjunction with revisions to the wetlands and riparian area analyses, to address the deficiencies described above.

10.9 COMMENTS REGARDING CUMULATIVE EFFECTS, AVOIDANCE, MINIMIZATION, AND MITIGATION

10.9.1 Complete Analysis Is Needed

SDEIS Appendix F
Conceptual Mitigation Plan

Comment: The adequacy of the cumulative effects and mitigation planning cannot be evaluated without better analysis of the critical factors discussed in this Section 10. The impacts to the riparian and wetland resources need to be quantified in order to address them. The SDEIS rationale that the impacts will be imperceptible, negligible, or minor and that Alternative 2 will accelerate and/or reinforce the well-established trajectory is not substantiated.

10.9.2 Current Proposal Omits Certain Needed Elements

SDEIS Appendix F
Statement: "*Proposed Conceptual Mitigation Plan …*"

Comment: The proposed avoidance, minimization, and mitigation described in the SDEIS lack certain required elements, such as peaks flows and other measures to specifically address the issues identified in this Section 10. The key missing elements of the current proposed approach are:

- Provision of peak flows to compensate for narrowing of all riparian flow related functions and wetland loss.
- Provision of long term management plans for improving river floodplain access as well as periodic manual scour (creation of bare sites) to support maintenance of future forests and resilience of native woody species.
- Provision of means to address the loss of critical ecological services associated with flooding in the riparian zone.

Peak flows are the cornerstone of riparian and wetland resources. Peaks flows therefore should be a central component to any plan to avoid, minimize, or mitigate the impacts. Any avoidance, minimization, and mitigation should also address the issues described above.

10.10 RESOURCES FOR SECTION 10

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APPENDIX A:
CITY OF FORT COLLINS' COMMENTS ON SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE NORTHERN INTEGRATED SUPPLY PROJECT

LIST OF SELECTED PREPARERS OF COMMENTS

1. CITY OF FORT COLLINS STAFF

Donnie Dustin, P.E. Donnie Dustin is the Water Resources Manager for the City of Fort Collins Utilities. His education includes a B.S. in Geology from James Madison University in Virginia and a M.S. in Civil Engineering (with emphasis in Water Resources Planning and Management) from Colorado State University ("CSU"). He is a registered professional engineer in Colorado and has been employed by the City of Fort Collins for approximately 17 years, 10 of which has been with the Utilities Water Resources Division. His duties and expertise include developing policies related to water supply system operations and development, and demand management. He has provided criteria and guidance related to hydrologic and water rights allocation modeling. He oversees the management of the City's raw water supplies including the administration of relevant water rights decrees. He also serves on the governing boards of two irrigation companies.

Keith Elmund, Ph.D. After serving as an officer in the U.S. Air Force, Keith came back to CSU and finished his Ph.D. in environmental microbiology. He has been with the City of Fort Collins Utilities for over thirty-five years and since 1984 has served as Environmental Services Manager. In this role, he manages both the City's certified drinking water quality and pollution control labs. Beginning in 2006, he helped implement the Poudre River Monitoring Alliance that was part of EPA's award winning "performance track" environmental leadership program. This ongoing program joins together the Cities of Fort Collins and Greeley, the Town of Windsor, the Boxelder and South Fort Collins Sanitation Districts, and Carestream Health, with CSU, the North Front Range Water Quality Planning Association and the Colorado Water Quality Control Division in a collaborative effort to monitor and help protect water quality in over 42 miles of the lower Poudre.

Cameron Gloss, AICP. Cameron Gloss is the Planning Manager for the City of Fort Collins. Since entering the field in 1984, his public and private sector experience includes an array of work including comprehensive community planning, subarea and neighborhood planning, transportation master planning, land development review, sustainability modeling, and the crafting of land use regulations. Prior to his most recent role with the City of Fort Collins, Cameron spent five years working with the Fort Collins offices of both AECOM and Clarion Associates where he acted as a Senior Planner, leading community planning projects over a dozen states, primarily within the western region. Mr. Gloss holds a B.S. in Geography (urban emphasis), Arizona State University, 1983. He is a member of the American Institute of Certified Planners.

Adam Jokerst, P.E. Adam Jokerst is a Water Resources Engineer for the City of Fort Collins Utilities. His education includes a B.S. in Biological and Agricultural Engineering from

the University of Arkansas and a M.S. in Civil Engineering from CSU. He is a registered professional engineer in Colorado and has been employed by the City of Fort Collins for approximately three years with the Utilities Water Resources Division. His main function at the Utilities is to provide hydrologic, water rights, and system modeling used to assess the Utilities' current and future water and infrastructure needs. In addition, he acts as project manager for the Halligan Water Supply Project. He is also knowledgeable in the areas of water resources engineering, planning and management and provides his expertise to develop policies, maintain and protect water rights, and provide water supply and use information.

Bonnie Pierce, Ph.D. Bonnie Pierce is an Environmental Data Analyst in the Fort Collins Environmental Services Department. Dr. Pierce's work for Fort Collins focuses on climate change and air, water, and hazardous waste matters including those related to oil and gas operations. Dr. Pierce is the City's project manager for the Poudre River Area and North College Ave. Innovation District Brownfields Assessment project. Her previous job assignments include Program Principal and Senior Project Manager for the Solid and Hazardous Waste Division for the Wyoming Department of Environmental Quality and Associate Director for Natural Resources, State of the Parks program, National Parks Conservation Association. Dr. Pierce received her Ph.D. in Soil Science from CSU.

Jill Oropeza. Watershed Specialist for the City of Fort Collins Utilities and Secretary/Reserved Seat Member of the Coalition for the Poudre Watershed. Jill has worked as the Watershed Specialist for the Fort Collins Utilities Source Watershed Program since 2007. The City's Watershed Program monitors water quality of the Upper Poudre River and Horsetooth Reservoir in collaboration with the City of Greeley and the Tri-Districts in effort to identify and address issues that affect drinking water treatment operations and watershed health. Jill holds an M.S. decree from CSU in Ecology and has over 12 years of experience working on natural resource issues in the state of Colorado.

Eric R. Potyondy, Esq. Eric Potyondy is an Assistant City Attorney in the Fort Collins City Attorney's Office. Mr. Potyondy's work for Fort Collins focuses on water-related issues, including water rights, water quality, and related matters. Prior to working for Fort Collins, Mr. Potyondy was in private practice in Colorado for nearly six years, with his practice focusing almost exclusively on water rights and related matters. Mr. Potyondy has litigated numerous cases in the Colorado District Courts for various Water Divisions and the Colorado Supreme Court. Prior to private practice, Mr. Potyondy worked for two years as the water law clerk for Hon. Chief Judge Roger A. Klein, District Court, Water Division 1, State of Colorado. Mr. Potyondy received his J.D. degree and his B.A. degree from the University of Colorado.

Kenneth C. Sampley, P.E. Ken Sampley manages the Water Utilities Engineering Division of Fort Collins Utilities consisting of a multi-disciplinary team of 13 employees that provide stormwater and floodplain management, flood warning and emergency preparedness, stormwater master planning, stream rehabilitation and stormwater water quality, development review for new stormwater, water and wastewater improvements, and water distribution and wastewater collection system capacity. Ken is a licensed professional engineer in the State of

Colorado and has over 34 years of experience. He worked for 3 years in consulting engineering, 26 years for the City of Colorado Springs, and the last 5 years for the City of Fort Collins. Ken graduated from CSU with a B.S. degree in Civil Engineering, specializing in hydrology and hydraulics. He obtained his M.P.A. degree from the University of Colorado.

Jennifer Shanahan. Jennifer Shanahan is an environmental planner for the City of Fort Collins, Natural Areas Department. Jen leads and participates a variety of planning processes related to management of the City's 42 natural areas with a particular focus on a spectrum of issues and projects surrounding the Poudre River. These include collaborative landscape-level planning, application of river science to policy and management, report development on integrative river models and monitoring projects, and communication of technical Poudre River issues to the broader community. She holds an M.S. degree from the Department of Forest Rangeland and Watershed Stewardship at CSU, with a research focus in riparian restoration.

John Stokes. John Stokes is the Director of the City's Natural Areas Department. The Department manages over 40,000 acres of conserved land, including approximately 1,800 acres along the Poudre River in Fort Collins. John is a member of the Colorado Water Institute initiative the Poudre Runs Through It, a regional collaborative group working on issues related to river health and water supply. In that capacity John has initiated an instream flow collaboration with various regional partners as well as an annual Poudre River Forum that has generated substantial participation from the community. John is a member of the South Platte Basin Roundtable as one of two environmental representatives. In 2014 John was recognized by the Colorado Water Trust with the David Getches Flowing Waters Award which recognized John's efforts to restore and improve Poudre flows.

2. OUTSIDE CONSULTANTS

Daniel Baker. Daniel Baker is a research scientist at CSU. In the summer of 2012 Dan completed a postdoctoral fellowship at Johns Hopkins University, working with the National Science Foundation-funded National Center for Earth Surface Dynamics and the Intermountain Center for River Rehabilitation and Restoration based at Utah State University. He completed his PhD in civil and environmental engineering in 2009 at CSU, with a focus on river engineering and stream restoration. Dan's research focuses on the interaction between physical and biochemical processes in streams, the effects of flow extraction on stream geomorphology and sediment dynamics, and the application of Geographic Information Systems (GIS) technology to evaluate reach-scale conditions from digital elevation models. Other current projects focus on developing urban stream restoration guidance with the USACE and monitoring post-fire sediments and aquatic insects on the Poudre River.

Brian Bledsoe. Brian Bledsoe is a professor of Civil and Environmental Engineering at CSU. Brian has more than 25 years of experience as an engineer and environmental scientist in the private and public sectors, including more than 20 years of experience in stream and wetland restoration. Brian's research and teaching are focused on watershed and river processes at the interface of hydrology and aquatic ecology. He has worked in the private sector as a consulting

engineer and surveyor, and for the state of North Carolina as a stream and wetland restoration specialist and nonpoint source program coordinator. Brian has served as a peer reviewer on recovery programs for the Platte and San Juan Rivers, the U.S. Environmental Protection Agency's Environmental Monitoring and Assessment Program (EMAP), as well as on numerous large-scale restoration projects including the Everglades and Louisiana coastal areas. Brian is a licensed professional engineer in Colorado and North Carolina.

Claudia A. Browne. Claudia Browne, is a Water Resources Specialist and the Southern Rocky Mountain Bioregion Leader at Biohabitats Inc. (since 2004), a national ecological consulting firm specializing in restoration, conservation planning and regenerative design. Ms. Browne has over 30 years of experience in environmental protection and water resource management with expertise in habitat assessments, riparian and wetland restoration and maintenance, groundwater monitoring well installations, surface water and groundwater data collection and evaluation, wetland permitting soil sampling and data evaluation, point-flow analysis, water budgets, conceptual hydrogeologic model development, and groundwater modeling. Ms. Browne has been the Project Manager for the Fort Collins Wetland and Riparian Restoration On-Call contract since 2008. As such, she has participated in a wide range of City's river projects including assisting with the Poudre River Management Plan update; assessing the groundwater-surface water regime for multiple properties, and; restoration planning efforts including prioritizing potential restoration projects, identifying focal species and habitat types, and helping develop restoration concept plans. Ms Browne is also providing ecological master planning assistance for the Poudre River Downtown Master Plan for the City. Her role has included developing habitat goals and objectives for 10 miles of river through the City's urban core, mapping priority habitat areas, collaborating with wildlife biologists and stakeholders, and identifying opportunities and constraints. Ms. Browne received her B.S in Natural Resources from Cornell University and her M.S. in Ecology from CSU.

Jordan Furnans, Ph.D., P.E., P.G. Dr. Furnans is a Senior Water Resources Engineer with INTERA Incorporated, and engineering and geosciences consulting firm in Austin, TX. Dr. Furnans holds a PhD in civil engineering and an M.S.E. degree in environmental and water resources engineering, both from the University of Texas at Austin, and a B.S.E. degree in civil and geological engineering from Princeton University. Dr. Furnans has 16 years of professional experience that encompasses both field hydrologic data collection and the analysis of data through the development and application of numerical models. He specializes in the areas of water right accounting; coupled field and model hydrodynamic investigations of estuaries, lakes, and rivers; linking water quality and hydrodynamics in natural systems; water availability modeling; watershed hydrology planning and management; hydrographic and sedimentation survey methods; and freshwater inflow and instream flow requirements for ecosystem health. Some of Dr. Furnans' recent experience includes developing expert testimony for water rights litigation efforts, accounting plan development and water rights analysis, performing model reviews, developing an automated bathymetric data processing system for volumetric and sediment surveying, aiding development of instream flow recommendations for rivers in Oklahoma, and modeling circulation in lakes.

Andrew Herb. Mr. Herb, owner of AlpineEco (founded in 2007) has worked as an ecologist in the Rocky Mountain Region for over 16 years. Although most of his work has been in Colorado and Utah, he has worked in nearly all the Rocky Mountain, Great Plains, and Great Basin States, as well as in Korea, Japan, Guam, and Puerto Rico. His work involves most aspects of field ecology, with a focus on wetlands. He is currently the president of the Rocky Mountain Chapter of the Society of Wetland Scientists, which is an international organization committed to improving the management of wetlands through sound science and education. He is also the founder and chairperson of SWS's Wetland Restoration Section, which brings together professionals from around the world to share information on wetland restoration. His commitment to science and the environment, combined with his practical approach to problem-solving results in creative, cost-effective, and ecosystem-friendly approaches to projects. Mr. Herb is also the owner of AlpineEco Nursery (founded in 2012) which provides native wetland and riparian plants for ecological restoration.

William Lewis, Jr., Ph.D. Dr. Lewis is professor and Director of the Center for Limnology, University of Colorado Boulder, and serves as Associate Director of the University of Colorado at Boulder Cooperative Institute for Research in Environmental Sciences. His interests in research and teaching include ecological characteristics and processes of inland waters (lakes, streams, and wetlands). Research for Dr. Lewis and his students focuses mainly on biogeochemical processes, ecosystem modeling, effects of water pollution and hydrologic changes on aquatic ecosystems and organisms, composition and abundance of aquatic organisms under natural and anthropogenically altered conditions, and productivity of aquatic ecosystems. Dr. Lewis has published over 200 journal articles related to these research interests. He is recipient of the Renewable Natural Resources Foundation Sustained Achievement Award and of the Baldi Award and the Naumann-Thienemann Medal of the International Society for Limnology. He has served as a member of the Board on Environmental Studies and Toxicology and on the Water Science and Technology Board of the National Academy of Sciences National Research Council.

John Putnam, Esq. John Putnam is an attorney and partner at the law firm of Kaplan Kirsch & Rockwell, LLP, in Denver. Mr. Putnam's practice emphasizes counseling and litigation for public and private entities on complex issues of environmental law, especially for large public and public/private projects. Mr. Putnam has extensive experience providing clients nationwide with strategic advice on large and controversial development and transportation projects, including airports, highways, real estate development, telecommunications facilities, and other infrastructure. He counsels clients regarding a wide range of environmental, transportation and development issues, including the National Environmental Policy Act, wetlands, air quality, climate change, sustainability, air toxics, noise, tolling and innovative finance, land use, endangered species, floodplains, municipal law, transportation regulations and Native American jurisdiction. Mr. Putnam received his J.D. degree from the University of Chicago and his B.A. degree from Williams College.

Jennifer Roberson. Jennifer is a professional research assistant with the Center for Limnology at the University of Colorado Boulder, within the Cooperative Institute for Research

in Environmental Sciences. Her duties include data assembly, data analysis, and synthesis of information for reports and publications of the Center for Limnology. She holds a Bachelor's Degree in Ecology and Evolutionary Biology from the University of Colorado Boulder and has extensive experience in fieldwork, laboratory analyses, data analysis, and document preparation related to water quality, aquatic life, water quality regulations and related matters specifically for Colorado.

APPENDIX B:
CITY OF FORT COLLINS' COMMENTS ON SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE NORTHERN INTEGRATED SUPPLY PROJECT

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- City of Fort Collins, 2014 Comparative Municipal GHG Report
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Designing flows to enhance ecosystem functioning in heavily altered rivers

Kevin R. Bestgen,[1,11] N. LeRoy Poff,[2,3] Daniel W. Baker,[4] Brian P. Bledsoe,[4,10] David M. Merritt,[5] Mark Lorie,[6] Gregor T. Auble,[7] John S. Sanderson,[8] and Boris C. Kondratieff[9]

[1]*Department of Fish, Wildlife and Conservation Biology and the Graduate Degree Program in Ecology, Colorado State University, 1474 Campus Delivery, Fort Collins, Colorado 80523 USA*
[2]*Department of Biology and Graduate Degree Program in Ecology, Colorado State University, Fort Collins, Colorado 80523 USA*
[3]*Institute for Applied Ecology, University of Canberra, Bruce, Australian Capital Territory 2617 Australia*
[4]*Department of Civil and Environmental Engineering, Colorado State University, Fort Collins, Colorado 80523 USA*
[5]*USDA Forest Service, National Stream and Aquatic Ecology Center, 2150 Center Ave, Fort Collins, Colorado 80526 USA*
[6]*Corona Environmental Consulting, 357 McCaslin Blvd, Louisville, Colorado 80027 USA*
[7]*U.S. Geological Survey, Fort Collins Science Center, 2150 Center Ave., Fort Collins, Colorado 80526 USA*
[8]*The Nature Conservancy, 2424 Spruce St., Boulder, Colorado 80302 USA*
[9]*Department of Bioagricultural Sciences and Pest Management, Colorado State University, 1177 Campus Delivery, Fort Collins, Colorado 80523 USA*

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Abstract. More than a century of dam construction and water development in the western United States has led to extensive ecological alteration of rivers. Growing interest in improving river function is compelling practitioners to consider ecological restoration when managing dams and water extraction. We developed an Ecological Response Model (ERM) for the Cache la Poudre River, northern Colorado, USA, to illuminate effects of current and possible future water management and climate change. We used empirical data and modeled interactions among multiple ecosystem components to capture system-wide insights not possible with the unintegrated models commonly used in environmental assessments. The ERM results showed additional flow regime modification would further alter the structure and function of Poudre River aquatic and riparian ecosystems due to multiple and interacting stressors. Model predictions illustrated that specific peak flow magnitudes in spring and early summer are critical for substrate mobilization, dynamic channel morphology, and overbank flows, with strong subsequent effects on instream and riparian biota that varied seasonally and spatially, allowing exploration of nuanced management scenarios. Instream biological indicators benefitted from higher and more stable base flows and high peak flows, but stable base flows with low peak flows were only half as effective to increase indicators. Improving base flows while reducing peak flows, as currently proposed for the Cache la Poudre River, would further reduce ecosystem function. Modeling showed that even presently depleted annual flow volumes can achieve substantially different ecological outcomes in designed flow scenarios, while still supporting social demands. Model predictions demonstrated that implementing designed flows in a natural pattern, with attention to base and peak flows, may be needed to preserve or improve ecosystem function of the Poudre River. Improved regulatory policies would include preservation of ecosystem-level, flow-related processes and adaptive management when water development projects are considered.

Key words: algae; aquatic insects; channel geomorphology; climate change; designed flow regime; fish; hydrology; modeling; NEPA policy change; probabilistic Bayesian Network model; riparian community; water development.

Introduction

Rivers have been heavily modified on a global scale due to hydrologic alteration by dams and water extraction, leading to extensive ecological change (Nilsson et al. 2005, Dudgeon et al. 2006, Vörösmarty et al. 2010). Ongoing demand for municipal and agricultural water will continue to stress river ecosystems, but those uses are countered by growing interest in restoring rivers to sustainable ecosystem conditions, while still accommodating human needs. Providing water for traditional uses while sustaining ecosystem function poses challenges, particularly in semiarid and arid landscapes where water demand is high (Grafton et al. 2013). Thus, restoration practitioners seek to optimize the functional

Manuscript received 30 November 2018; revised 19 July 2019; accepted 24 July 2019. Corresponding Editor: Ryan S. King.
[10] Present address: University of Georgia, Athens, Georgia 30602 USA.
[11] E-mail: kbestgen@colostate.edu

impact of limited water to maximize ecological outcomes (Yarnell et al. 2015).

River restoration requires understanding linkages between specific flow conditions and ecosystem attributes to provide clear, quantified management targets (Poff and Schmidt 2016, Webb et al. 2017). In heavily altered systems, restoration to a "natural," pre-development state is generally not an option, particularly when future climate is uncertain (Moyle 2014, Poff 2018). Alternatively, specifying flows to restore functions that are ecologically important and socially desirable may be possible. So-called "designer flows" (sensu Acreman et al. 2014) can, in principle, help meet both ecosystem and human needs for water (e.g., Kiernan et al. 2012, Chen and Olden 2017). For heavily appropriated systems with multiple competing users, it is critical to understand how alternative management interventions will affect existing economic and social benefits provided by the river (Northern Colorado Water Conservancy District 2017). It is also important to understand the biophysical processes needed to promote long-term ecosystem functioning, including dynamic channel features and desirable aquatic and riparian species, which may have different requirements. Appropriate ecosystem modeling that incorporates a variety of future flow conditions is useful for such an evaluation.

The Cache la Poudre River (hereafter, Poudre River) is a southern Rocky Mountains, USA, mountain and plains system in northern Colorado that has been altered by heavy agricultural and urban water use since European settlement in the 1870s. Despite streamflow changes, intensive agricultural and urban land use, and nonnative species establishment, the Poudre River remains a valued amenity both socially and functionally, particularly where it flows through the City of Fort Collins (City). Declining ecological condition of the Poudre River has been documented (City of Fort Collins 2017) but a strong interest has developed among the public and government institutions to restore and promote a dynamic and functioning river that provides amenities. However, extensive dam and diversion infrastructure, proposed additional water development near Fort Collins (U.S. Army Corps of Engineers 2018), and climate change, complicates appropriate management strategies.

Management of arid-land systems such as the Poudre River requires understanding flow-ecology relationships (Poff et al. 2010), as well as anticipating future hydrologic change, to illuminate restoration strategies responsive to likely evolution of the river ecosystem. To accomplish this, we first developed a comprehensive, multi-compartment model informed by empirical data showing how hydrology and other variables (e.g., channel structure, water temperatures, and nutrients) drive important riverine geomorphic processes and associated ecosystem endpoints in the coupled aquatic-riparian system. Thus, our model differs from other strictly flow-driven modeling approaches such as ELOHA (Poff et al. 2010), which is effectively a rapid assessment tool useful for multisite comparisons of potential river degradation. Following model development for the current ecosystem, we evaluated how "scenarios" of future hydrologic conditions, ranging from status quo to expanded water development and climate change, may alter the Poudre River ecosystem. We also designed and modeled hypothetical flow regimes that we thought might achieve acceptable ecosystem outcomes under active flow management. Our aim was to produce a scientifically credible and comprehensive analysis to inform the public and assist water managers interested in sustainable management of the Poudre River ecosystem. Here, we detail model development and implementation to identify aspects of an ecologically effective flow regime that might be attainable through active management of water infrastructure, including proposed development in the Poudre River basin. This modeling effort may also inform predictions and management perspectives for other heavily altered river ecosystems in the western United States and elsewhere.

Methods

Study site

The Poudre River drainage (~2,865 km^2) originates in high-elevation mountains (>4,000 m above sea level) west of Fort Collins, Colorado, USA (U.S. Geological Survey [USGS] gage 06752260, Fig. 1). Above 1,900 m elevation, the river is a moderate to high gradient, high-velocity, cobble-bottomed stream that supports a trout-dominated fish community and diverse aquatic insects in orders Ephemeroptera, Plecoptera, and Trichoptera (EPT taxa). In the study area just downstream, the channel meanders through a lower gradient, less confined transition zone between mountains and prairie (~1,600–1,900 m elevation) and supports cool water tolerant trout, native catostomids and cyprinids, and fewer EPT taxa while adding Diptera (Fausch and Bestgen 1997). Native narrowleaf and plains cottonwood (*Populus angustifolia* James and *P. deltoides* W. Bartram ex Marshall, respectively) and their hybrids, willow (*Salix* spp.) and green ash (*Fraxinus pennsylvanica* Marshall), as well as nonnative species crack willow (*Salix fragilis* L.), Siberian elm (*Ulmus pumila* L.), and Russian olive (*Elaeagnus angustifolia* L.), dominate the riparian zone. Gravel, cobble, sand, and silt predominate in this montane-prairie ecotone. Downstream, the warm-water Poudre River continues another 60 km to the South Platte River, Missouri–Mississippi River watershed.

The 21 km long transition zone reach of the Poudre River, as just described, historically had multiple and sinuous channels and a broad floodplain with oxbows (Fig. 2a). As urbanization and development proceeded, riverbanks were structurally hardened to prevent channel meandering and property destruction during flooding, which resulted in a straighter and mostly confined

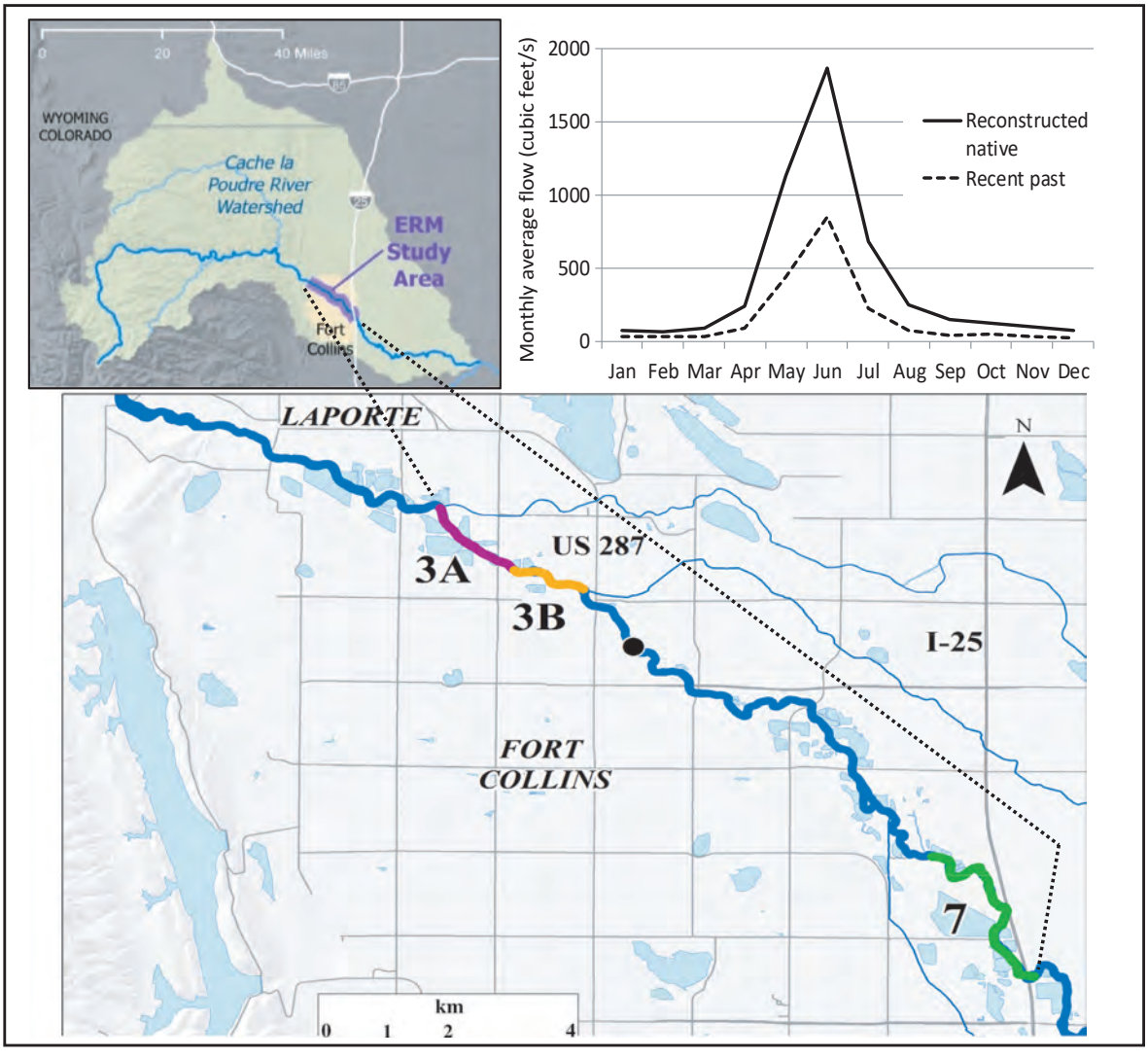

FIG. 1. The Ecosystem Response Model study area in the Cache la Poudre River watershed near Fort Collins, Colorado, USA. The Poudre River Basin map (upper left; 1 mile = 1.61 km) shows the study area segment, which is expanded below to show confined, moderately confined, and least confined reaches (3a, 3b, and 7, respectively) from up to downstream. Reduced mean monthly flow of the Poudre River in Fort Collins (water years 1975–2005) for the altered recent past hydrologic scenario (from flow gage measurements, USGS # 06752260; 1 cubic foot/s = 0.03 m^3/s) is compared to the reconstructed native (pre-development, modeled flows) flow regime (upper right; Shanahan et al. 2014).

single-thread system (Fig. 2b). Native cottonwood and willow dominate the riparian community, although non-native trees are increasing. Three of eight urban to sub-urban river corridor sub-reaches (Fig. 1b) were chosen for modeling because they represented the range of upstream to downstream channel constriction and floodplain connectivity through the 21 km long study area. Reach 3a (confined reach) is highly confined upstream by bank stabilization and has only a few opportunities for floodplain restoration. Just downstream, Reach 3b (moderately confined reach) is partially confined, offering modest restoration opportunity for natural riverine and riparian functions, while downstream Reach 7 (least confined reach) has a mix of armored banks and open floodplain and, potentially, the greatest channel-floodplain restoration opportunities.

Conceptual hydrologic calendar

To illustrate how changes in flows qualitatively affect important geomorphic and biological attributes, we developed a conceptual Poudre River hydrologic calendar (Fig. 3). We developed this model from stream ecology literature (e.g., Allan 1995), regional and Poudre-River-specific ecological and geomorphic traits (Fausch and Bestgen 1997, Merritt and Poff 2010, Wohl et al.

a) 1937

b) Recent, circa 2005

FIG. 2. Cache la Poudre River along a section of the ERM study reach, Fort Collins, Colorado, (a) in 1937 and (b) recently (circa 2005). Panel a shows a meandering channel, with a wide, unimpaired zone of channel movement across the floodplain and presence of cottonwood forests of various ages. Panel b depicts the confined channel after nearly a century of land use changes that simplified and straightened the river, reduced channel migration and the associated rejuvenation of riparian habitat, narrowed the riparian zone, and confined the channel with hardened banks and associated pit ponds following gravel extraction.

2016), as well as from observations and expert judgement based on the authors' extensive field sampling over the last two or more decades. We adopted this river view after discussions that gravitated from a narrowly focused subset of flow-biology relationships to a holistic Poudre River ecosystem model useful to predict responses of geomorphic and biological indicators to flow and changes in management. This model reflects our aim of counterbalancing the unintegrated and few species-specific approaches commonly used in environmental assessments and resource management decision-making.

Strongly seasonal spring and early summer peak flows foundational to a functioning snowmelt river ecosystem set the physical habitat template for the Poudre River. Increased discharge from high-elevation snowmelt recruits streamside wood into the channel, mobilizes fine sediments, and scours algae, gravels, and cobbles to create aerated spawning substrates for fishes, including spring-spawning salmonids. Cool water fishes reproduce and young of spring-spawning salmonids emerge. High magnitude flow peaks maintain channel width and complexity and sometimes connect the river and floodplain, forming seasonal wetlands of variable extent and duration depending on snowmelt volume. Descending limb flows and associated sediment deposits create germination sites and enhance seedling survival for colonizing plant species (e.g., *Populus* and *Salix*) and enable early life stage fish dispersal to complex, secondary-channel backwaters. In summer, relatively stable base flows facilitate rapid growth of tree seedlings as well as reproduction and growth of native fishes, trout, and aquatic insects that require cleansed and oxygenated gravel beds. Stable autumn and winter base flows of appropriate magnitude support spawning fish and enhance survival of trout eggs and insects in shallow riffles.

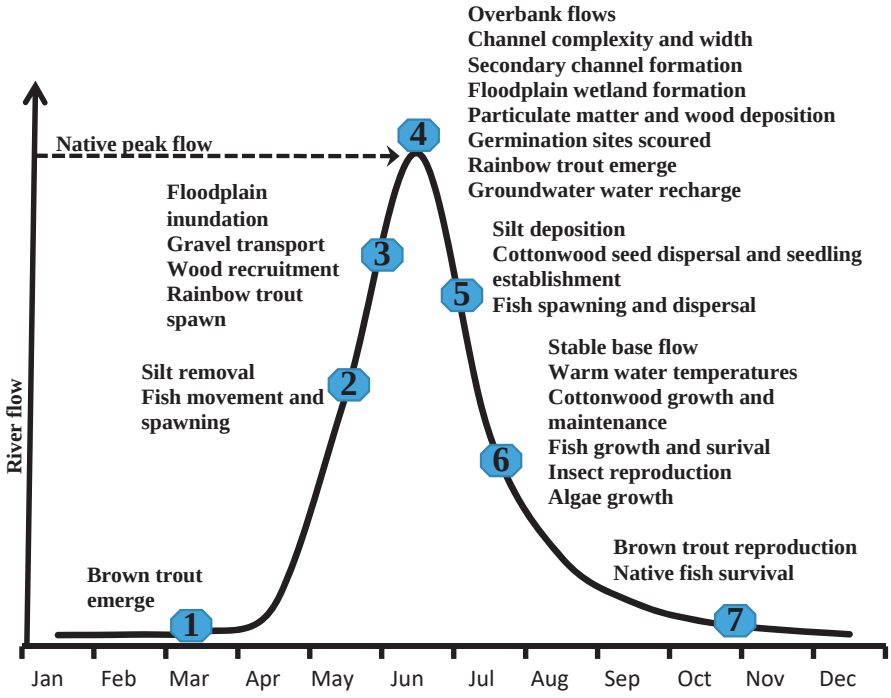

FIG. 3. Poudre River hydrology calendar, which conceptually describes flows and timing of functions those flows support to produce physical, chemical, and biological responses.

In contrast to the historical conditions portrayed by the hydrologic calendar, the contemporary Poudre River is highly altered (Appendix S1: Tables S1, S2). Extensive water storage infrastructure was developed to supply agriculture and municipal use, aggregate mining and urban development resulted in confined channels, and the many diversion dams upstream of the city (Fig. 1, Appendix S1: Table S1) divert a large proportion of river flow for much of the year. Storage and diversions reduce pre-development (native) peak and base flows (flows that would occur in the absence of diversions and other management) by 59% and 57%, respectively (Bartholow 2010, Shanahan et al. 2014). These hydrologic changes reduce sediment flushing and contribute to channel simplification thus reducing river amenities including a quality fishery or native riparian corridor (Wohl et al. 2015).

Model development and structure

Hydrologic alteration induces multiple, linked ecosystem responses, including changes to sediment transport, channel maintenance, and floodplain and wetland inundation, which affect distribution and abundance of in-channel and riparian biota (Nilsson and Svedmark 2002). Thus, we developed a multi-compartment Ecosystem Response Model (ERM) to evaluate future trajectories and complex and interacting biophysical functions under various Poudre River flow regimes, using a probabilistic Bayesian Network model. Here, we describe generalities of ERM development; additional details regarding probability tables and relationships used to calculate responses to flows and other variables are in Shanahan et al. (2014), Supporting Information (SI; Data S1) and City of Fort Collins (2019).

The probabilistic ERM network conceptualizes cause-and-effect relationships between flow regime, sediment, temperature, and ecological states (Fig. 4). Most relationships are based on conditional probabilities such that effects of one driver on a response will vary depending on other driver variables. Use of conditional probabilities leads to complex model parameterization but allows for incorporation of many information types to produce predictions about physical, chemical, and biological resources, and interactions among them. Because hydrology is a known master driver of physical and ecological conditions in streams (Poff et al. 1997, 2010), the ERM can be used to predict outcomes under various conditions including native flows, present altered flows, and future regimes resulting from additional water storage or climate change. The ERM incorporated major ecosystem components and interactions and retained advantages of a Bayesian Network approach (Uusitalo 2007) including (1) integration of various ecosystem functions typically evaluated as independent variables, (2) incorporation of various data types ranging from quantitative empirical analyses to qualitative expert judgment, (3) explicit quantification and incorporation of uncertainty, and (4) flexibility to test an array of scenarios.

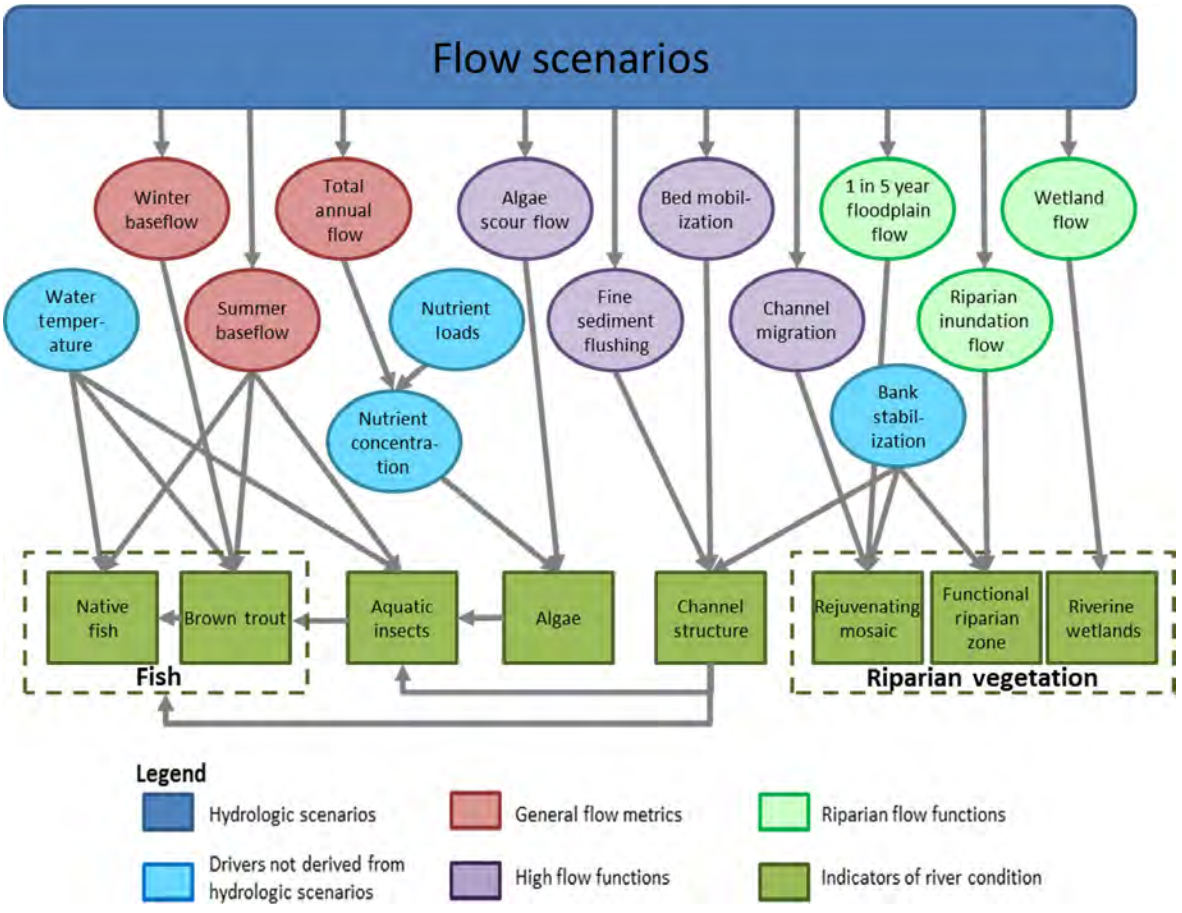

FIG. 4. Structure of the Bayesian network for the Poudre River Ecological Response Model (ERM), which links flow regime drivers, including aspects of magnitude, duration, frequency, and variability, to various flow metrics and functions, and their influence on indicators of river condition, the sum of which form ecosystem responses. Arrows between flow metrics and function nodes to indicators of river condition are predictive relationships in the model. Arrows linking indicators of river condition reflect interactions.

Indicators were formulated using combinations of quantitative channel hydraulics, empirical flow-ecology relationships based on continuous or categorical responses, and interacting effects of flow mediated through various combinations of base and peak flow, temperature, nutrients, and bed stability. Indicators included in the ERM (see Appendix S1: Table S3) were: (1) channel structure (substrate and channel geometry template for physical and ecological processes), (2) algae (basal food web resource, but unaesthetic and detrimental when excessive), (3) aquatic insects (species composition and abundance indicates flow regulation, water quality, and is a critical food web link), (4) native fish (indicates channel condition and flow regulation effects), (5) trout (mainly nonnative brown trout (*Salmo trutta* L.), which have high angler value and are a sensitive indicator of thermal and hydrologic regimes), (6) rejuvenating mosaic forest (width of multistage riparian forest with species adapted to disturbance), (7) functional riparian zone (river-connected area that supports biogeochemical processing, flood peak attenuation, sediment deposition, episodic aquatic habitat, and a productive vegetative community), and (8) riparian wetland (floodplain area inundated with sufficient frequency and duration to support wetland plants). Indicators were grouped into three types, based mainly on the amount of quantitative data available to describe them. The first group, for which quantitative data were available, included channel structure and three indicators of riparian condition, for each of the three separate river reaches. Because quality and quantity of stream habitat are determined by the interaction between flow and the structure of the river channel, the effects of flow changes on the ecosystem must be considered in the context of the current channel structure and its variability along the river (Brewer et al. 2016, McManamay et al. 2016). To quantify the effects of channel structure and associated moderate to high flows on indicators in the ERM (i.e., algae, native fish, trout, aquatic insects, and three riparian vegetation indicators), shear stress and effective

discharge analyses were performed at representative locations in each of the three reaches modeled along the Fort Collins river corridor. Hydraulic modeling identified discharges at which critical thresholds of shear stress, associated with riverbed flushing and bed and channel mobilization, were met, based on flow characteristics, channel geometry, and substrate composition in each reach (details in Shanahan et al. 2014; the full channel structure model data and a detailed narrative is in SI, and Data S1; the full Excel spreadsheet is also available from the senior author upon request). An annual high flow pulse capable of flushing surface deposits of fine sediment was assumed needed to ensure ecological functioning, while widespread mobilization of the coarse river bed sediments had a longer, two-year average return interval based on the current management infrastructure, and on interannual flow variability including multi-year dry periods. Descriptions and data sources for cross-sectional geometry were used to perform shear stress and effective discharge analyses, discharge–shear-stress rating curves, the HEC-RAS model (U.S. Army Corps of Engineers 2009), hydraulic model median grain size (d_{50}), and flow records for each of the three reaches, as described in Shanahan et al. (2014), SI (Data S1) and City of Fort Collins (2019).

Geospatial probability modeling was used to determine floodplain area available for the three riparian indicator responses. Reach-specific empirical models related flood flow inundation to riparian forest species and functional group composition. These relationships used detailed riparian plant distributions (Shanahan 2009) and measured presence of the rejuvenating mosaic, functional riparian zone, and riverine wetlands, and were modeled as a function of exceedance probability from a 30-yr flow record (USGS streamflow gages) using logistic regression. Compared to the other two riparian indicators that mainly require floodplain inundation, the rejuvenating mosaic requires higher shear stresses to induce channel migration and to disturb and scour floodplain germination sites for seeds. Exceedance probability was mapped using local rating curves developed with HEC-RAS 1-D hydraulic models (U.S. Army Corps of Engineers 2009), a 1-m^2 digital elevation model, and river flow duration curves. Reconstructed historical flows and future climate change and water development scenarios were used to recalculate and reproject future exceedance probabilities and corresponding distributions and area of vegetation, which informed probabilistic model parameters.

The trout indicator was the sole member of the second indicator group, which was based on an empirical flow-ecology relationship augmented with expert judgement. The trout indicator was based in part on field sampling that related abundance of young brown trout captured in autumn samples (n = 16 yr) as a function of the river flow level in the previous winter when eggs were incubating and hatching. This relationship indicated that higher winter flows of about 1 m^3/s, for example, had a relatively high 0.67 probability of producing a larger number (>20) of young trout per year, while low flows < 0.28 m^3/s had an 80% probability of producing 5 or fewer trout; intermediate flows produced an intermediate number of young trout. The empirical relationships between winter flow categories and young trout abundance were used to describe the probabilities of having a trout fishery in one of four categories, or states (−−,−, 0, +) that reflect the number of age classes present, their abundance, and reproductive success (present state is between − and 0). Several other factors also influenced this indicator (see Fig. 4), and these were assigned independent probabilities (by expert judgement) to place trout into one of the four states in a process similar to that described below for qualitative indicators (see SI; Data S1; City of Fort Collins 2019). We also weighted driving variables for each indicator in the ERM according to their relative importance. Using trout as an example, weights for winter baseflow, summer baseflow and temperature, and channel structure were relatively high and equal (0.27 each, total of 0.81), reflecting that habitat and temperatures are relatively more important, while invertebrates received a lower relative weight (0.19), reflecting that trout can likely obtain ample food even in a relatively degraded system. We also detail the full progression of the trout indicator, including several interacting flow-related metrics and probability tables, across the range of environmental drivers to demonstrate how we arrived at the final reach-specific indicator states (see SI; Data S1).

Expert judgment was used to assign flow-based or other probabilities to a third group of indicators, algae, aquatic insects, and native fish, in the absence of direct flow-ecology relationships. For example, aquatic insects in each reach were assigned to one of three states: + (many EPT, including insects with 2-yr life cycles), 0 (mostly EPT but univoltine and reduced abundance) and − (some EPT but many tolerant taxa as well). Insect community probability state was a function of three designated drivers (see Fig. 4) of community composition and abundance: (1) channel structure (a function of fine sediment flushing, bed mobilization and bank stabilization), (2) summer base flow magnitude and water temperature above or below 23°C as one combined variable, and (3) algae production (a function of nutrient concentration and scouring flow). For example, a clean and diverse streambed had respective probabilities of producing aquatic insect states −/0/+ of 0.0/0.5/0.5. Note total probability sums to 1.0 across the three states. Adequate summer baseflow combined with cool temperatures generated probabilities for aquatic insect states −/0/+ of 0.0/0.5/0.5. For algae, where future abundance was "about the same as today" insect states −/0/+ were assigned probabilities of 0/1/0. Thus, in a river reach, under a given flow scenario that generates a clean and diverse streambed, adequate and cool baseflow, and about the same amount of algae as today, the conditional probability of an aquatic insect state of 0 is

calculated from the product of the probabilities of the three controlling variables, i.e., $0.5 \times 0.5 \times 1 = 0.25$. Similar reasoning was followed for other response variables lacking suitable empirical monitoring data. For example, probability tables for the impacts of nutrient enrichment (total nitrogen and dissolved phosphorus) and scouring flows on algal biomass were based on general observations of experts in recent years to generate states of − (less than today), 0 (about the same as today), and + (more than today). Native fish states (−−,−, 0, +) were based on expected species richness, abundance, and life stage diversity in response to summer baseflow, temperature, trout predation, aquatic insects, and channel structure (see Shanahan et al. 2014 and SI [Data S1] for further details). Our fish species richness metrics were tailored to the naturally depauperate local assemblage and reduced species richness due to extirpation of specialists more sensitive to flow alterations (e.g., gravel-spawning nest builders, Fausch and Bestgen 1997), but could be easily altered for other geographic areas where fish species richness is higher.

Use of expert judgement, based on research experience and published ecological and hydro-geomorphic principles, is well-established in modeling and decision analysis (von Winterfeldt and Edwards 1986, Otway and von Winterfeldt 1992). Our main effort to reduce uncertainties associated with expert judgement was to assign conservative conditional probabilities, such that only stressor levels in the highest category were coded to cause ecological impairment. This conservatism may lead to less variation in the absolute expected values of each indicator, but the relative differences across the flow scenarios remained robust. While we specified prior distributions for all parameter interactions, we currently lack sufficient empirical data across all flow scenarios and indicators to refine prior distributions. Hence, we proceeded by specifying network linkages (Fig. 4), computing prior distributions from available data, and comparing results for a single flow scenario (recent past) against other scenarios of interest.

The ERM model uses Structural Modeling, Inference, and Learning Engine software running in GeNIe (Graphical Network Interface; Decision Systems Laboratory 2014) and computes conditional probabilities for input data using the general form

$$P(A_i|B) = \frac{P(B|A_i)P(A_i)}{P(B)} = \frac{P(B|A_i)P(A_i)}{\sum_{i=1}^{n} P(B|A_i)P(A_i)}$$

where A and B are possible outcomes and $P(A_i|B)$ is the conditional probability of A_i given B. The eight ERM indicators (model output) measure aspects of ecosystem function and condition and include variables that have regulatory implications, such as Clean Water Act aquatic life criteria, nutrient thresholds, and water temperatures, and biological indicators valued by the community.

Linkages that determined indicator condition were mapped in the final Bayesian network (Fig. 4). Hydrologic drivers including flow magnitude, duration, and frequency influenced physical processes and ecological states directly and interactively and those were altered to create flow regime "scenarios." Flow attributes had both direct and interacting effects on indicator condition. For example, peak flow conditions directly affected algae via scouring, and channel structure via sediment flushing and bed mobilization. In contrast, aquatic insects, native fish, and trout indicators had only interacting links to peak flow attributes, via changes in channel structure, because direct relationships were not available from existing data or reliably inferred from expert judgement. Although hydrology was the primary driver of ecosystem responses, other important factors were also incorporated including water temperature, nutrients and water chemistry, and bank stabilization interacting with flows (Fausch and Bestgen 1997, Dudgeon et al. 2006, Poff 2018).

Hydrologic scenarios

After finalizing the ERM structure, we developed nine hydrologic scenarios as model inputs (Fig. 5; Appendix S1: Table S4). Scenarios characterized their effects on the Poudre River ecosystem (e.g., peak flow frequency, low flow duration) and spanned a spectrum of past to future conditions including

1) three historical scenarios that included historic unaltered regimes (reconstructed native), recent-past altered flows (recent past), and present, continuing flow alteration (present operations;)
2) two future scenarios with reduced water availability due to additional development (additional water development) or climate change (driest climate); and
3) four designed hydrologic scenarios with combinations of base flow magnitude and consistency, and peak flow magnitude, duration, and frequency to achieve specific ecosystem goals. These we referred to as stable base–low peak, high base–moderate peak, dry base–high peak, and stable base–high peak.

Historical and future hydrologic scenario development.— Hydrologic scenarios were based on gage records, diversion withdrawal data, and outputs from models used by city planners and regional water managers. All historical and future scenarios were founded on the recent past scenario, a spatially discretized record of gaged discharges across the study reach. Native and present operations scenarios remove (or add) the effect of existing reservoir and diversion operations in the Poudre River drainage. Together, these models and streamflow gages produced time series of simulated flow at a daily time step (Fig. 5; Appendix S1: Tables S2, S3). To incorporate climate change impacts, the present operations scenario was modified using predictions from global

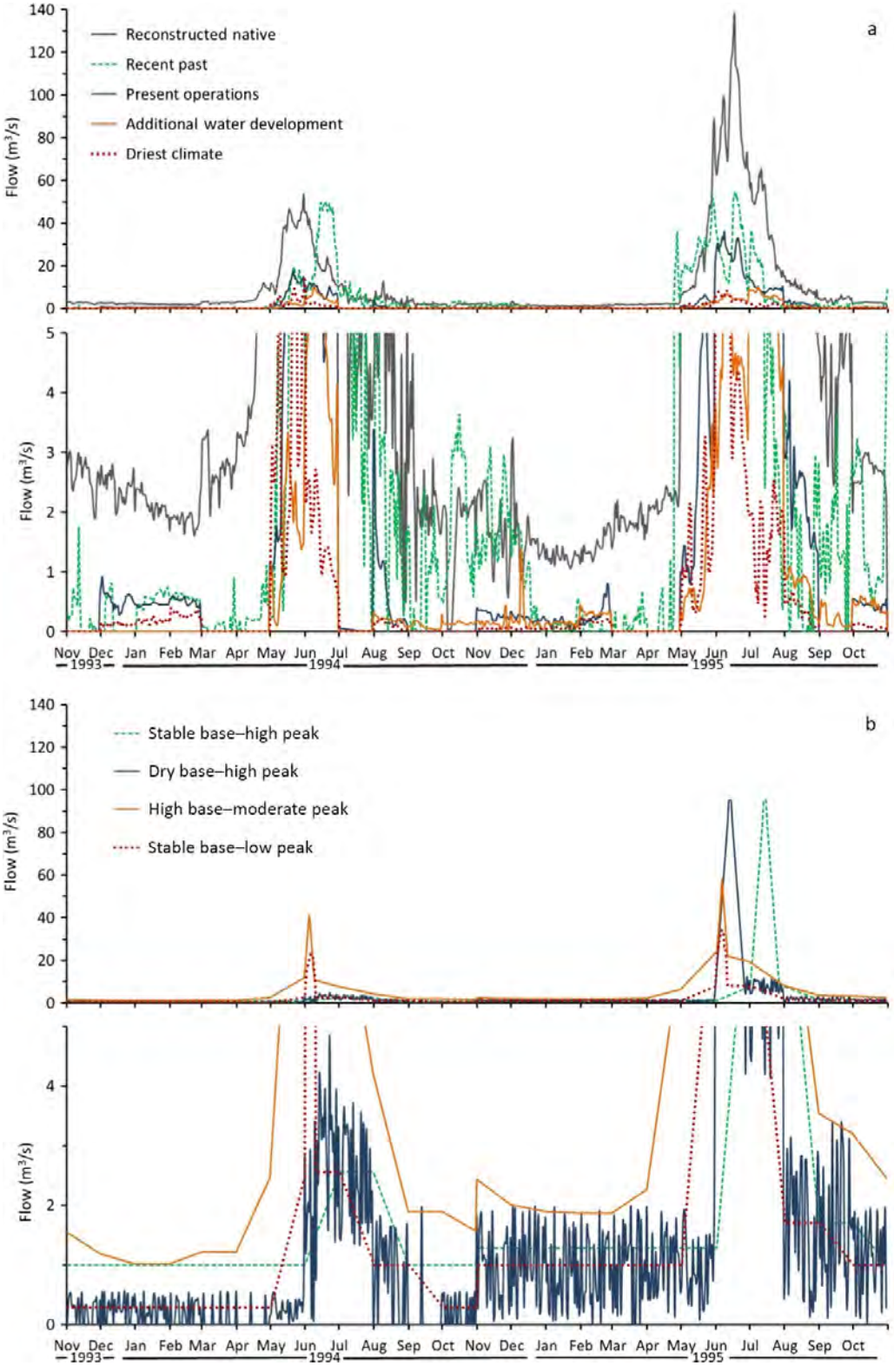

FIG. 5. Dry and wet year hydrographs for the Cache la Poudre River, Fort Collins, Colorado, showing differences in peak (upper) and base (lower panel, expanded for detail) flows for (a) five historical or future flow scenarios and (b) four designed flow scenarios. All are modeled flow scenarios with the exception of the recent past, which is from gage data (U.S. Geological Survey # 06752260).

climate circulation models (Diansky and Volodin 2002) and the Bias Corrected Spatially Downscaled [BCSD], Coupled Model Intercomparison project phase 3 archive (CMIP3, collectively the BCSD-CMIP3) that describes climate-changed hydrologic scenarios for the western United States (Gangopadhyay et al. 2011, U.S. Bureau of Reclamation 2011). Downscaled hydrology data are monthly time series predictions of unit runoff for each circulation model for one-eighth degree (12 × 12 km) latitude-longitude grid cells. Runoff calculations used the CMIP3 scenario with the lowest projected runoff in 2050 (inmcm3_0.1.sresb1) for the grid cell that most overlapped the Poudre River basin, and was the basis for our plausible driest climate scenario. To create the hydrology time series, we first computed the monthly ratio of average runoff under the driest climate scenario to average runoff under current baseline conditions. These ratios were then multiplied by the present operations daily flows to estimate the driest climate hydrologic time series of daily flows used with the ERM.

Designed flow scenario development.—The designed flow scenarios were developed as potential guidelines for water managers with the goal of improving the Poudre River flow regime to achieve certain social-ecological outcomes (Acreman et al. 2014). Designed flow scenarios have combinations of functional characteristics (e.g., Yarnell et al. 2015) that include base flow magnitude and consistency, and peak flow magnitude and duration. Sufficient base flow magnitude supports habitat for fish and aquatic insects, and influences water temperature and nutrient levels, while flow consistency reduces variation due to high diversion extraction or low reservoir releases that presently create disconnected pools and dry reaches detrimental to aquatic life. Although highest magnitude flows depend largely on snowpack levels, proposed water projects would store additional peak flows and further reduce their magnitude and duration, allowing for the possibility of designed flows to achieve downstream ecological targets if reservoir and diversion operators let flows bypass infrastructure. Designed scenarios (e.g., stable base–high peak) also included ascending and descending limb flow rates of change of about 7.1 $m^3 \cdot s^{-1} \cdot d^{-1}$ during the peak runoff period (e.g., Yarnell et al. 2010, 2015, City of Fort Collins 2019); direct effects of limb flows are presumed important but were not modeled. We show two consecutive years of the modeled Poudre River hydrographs for all scenarios (Fig. 5), in consecutive dry (1994) and wet (1995) years, to illustrate differences in base and peak flow magnitude, timing, and variability, among years when snowmelt runoff magnitude differed. Using the ERM relationships between flow and various indicators of river condition, we predicted effects of the four hypothetical designed flow scenarios on Poudre River ecosystem attributes using the same technique as for historical and future flow scenarios.

For each of the three reaches evaluated by the ERM, the ecological response of the eight river indicators under nine hydrologic scenarios was computed as a probability distribution scaled from lower (0) to higher (1) functioning. Each distribution is portrayed as a single mean value, which simplifies data presentation (Table 1; details in Shanahan et al. 2014 and SI). Indicator scores were then plotted (Fig. 6) on a probability scale (0–1) with associated qualitative predictions of condition from lowest (0) to highest (1). For example, channel structure scores were assigned to quartiles of the scale that ranged from an entrenched condition (lowest, score of 0–0.25) to a clean and diverse condition (highest, score 0.76–1). Native fish and trout scores from lowest to highest were assigned relative predictions in four ranked classes (−−,−, 0, +) and lowest to highest riparian indicator scores had relative predictions from minimal to wide areas of inundation, respectively. Indicators with only three categories were similarly assigned, where, for example, aquatic insect predictions ranged from −− (lowest condition, score of 0–0.33) to + (highest condition, score 0.67–1.0). Algae scores represented conditions that were significantly enriched and worse than present conditions (lowest, 0–0.33), similar to current conditions (0.34–0.66), or were significantly improved from present conditions (highest, 0.67–1.0). Differences in indicator scores are appropriately interpreted between flow scenarios in comparative rather than absolute terms as 0–1 scales for each indicator varied with input data and assumptions for each prior distribution.

Results

Modeling showed indicator variable response patterns typical of many flow-regulated systems, but it also revealed lesser-known interactions instructive for ecological understanding and management that varied spatially. Indicator scores were generally highest under the reconstructed native flow regime followed by the two designed flow scenarios with high peaks and the Recent Past regime in the least confined downstream reach (Fig. 6, Table 1). Indicator responses were lowest under future flow scenarios (additional water development or dry climate) in the confined reach. Present operations scenario scores were generally low.

Channel structure and the three Riparian zone indicator response scores were most sensitive (variable) to the array of flow scenarios. Low or zero scores resulted when only low magnitude peak flows were available (e.g., two future scenarios) but channel structure responded strongly to high magnitude flows because key shear stress levels were exceeded (e.g., reconstructed native, two designed flows with high peaks). Among instream biota, algae and trout were most sensitive to flow, responding negatively in the absence of high flows and subsequent impaired channel structure, and positively to presence of higher base flows, especially in winter, and cooler water temperatures in summer. Aquatic insect and native fish scores were the least sensitive to various

TABLE 1. Index of Poudre River condition for eight indicators in three different river reaches (3a = confined, 3b = moderately confined, 7 = least confined) under nine different hydrologic scenarios.

				Flow scenario					
Indicator and reach	Reconstructed native	Recent past	Present operations	Additional water development	Driest climate	Stable base–low peak	High base–moderate peak	Dry base–high peak	Stable base–high peak
Channel structure									
3a	0.80	0.33	0	0	0	0	0	0.80	0.81
3b	0.80	0.58	0.03	0	0	0	0.38	0.80	0.80
7	0.91	0.91	0.26	0	0	0.35	0.64	0.91	0.91
Algae									
3a	0.80	0.30	0.30	0	0	0	0.45	0.70	0.70
3b	0.80	0.30	0.30	0	0	0	0.45	0.70	0.70
7	0.95	0.30	0.30	0.30	0	0.10	0.60	0.70	0.70
Aquatic insects									
3a	0.46	0.26	0.26	0.21	0.21	0.30	0.41	0.41	0.53
3b	0.46	0.28	0.26	0.21	0.21	0.30	0.41	0.41	0.53
7	0.53	0.38	0.26	0.26	0.21	0.32	0.48	0.45	0.57
Native fish									
3a	0.45	0.37	0.30	0.30	0.30	0.37	0.38	0.43	0.53
3b	0.45	0.40	0.30	0.30	0.30	0.37	0.47	0.43	0.53
7	0.58	0.50	0.36	0.30	0.29	0.47	0.62	0.51	0.75
Trout									
3a	0.61	0.30	0.18	0.18	0.18	0.35	0.52	0.40	0.72
3b	0.60	0.35	0.19	0.18	0.18	0.35	0.60	0.40	0.71
Rejuvenating mosaic forest									
3a	0.62	0.26	0	0	0	0	0	0.23	0.23
3b	0.83	0.43	0.23	0	0	0	0	0.30	0.30
7	0.94	0.83	0.29	0.06	0.06	0	0.06	0.50	0.50
Functional riparian zone									
3a	0.25	0.23	0.13	0	0	0	0	0.21	0.21
3b	0.90	0.82	0.41	0.11	0	0.11	0	0.67	0.67
7	0.93	0.93	0.48	0.27	0.22	0.32	0.22	0.89	0.89
Riparian wetland width									
3a	0.51	0.36	0.30	0	0	0.21	0.30	0.46	0.46
3b	0.98	0.63	0.44	0	0	0.28	0.44	0.89	0.89
7	1	0.94	0.68	0.33	0	0.55	0.77	1	1

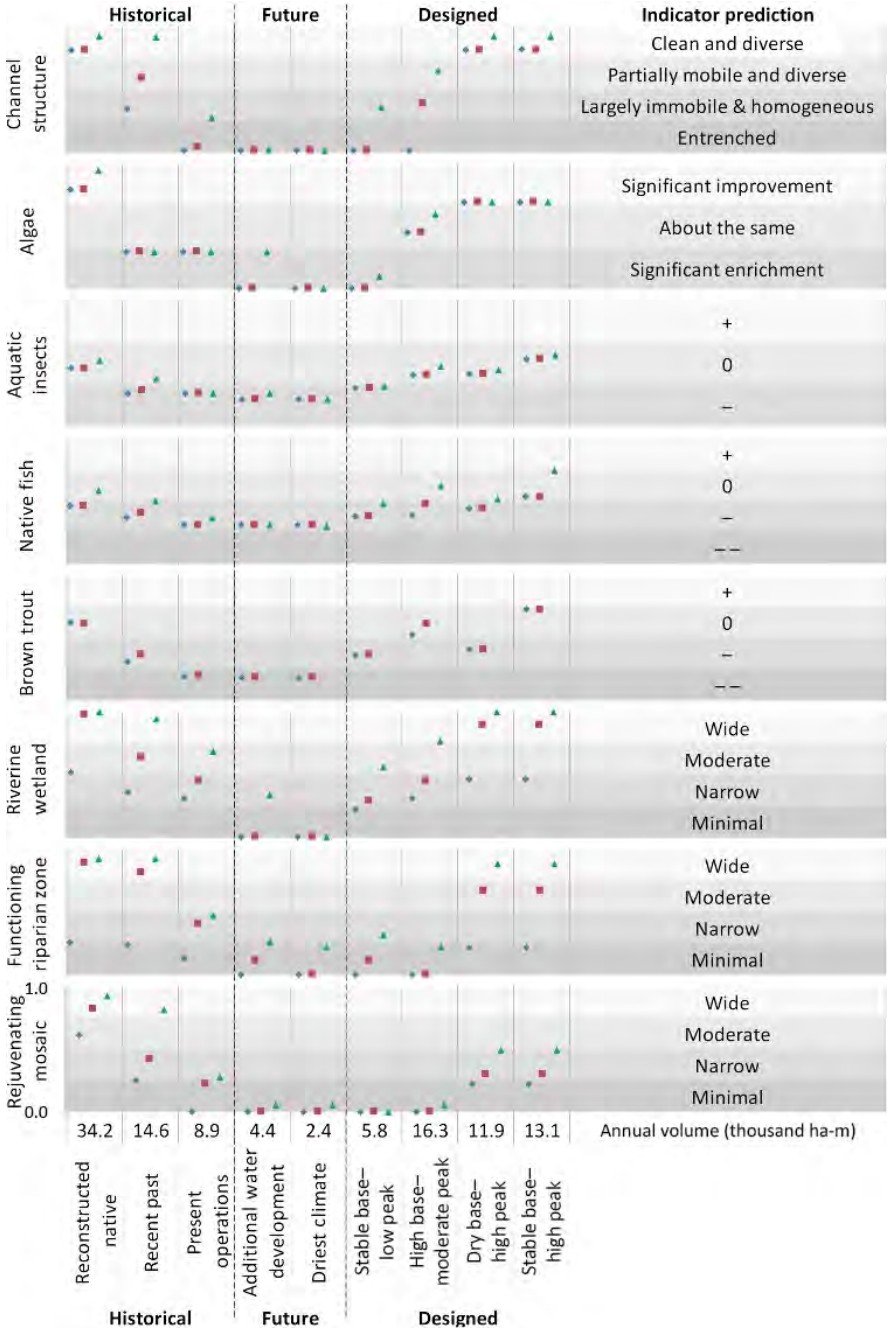

FIG. 6. Indicator predictions for three historical, two future, and four designed hydrologic scenarios for eight indicators of river condition in each of three Poudre River reaches. Each indicator is scaled from 0 to 1, with the four different gray-shaded rows for each indicator showing quartiles of change. From up to downstream, blue diamonds are for the confined reach, red squares for the moderately confined reach, and green triangles for the least confined reach. The annual volume of flow (ha-m) required to achieve each Hydrologic Scenario is portrayed at the bottom of each results column. Scores for river condition indicators for aquatic insects (+, 0, −) and fish (+, 0, −, −−) are arrayed from lowest to highest. No trout scores are presented for the downstream, least confined reach because water was warm, and few trout were present.

scenarios because assigned probabilities for various effects were conservatively estimated, mainly because few specific links to flows and other drivers were apparent (Shanahan et al. 2014). Details for indicator responses to flow scenarios are below.

Channel condition

Channel structure scores declined through the progression from Historical to Future hydrologic scenarios, due to declining peak flows and increased channel

simplification, a pattern generally similar for other indicators. Highest channel structure scores (0.80–0.91) under reconstructed native and some designed scenarios resulted from high magnitude flows for a minimum of three consecutive days that provided sediment flushing, coarse substrate mobilization, channel migration, and increased geomorphic complexity. Alternatively, channel structure score was 0 in high base–moderate peak, additional water development, and driest climate scenarios in confined and moderately confined reaches because flow magnitude was inadequate to mobilize substrate and halt channel simplification.

Flows required for substantive geomorphic work varied spatially along the river corridor. Increasing channel structure scores from upstream confined and moderately confined reaches to the downstream least confined reach reflected increased downstream channel migration and complexity. Increased downstream geomorphic work can be achieved, despite identical simulated river flows, because median sediment size decreased more rapidly than channel gradient from upstream to downstream, so the same peak flow magnitudes increased channel structure scores more downstream.

Instream biota

Algae indicator scores were also highest under reconstructed native and designed hydrologic scenarios with high peak flows (score range 0.70–0.95) but lowest in confined reaches with low peak flows because substrate mobilization and scour were minimal. Identical recent past and present operations scores resulted because flow thresholds that altered channel structure were not achieved.

Aquatic insect scores were highest (0.46–0.57) in high peak and higher base flow scenarios (reconstructed native, stable base–high peak) because those conditions increased taxa richness, life history diversity, and abundance and were lower in confined reaches with low peak flows and low or variable base flows. Native fish indicator scores were higher (0.38–0.75) in scenarios with higher peak flows and consistent base flows (reconstructed native and designed scenarios except stable base–low peak) due to higher taxa richness, life stage diversity, abundance, and channel-structure-related habitat diversity, attributes that were reduced in low peak or variable base flow scenarios. Reasons for reduced score ranges over all flow scenarios and reaches for aquatic insects and native fish were discussed above. Native fish scores in the least confined reach were consistently higher, regardless of hydrologic condition, reflecting greater habitat availability and low abundance of predaceous trout in that warmer reach.

Trout reproduction, abundance, and age-class diversity varied with summer and winter base flow levels, summer water temperatures (higher in low flows), aquatic insect abundance, and channel structure. Thus, highest trout scores (0.40—0.72) resulted from higher peak and consistent base flow scenarios (reconstructed native, high base-moderate peak, and stable base-high peak), which was supported by empirical data that linked trout reproductive success with higher winter base flows. Conversely, trout were negatively affected by low base flows in summer (reduced survival) and winter (reduced reproduction), and elevated summer water temperatures that may reduce dissolved oxygen levels. Effects of lower winter base flows are evident by comparing the dry base-high peak score (0.40) to other designed scenarios with higher base and higher peak flows (score range 0.52–0.72).

Riparian zone

Riparian forests responded positively to high peak flows that saturated soils, mobilized sediment, and created channel movement, and they responded negatively to low flows and bank armoring, especially in confined reaches. Among historical flow regimes, reconstructed native and, to a lesser extent, recent past scenarios elicited the strongest positive response by the rejuvenating mosaic indicator, particularly in the least confined reach (0.94 and 0.83, respectively). Designed hydrologic scenarios with high peak flows showed the greatest improvement over those with moderate or lower peaks. Native riparian tree recruitment was negligible with low peak flows (score range 0.00–0.29) because floodplain connections rarely occurred, even in the least confined reach.

Scenarios with high peak flows (reconstructed native, recent past) produced the highest functional riparian zone scores, especially in the least confined reach (scores = 0.93), similar to riparian wetland scores (0.94–1.00). Wetland development was limited in channel-confined reaches under most flow scenarios (confined reach = 0.00–0.51) because high, steep banks and channel entrenchment prevented river–floodplain connections. Similar to the functional riparian zone, wetlands would increase if bank height were reduced and banks were set back and sloped to allow greater river–floodplain connection and a more continuous moisture gradient. Rejuvenating mosaic scores were lower than the other two riparian vegetation scores under the same flow and reach conditions because flow magnitudes and velocities were insufficient to disturb and scour surfaces needed for seed germination sites.

Annual flow volume required to implement the nine ERM flow scenarios varied widely. For example, annual discharge volume in the reconstructed native scenario was more than twice as high (34,246 ha-m; 278,000 acre-feet, Appendix S1: Table S2) as other scenarios and up to 14× greater than low peak flow scenarios, regardless of base flow characteristics. Notably, when compared with the reconstructed native or recent past scenarios, the stable base–high peak scenario produced comparable or higher indicator scores for most metrics with substantially less water (13,117 ha-m;

106,000 acre-feet, Appendix S1: Table S2). Reach differences for indicators reflected prevalence of overbank flooding, or, of differences in channel structure rather than flows, which were identical across reaches.

All indicators were sensitive to changes in assumptions of driving variables; those with linear or continuous responses were relatively more sensitive than categorical driving variables. For example, increased flows and shear stress caused channel structure change, especially when thresholds for bed particle mobility were exceeded. Channel structure changes then cascade interactively through most instream biological indicators. Categorical variables were less sensitive to flow changes, unless they resulted in response category changes, indicating that additional quantitative data that explicitly linked indicators to flows would improve model performance. Additionally, all indicators have assumptions and thresholds that can be changed, to reflect differing local conditions or addition of new or refined flow regimes, which increases model flexibility and utility.

Discussion

Ecological response model outcomes and important drivers

The integrated ERM for the urban Poudre River demonstrated how the structure and function of the coupled aquatic and riparian ecosystem are strongly shaped by flow and illuminated complex interactions between different taxa and trade-offs with different flow regimes. Thus, this model could provide restoration ecologists and managers with a tool to assess effects of potential future flows to target specific, desired processes or ecosystem attributes. Assuming additional changes from new development or climate change will cause further alterations to the urban Poudre River, the ERM would also allow insights into what specific flow components may need to be "designed" as part of any new infrastructure to help sustain or improve ecological integrity.

Our modeling led to three main observations. First, the conceptual hydrologic calendar and ERM predictions increased our understanding of the complex interactions among flows, bed mobilization, channel structure, and biota (e.g., Fig. 4) that contribute to overall ecosystem condition. Second, specific peak flow magnitudes based on geomorphic measurements and hydraulic modeling were critical for substrate cleansing and mobilization, channel morphology, and overbank flows, with strong subsequent effects on riparian and instream biota. Instream biological indicator scores (aquatic insects, native fish, trout) increased in hydrologic scenarios with greater peak flow magnitudes because of improved channel structure, the physical habitat template of the river, even though those indicators were only interactively linked to peak flows. Implicit is that other important ecological processes and communities not modeled by the ERM, including those supported by ascending or descending limb flows, are maintained. Third, an unexpected model result was that designed flows with high peaks resulted in restoration of impaired processes using about the same Poudre River annual water volume available in the flow-depleted recent past scenario. These complex and interacting Poudre River insights demonstrated by the ERM would not be possible with more traditional flow assessments that evaluate only single variables independent of each other (Brewer et al. 2016, McManamay et al. 2016).

Modeling ERM flow effects indicated how river management could be optimized. For example, high flows had the greatest effects in the least confined channel reach, but all reaches may benefit if flow effects were combined with levee or bank modifications. To this point, lowered banks in the downstream portion of the confined reach promoted successful floodplain cottonwood recruitment in recent higher flow years. Stable base flows most effectively increased instream biological indicators such as trout and aquatic insect scores compared to present conditions because periods of stream desiccation and extreme fluctuations were reduced. Indicator scores in low peak flow scenarios were only about 50% of those with high peaks, demonstrating strong links between geomorphic function and biota.

The importance of natural flow regime components (Poff et al. 1997, Postel and Richter 2003) to a higher-functioning Poudre River ecosystem was illustrated by ERM modeling because peak flows scoured riverbed substrate, increased channel complexity, removed excess algae, and promoted a diverse aquatic insect community that supported fish and likely, other ecosystem components such as terrestrial insectivores (e.g., Baxter et al. 2005). Extreme peak flows that may cause channel incision may not be an issue here because discharge magnitudes in designed flows are relatively low. High flows may also increase the quantity of large wood via channel migration (Yarnell et al. 2010, Wohl et al. 2015, 2019), and river connectivity to floodplain wetlands important to backwater-dependent aquatic organisms. Descending limb flows, although not modeled explicitly, likely modified channel morphology, cued reproduction by fishes and other aquatic organisms, and prepared surfaces needed for native seed germination and seedling growth and survival necessary for perpetuating the ecologically important riparian gallery forest (Mahoney and Rood 1998, Yarnell et al. 2010). Base flows supported fish and aquatic insect reproduction and growth, and successful reproduction by trout until the spring hydrologic cycle begins again.

A changing ecosystem

The Poudre River supports functioning remnants of native riparian and aquatic biota, but this urbanizing ecosystem has undergone significant change over the last 150 yr. Examples include channel modification and simplification, diminished native fish populations, and

limited recruitment of young trees in stands of senescent narrowleaf and plains cottonwood. Native fish only approached the highest indicator condition once (stable base–high peak in the least confined reach 7) because local extinctions are exacerbated by negative modeled interactions with trout (e.g., predation) and habitat changes (e.g., backwater loss) related to simplified channel structure and, presumably, greater upstream river fragmentation and dewatering by diversion dams. Regardless, and specific to the Poudre River system, dynamic model responses of indicators demonstrated ecosystem decline was not inevitable, and that designed flows using existing and proposed infrastructure could lead to improved conditions. The flexible ERM could model ecosystem responses to additional designed Poudre River flow regimes, or be used as a general assessment approach in other altered systems where managers seek to improve ecosystem conditions, after tailoring geographically relevant indicator information for the model.

Similar to other modified arid-land rivers, the Poudre River ecosystem is a spatially variable patchwork of physical conditions with a changing biological composition whose functioning varied even across the relatively short reaches we evaluated. For example, modeling showed confined reaches had reduced ecosystem complexity and indicator scores compared to the least confined downstream reach, which more typified predevelopment conditions (Fig. 2). Thus, modeled ecosystem responses to flow management varied in a spatial context and may better allow practitioners to align restoration prescriptions with reaches most suited for a particular management action. Extreme low flows presently occur in some Poudre River reaches and result in persistent riverbed desiccation especially in winter, effects that are exacerbated by diversion dams that limit upstream recolonization by downstream biota. Effects of management strategies to enhance river connectivity or bank restoration could be modeled in the ERM to evaluate indicator responses and relative costs and benefits of such actions.

We acknowledge that flows discussed here may benefit some nonnative species. For example, anglers fish for nonnative brown trout, because native cutthroat trout (*Oncorhynchus clarkii* [Richardson]) disappeared decades ago due to competition and hybridization with nonnative trout species (Behnke 1992, Bestgen et al. 2019). Further, predaceous trout may have a negative impact on non-salmonid native fishes, creating a challenge in managing for healthy populations of both. We speculate that flows to benefit nonnative trout would also likely benefit native cutthroat trout that once existed here but flow management would do little to restore native trout because they were extirpated by other mechanisms (Behnke 1992).

Unlike the situation with trout, designed flows, and increased channel and floodplain management, may promote native cottonwoods via increased seedling recruitment (Merritt and Poff 2010). This is important because of limited recruitment of young trees to replace old stands of native cottonwoods, keystone species in western stream ecosystems (Merritt and Bateman 2012) that are being replaced by nonnative taxa. Thus, species-specific responses to flow management and the relative ability to favor native taxa over nonnative ones is a planning consideration, and can be modeled with the ERM.

Strengths and limitations of the Ecosystem Response Model

The ERM was constructed to evaluate linked biophysical responses over a range of possible flow futures, with few constraints on what is likely, affordable, or administratively possible. Decision-makers must ultimately weigh stakeholder interests with the ecological, economic, and societal consequences associated with various policy options. Although ERM predictions are not precise in an absolute sense, the power of this modeling approach lies in its integrative and comparative nature. For example, modeling showed that instream biological indicators (e.g., algae, aquatic insects) benefitted from higher and more stable base flows and high peak flows, but stable base flows with low peak flows were only half as effective to increase indicator scores. A nuance was that trout scores in high peak designed scenarios nearly doubled when base flows changed from low to higher levels, reflecting the important seasonal role of flow on reproductive success. Thus, explicit baseflow management to enhance trout in the absence of peak flows would result in only a modest improvement in scores and at the expense of other indicators dependent on high peak flows.

Modeling also showed the strong positive link between channel structure and riparian indicators with peak flow, reflecting gradient (channel structure) or threshold (riparian) effects as peaks declined from historical flow levels. The ERM provides insight into what magnitudes of designed flows would be minimally sufficient to reestablish higher functioning along the river corridor. Thus, designed flows with high peaks would likely enhance channel and riparian functioning, but if peaks came at the expense of higher and more stable base flows, instream biota indicators would decline, demonstrating the utility of the ERM to evaluate flow scenario trade-offs and to explore nuances that may vary seasonally or spatially.

The interactive and data-driven ERM differs from another flow modeling approach, ELOHA, in several ways. ELOHA is mainly a multisite comparative approach intended for use in situations that are data sparse and where scientific capacity to generate detailed knowledge is lacking. Studies more detailed than ELOHA-type analyses are required for highly valued local ecosystems, where the assumption that streamflow alone drives ecological function cannot be accepted, and where other environmental factors such as water

temperature, channel structure, and streambed scour and movement, are important. The ERM for the Poudre River is such a detailed, site-specific model that includes many relationships that are both directly and interactively influenced by flow, directly via flow-linked pathways to indicators, and interactively through indicators. Differences notwithstanding, ERM findings could be placed into an ELOHA-type framework by classifying the Poudre River as a particular flow regime type (in a given geomorphic context) to set expectations for the ecological performance of similar river types.

Indicator response comparisons across a set of diverse and plausible hydrologic scenarios reveal certain futures are likely better than others in terms of a highly functioning ecosystem that provides valued river amenities. Given the altered condition of the present-day Poudre River ecosystem, managers and the public need to consider the vulnerability of the system to further hydrologic alteration and the associated trade-offs. The ERM also illustrates another salient point for river managers to consider: that the same volume of flow can achieve substantially different ecological outcomes, depending on how it is managed.

Thus, the ERM provides a clear framework and useful decision support tool for understanding trade-offs and consequences of various management options on water supply and biota. Indeed, a general, risk-based modeling approach may be more useful than traditional environmental assessments that produce unintegrated measures of resource alteration, especially considering the trajectory of ecosystems under changing environmental conditions including climate warming (Schindler and Hilborn 2015). Application of probabilistic models to other systems will require the system-specific quantification of geomorphic and ecological relationships, which will inform a transparent and science-based process to aid decision-making and clarify the likely trade-offs and consequences of flow management regimes. Modeling approaches that predict ecosystem pathways also allow decision-makers to compare a variety of stakeholder interests and the engineering, ecological, economic, and societal consequences associated with policy options (see Baker et al. 2004).

Futures for flow-altered systems

The ERM analyses confirmed changes in historical Poudre River ecological conditions and indicated additional legacy shifts will occur even if present flow management practices are maintained. Further, ecological changes will be accelerated by additional water development or a drying climate. However, results also indicated carefully managed flows that link key hydro-geomorphic processes with biological responses are likely to enhance ecological functioning of the river ecosystem. Key elements of a designed flow in this and other systems similar to the Poudre River would be peak magnitudes in spring and early summer that meet threshold levels for channel maintenance and riparian vegetation, gradually ascending and descending limb flows, and relatively stable and adequate magnitude base flows, which collectively should improve geomorphic and biological indicators. Because flow requirements differ among biota, maintenance of interannual variability is important to support a more biodiverse ecosystem through time. Although we evaluated only a few designed scenarios, other flow regimes that incorporate additional seasonal or interannual variability in peak or base flows could easily be modeled to better understand those effects.

In any plausible future, the Poudre River will not return to native flows, because annual discharge in the reconstructed native scenario is up to 14× higher than other scenarios. This large gap between natural flow conditions that set the original physical template for the Poudre River and current or future flows suggests that (1) managers of heavily altered river systems may need to set ecological objectives that are not strictly "natural," and (2) designed flows are needed to achieve specific objectives (e.g., Acreman et al. 2014, Brewer et al. 2016, McManamay et al. 2016). The ERM demonstrated that specific Poudre River objectives could be achieved with about one-half the annual discharge of the reconstructed native scenario, if certain flow targets are met. Social and ecological benefits from designed flows in altered systems are most likely to occur if basin-wide flow management is combined with other actions to promote upstream–downstream and channel–floodplain connectivity along the river corridor.

Additional future depletions of Poudre River flows are possible given an existing proposal to store water in a new off-channel reservoir, which will further diminish already reduced peak flow magnitudes and impact river resources. Proposed project mitigation (Northern Colorado Water Conservancy District 2017) has focused on stabilizing base flow, which is needed to reduce present streambed desiccation. Our modeling indicated water levels to accomplish base flow functions in the stable base–high peak scenario was about 1 m^3/s flow (about 35 cubic feet per second), the required level for successful trout reproduction (Bartholow 2010, Appendix S1: Table S2), and improved functioning of other indicators. However, the proposed base flow would meet this threshold on average only 50% of years and would not benefit river resources downstream of the city because flows will be diverted.

Peak flow frequencies and magnitudes proposed are also inadequate to maintain channel condition and biota because a 3-d peak bypass flow is projected to occur in only 43% of years (Northern Colorado Water Conservancy District 2017; data *available online*).[12] Further, mean peak Poudre River flow magnitudes are unlikely to reach even the 31 m^3/s estimated for the relatively low present operations scenario in most years. As modeled

[12] http://www.northernwater.org/docs/NISP/MapsDocuments/2017FWMEPFinal.pdf

by the ERM and predicted by fundamental principles of river science (Poff et al. 1997, Wohl et al. 2015), changes from proposed additional water development would essentially ensure a general and long-term decline in Poudre River aquatic and riparian ecosystem functions. Thus, the best possibility for maintaining or improving Poudre River ecological conditions with the proposed off-channel storage is designed peak flows that bypass the newly proposed storage reservoir for a minimum of three consecutive days with the predicted highest magnitude flows each year. This scenario also ensures the natural interannual variability in flows needed to sustain ecosystem functioning, effects of which are seen by comparing ERM outcomes of managed scenarios with different peak flow levels.

Ideally, the frequency and magnitude of peak flows in flow-depleted rivers could be partially restored to more closely approximate natural flows, which here are those in the reconstructed native scenario (i.e., ≥3-d peak flows in more than 50% of years that reach 94.9 m^3/s at Fort Collins, to provide the flow magnitude and duration needed for channel maintenance (Andrews and Nankervis 1995, Emmett and Wolman 2001)). Although existing storage reservoirs and diversions have substantially reduced Poudre River peak flows, our analyses show that the estimated "deficit" in peak flow volume and duration could be met with bypasses from existing storage facilities or diversions in the Poudre River basin, which in real time would require adequate flow forecasting. Other studies that have implemented designed flows (Kiernan et al. 2012) or modeled them (Chen and Olden 2017, Sabo et al. 2017) show it is feasible to balance existing human demands while provisioning key ecosystem targets. Adaptive management will be needed to ensure flow scenarios support desired outcomes. Additional details regarding the high flow mitigation specific to the Poudre River are elsewhere (Appendix S2).

As stressors on over-allocated river ecosystems increase from human water demands and climate change, modeling approaches that predict future ecosystem responses to water development and management will play an increasingly important role in informing public debate and choices about management of these resources (Baker et al. 2004, California State Water Resources Control Board. 2017). Ecosystem-based models such as the ERM can identify strategies to achieve firm targets to assist with rehabilitation or mitigation plans in water development scenarios. Unfortunately, no policy requires that integrated, holistic, ecosystem-scale impacts be assessed before new water projects are approved. Rather, requirements for assessing "impact" under NEPA are satisfied when analyses are framed only in traditional single-variable models. Thus, even when river engineers and other scientists not associated with water development interests construct holistic models of "impact" (e.g., the ERM), there is no clear pathway to having those substantively considered in project development, much less adopted. Another fundamental problem with the traditional NEPA-driven "environmental impact" approach is failure to consider ecosystem functions and societal values on par with the economic factors that largely dictate proposed alternatives for development. Typically, impacts of the preferred project alternative are evaluated with a few single-factor analyses that are portrayed as causing minimal environmental alteration. Joint consideration of both long-term ecological issues and short-term economic gain at the project proposal stage may aid development of more environmentally sustainable alternatives, especially in light of new uncertainties posed by climate change (see Poff et al. 2016). This would promote more robust science and more transparent trade-off analyses of alternative development options needed to support more rational societal decisions about river management in a complex and uncertain future.

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Supporting Information

Additional supporting information may be found online at: http://onlinelibrary.wiley.com/doi/10.1002/eap.2005/full

Data Availability

Data are available from the City of Fort Collins Natural Areas Department at https://www.fcgov.com/naturalareas/pdf/erm_report.pdf, https://www.fcgov.com/naturalareas/pdf/erm_appendix.pdf?1421099850, and https://www.fcgov.com/naturalareas/eco-response.php

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STATE of the POUDRE

A River Health Assessment

City of Fort Collins

BCC 08/17/20

NISP

Executive Summary

The purpose of this first State of the Poudre River (SOPR) is to provide a description of the current health of the Cache la Poudre River (Poudre) from approximately Gateway Natural Area to I-25. The Poudre is a complex natural system that has been altered by nearly two centuries of human influence. This has resulted in dramatic changes to the physical structure of the river, water quantity and quality, floodplain, forests, and wildlife communities. The human footprint continues to expand, placing additional pressure (or stresses) on the river ecosystem and the natural processes that sustain it. This river health assessment provides the City of Fort Collins with a new tool to track trends and benchmark progress towards its vision of sustaining a healthy and resilient Cache la Poudre River.

While the Poudre flows 126 miles from its headwaters to its confluence with the South Platte near Greeley this study focuses on a 24-mile reach from the lower canyon through Fort Collins. The study area was divided into four zones (Canyon, Rural, Urban, and Plains) and further into 18 study reaches based on natural changes on the landscape and human influences.

Overall Grade: For the 24-mile study area the Poudre River received an overall grade of C. This grade indicates the even though the Poudre has been altered and degraded by a suite of local and system wide stresses that impair its health, it continues to support basic elements of a functioning river ecosystem.

The framework for this baseline assessment includes nine indicators of river health which are informed by 25 indicator-specific metrics. Collectively these provide a thorough evaluation of how well the system is functioning. Metrics grades are developed by collecting and incorporating many types of data, which were then translated into an A-F grading system. Indicator and metric numerical scores and their corresponding letter grades were calibrated to categorical definitions relating to degree of functionality or impairment.

Recommended ranges developed for each metric (as established in the River Health Assessment Framework, City of Fort Collins, 2015) and were developed based on the City's concept of working towards a functioning river ecosystem. The recommended ranges consider the contemporary real-world context and reasonable expectations for future change and the potential for improvement. They should, however, be used as a guide and aspiration rather than a directive. Also, when interpreting results for a comprehensive scientific assessment such as this, it is important to consider that uncertainty and variability exists across scientific disciplines, data sources, and river reaches. The methods and grading guidelines provide an explicit description of the analytical approaches used and can help the reader understand this variability.

This report is structured to allow the reader to understand the project approach (Sections 1 and 2) followed by identification of potential influences, or stressors, on river health in Section 3. The health assessment scores (Section 4) reveal the ramifications these anthropogenic stressors are having on ecosystem condition. Results indicate there is considerable variability across aspects of river health as scores vary widely (from A to F) at smallest unit of measurement (metrics scores by reach). In Section 5, the focus shifts to an overview of river health, describing the link between stressors and degree and type of impairment for each of the four zones. Poudre River health indicator grades for each zone are

compared to the ranges recommended in the City's Poudre River Health Assessment Framework (2015)—to highlight areas where there is the greatest gap between the City's goals for the river and today's conditions. This section also includes an analysis of the causes of impairment and explores which problems are tractable to practical solutions. Section 6 looks toward the potential future applications and improvements for the project.

Key findings by topic

- The Poudre is characterized by major changes in flow volumes and timing. Reductions have significantly altered peak and base flows, the effects which are exacerbated the further one travels downstream. Diversions also cause unnatural fluctuations in flow volume, which likely affects critical habitat and reproductive needs of fish and insects in the river.

- The river channel has seen drastic changes over the past two centuries causing widespread fundamental alterations to the ecosystem. The river used to meander across the floodplain. Forcing it into a single, permanent path has disrupted various processes dependent on natural river movement including the regeneration of riparian forests, the movement and balance of sediment, the river's resilience to large floods, and other events like wildfires in the upper watershed. However, with today's land uses, there is a need to protect infrastructure in the floodplain. Understanding this new physical dynamic and its relationship with extreme flow events is central to successful management for river health.

- Water quality in the Poudre is quite good, despite the presence of some stresses, and is supported by the City's commitment to manage stormwater runoff and meet regulatory requirements for treated wastewater effluent. The City and others closely track water quality, implementing quick action if undesirable changes are detected.

- While non-native trout are thriving in Poudre's cooler waters (generally upstream from College Avenue) the populations of native fish are in sharp decline. These declines are most likely due to fragmented habitat and extended periods of extremely low base flows. Other stresses likely influencing fishery health include rapid fluctuation of flows, non-native predatory fish and altered water temperatures.

- The riparian corridor has experienced a system-wide disconnect between the river and its floodplain. In many places riverside forests form only a narrow band that hugs the river banks providing little support for overall river health. However, where the riparian corridor is connected to the river there are pockets of healthy forests including a mosaic of diverse habitats, which are ideal for supporting wildlife. Restoring the river-floodplain connection and active management of aggressive non-native trees is making a positive difference across City-owned floodplain properties.

Zone Highlights

Canyon zone: B- (Munroe tunnel, above Gateway Natural Area, to the canyon mouth)

Through the Canyon zone the river and riparian corridor are confined by canyon walls. Highway 14 further limits the river's space and ability to mitigate large floods. Here the river supports aquatic life, a narrow riparian forest, and floodplain, but this zone marks the beginning of an approximately 20-mile reach of river that is heavily impacted by multiple diversions which begin to reduce flows and fragment aquatic habitat. The upstream forested watershed provides the City and surrounding communities with a reliable and high quality drinking water source, but in the lower Canyon zone warming water temperatures emerge as a potential concern for aquatic life.

Rural zone: C (Canyon mouth to just below Overland Road)

As the Poudre leaves the canyon the river has its first opportunity to connect to a wider floodplain, but impacts from berms, armored banks, and channelization disconnect the river from its floodplain. Native cottonwoods dominate many riverside forests; however, encroachment from agricultural lands affects the health of the vegetation. Cooler waters released from Horsetooth Reservoir lower water temperature in this zone. The impact of multiple large water diversions severely alters peak and base (low) flows.

Urban zone: C (just below Overland road to Timberline Road)

Gravel pits and associated berms affect the river's ability to access the floodplain on the upstream end of the Urban zone, while encroachment from roads and development through the City have impacted the diversity and extent of the riverside forests and habitats. Nevertheless, pockets of excellent riverside forests exist (near Shields Street) where high spring flows have access to the floodplain. The river once formed multiple braided channels increasing the system's capacity to mitigate large floods, but now as a single, confined channel it has reduced resilience to flooding. Diversion dams and the lack of large wood in the channel negatively impact habitat for aquatic insects and fish. While introduced non-native trout appear to be doing well, a major concern is the local loss of native fish.

Plains zone: C (Timberline Road to I-25)

As the river flows through large areas of land managed as conserved open lands river health improves slightly in the Plains zone. Yet the legacy of land use and water diversions continues to have a significant influence on river health. Diminished peak flows and significantly impacted base flows have created a smaller-than-natural river channel that is frequently disconnected from its floodplain. Low numbers and diversity of native fish are a major concern, but fish passage structures allow for better aquatic habitat connectivity.

So what?

A "B" grade for river health is desired to fulfill the City's vision for a healthy and resilient river. This holistic and science-based river assessment can help the City evaluate operational, management, and policy options for preserving or enhancing the river's health. This assessment can also serve as a benchmark for monitoring river health and changes in the future. Broader communication and engagement of diverse Poudre River stakeholders can strengthen our ability to manage for a healthy river now and in the future.

This report presents and discusses the comprehensive set of projects findings. Other project components (a summary report card and online mapping tool) are available at: www.fcgov.com/poudrereportcard.

2016-2017 State of the Poudre project team

Jennifer Shanahan, City of Fort Collins, Natural Areas Department

Jill Oropeza, City of Fort Collins Utilities, Water Quality Services Division

Jared Heath, City of Fort Collins Utilities, Water Quality Services Division

Mark Beardsley, EcoMetrics

Johannes Beeby, Otak Inc.

Brad Johnson, Johnson Environmental Consulting, LLC

Supporting team- discipline specific contributors

Andy Herb, AlpineEco

Dave Rees, Timberline Aquatics

Boyd Wright, Colorado Parks and Wildlife

Kyle Battige, Colorado Parks and Wildlife

City of Fort Collins, 5/24/2017

Glossary

Alluvial channel – a stream or river channel with soft bed and banks that maintains form through dynamic equilibrium between the forces of erosion and deposition. (See **threshold channel**.)

Armoring (bed) – the formation of a more scour-resistant layer of large particles on the surface of a river bed.

Armoring (channel) – the application of resistant materials on a river bed or banks for to reduce scour and erosion.

Augmentation (of flow) – addition of water to a system. (See **depletion**.)

Avulsion – the sudden change of river location. (See **migration**.)

Benthic macroinvertebrates – often referred to in this report simply as "aquatic insects", benthic macroinvertebrates refers to insects and other small invertebrate (without backbone) organisms that live in or on the river bed.

Channel maintenance flows: Flows large enough to initiate scour and deposition processes, including associated channel migration, which in turn maintain river conveyance capacity by scouring encroaching vegetation within the bankfull channel.

Channelization – mechanical alteration of a river or stream that confines flow within a single course. Often times these actions can be combined with planform straightening.

Depletion (of flow) – removal of water from a system (See **augmentation**.)

Embeddedness – the degree to which interstitial spaces between river substrate particles are filled with fine sediment. (See **interstitial space.**)

Encroachment – the intrusion of artificial structure, development, or land use on the floodplain or riparian zone. A second use of this word is when vegetation encroaches or moves into the existing active river channel.

Entrenchment – the degree to which river flows are vertically contained within a channel.

Flushing – the mobilization of sediment particles from the river bed substrate matrix by the physical force (referred to as shear stress) of moving water.

Flushing flows- the mobilization of median bed size material to support habitat and life cycle needs of aquatic insects and fish that rely on clean interstitial space.

Geomorphic (geomorphological) – relating to the form of the land or topography.

Interstitial space – the open space between particles, here referring specifically to open spaces in the river bed between substrate particles.

Mainstem – the principal or dominating stream or river in a drainage, in this case, it refers to the Cache la Poudre River.

Migration – the gradual change of river location. (See **avulsion**.)

Reach – a discrete segment of river between two points. In this study, 18 discrete reaches are defined for the purpose of assessment.

Riparian zone – the area between a stream and adjacent upland that whose vegetation and hydrology depend on the stream**.**

Threshold channel – a stream or river channel with hard bed and banks that maintains form by resisting erosion. (See **alluvial channel**.)

Metric definitions

The definitions provided below are intended to explain each metric concept in general terms. Definitions specific to this study for each metric are presented in Appendix A. Metrics are listed per the structure of the Poudre River Health Assessment Framework.

Peak flows occur when the river is at its highest flow; usually in the late spring or early summer.

Base flows are the low flows that occur during drier times of the year – diversions can cause base flow-like conditions at uncharacteristic times of the year.

Rate of change of flow describes how fast diversions lower or increase the quantity of water in the river channel.

Land erosion considers the amount of sediment produced in the watershed by hillslope processes and land uses resulting in exposed soils.

Channel erosion includes sediment production caused by channel erosion along the mainstem and its tributaries.

Sediment transport represents the ability of the river to export sediment from a reach in balance with what is coming in.

Water temperature compares the monitored temperature of water in the river with applicable water quality standards.

Nutrients examines overall load of water-quality impairing elements and compounds, most commonly involving nitrogen and/or phosphorous.

pH of water is a measure of its acidity or alkalinity.

Dissolved oxygen content is the density of oxygen in the river's waters, measured in milligrams/liter.

Floodplain extent is the amount of 5-year floodplain remaining in the SOPR riparian zone.

Vegetation structure and complexity considers the composition and condition of four habitat strata, canopy, sub-canopy, shrub, and herbaceous, along with patchiness and interspersion, and native forest regeneration.

Habitat connectivity examines the amount of natural or semi-natural habitat in the SOPR riparian zone and the ease with which animals can move through the riparian corridor.

Contributing area evaluates the ability of the area within 200m of the SOPR riparian zone to support or degrade river health, as a result of land use and land cover

Planform refers to the 'bird's eye' view of the river and describes the degree of branching and sinuosity.

Channel dimension focuses on the cross-sectional shape of the channel which can be altered by the processes of degradation, enlargement, and widening.

Channel profile is the downstream gradient or slope of a river, including any abrupt drops caused by dams or other grade control structures.

Dynamic equilibrium is the long-term (decadal) tendency for a river to maintain its form or character under a characteristic flow and sediment regime.

Channel recovery describes the ability of a river system to rapidly recover from changes arising from singular extreme events or disturbance (*e.g*., floods, fires, landslides) in an acceptable length of time.

Coarse-scale physical structure includes the characteristic diversity of different water velocity conditions (fast versus still water), depth, and physical cover such as structural elements (*e.g*., large wood jams or rocks), overhanging banks, and vegetation for the selected reference condition.

Fine-scale physical structure evaluates the amount and diversity of microhabitats within the reach, primarily bed materials and algae.

Aquatic insects considers the abundance of indicator taxa against desired amounts.

Aquatic habitat connectivity is the degree to which a zone is segmented by cross-channel structures, usually related to diversions.

Acronyms

303(d)	The 303(d) list of impaired waters in Colorado as defined by Colorado Department of Health and Environment
cfs	cubic feet per second
CDPHE	Colorado Department of Public Health and Environment
CPW	Colorado Parks and Wildlife
CSU	Colorado State University
CSU-LFL	Larval Fish Laboratory at CSU
EP	Ephemeroptera and Plecoptera (mayfly and stonefly; sensitive taxa)
ELC	Environmental Learning Center
ERM	Ecological Response Model
FACStream	Functional Assessment of Colorado Streams method
HEC-RAS	Hydraulic Engineering Center— River Analysis System
LiDAR	Light Detection and Ranging (a remote sensing method)
m	meters
MMI	Multi-Metric Index (used for aquatic insects)
MWAT	Maximum weekly average temperature
RHAF	River Health Assessment Framework
SOPR	State of the Poudre River

Table of Contents

1 Introduction and overview

1.1 Introduction

This State of the Poudre River (SOPR) report is an ecological assessment of current-day river health, designed to represent a wide range of legacy and modern-day influences. A healthy Poudre River corridor offers many important social, environmental and economic benefits to the City of Fort Collins. Maintaining river health is directly addressed in City's guiding strategic document, Plan Fort Collins, which states that the City will work towards "*…sustaining a healthy and resilient Cache la Poudre River*" (City of Fort Collins, 2010). The methods used in this river health assessment are detailed in the Fort Collins River Health Assessment Framework (RHAF) (City of Fort Collins, 2015).

The SOPR details the results of the first health assessment for the Poudre River. Two related products provide other avenues for audiences to engage with the results from this project. The River Health Report Card is a succinct, colorful summary of key findings and river health grades. An online mapping tool allows audiences to explore the assessment results at various spatial scales and on specific topics of interest. All elements of this project are available at fcgov.com/poudrereportcard.

The Cache la Poudre River (Poudre) runs approximately 126 miles from its headwaters in Rocky Mountain National Park to its confluence with the South Platte near Greeley. The study area of this assessment is limited to the section of river that most directly influences Fort Collins and extends from the City's water supply intake— near Gateway Natural Area in the lower Poudre Canyon — to Interstate-25.

1.2 Why assess river health?

The Poudre and its riparian floodplain habitat are a naturally complex system that have been altered by nearly two centuries of modern human use, resulting in dramatic changes to water quantity and quality, physical structure of the river and floodplain, riverside forests, and wildlife communities. Today, our human footprint continues to expand, placing added pressure on the river ecosystem and the natural processes that sustain it.

The City, across its many departments and divisions, is involved in a variety of projects and planning efforts that affect the river in many ways. This work is often aimed at mitigating specific, known stresses or enhancing particular benefits, also known as *watershed services*. Watershed services include the provision of consistent and clean water supplies, flood mitigation, fish and wildlife habitat, and diverse recreational opportunities (Figure 1.1).

The task of understanding, managing, and communicating the health of this complex system becomes increasingly important as the pressures that threaten its health and function also continue to grow. However, historically, there has not been a centralized or structured way to measure the collective impact of the City's efforts on the overall health of the river. To address this need, the City of Fort Collins Natural Areas and Utilities Watershed Program have developed this first holistic ecological assessment

of Poudre River health. It will provide the City with a comprehensive reflection of ecosystem health, enabling the City to benchmark progress towards achieving and sustaining river health in the broader context of sustaining watershed services.

By integrating hydrological, chemical, geomorphic (physical), and biological data into a holistic assessment of river health, this project provides a common platform for tracking river health in meaningful and measureable ways. A useful aspect of the SOPR is that it is easy to interpret at all levels of technical experience. It incorporates a wide range of information into a river health grades and uses the common A through F academic-type grading system. To track changes in river health over time, the SOPR assessment should be conducted periodically (every 3 to 5 years).

This accessible communication platform can expand stakeholder involvement and enhance dialogue around river management. Engagement of diverse interdepartmental and regional stakeholder groups can strengthen our collective efforts toward the goal of managing for a healthy Poudre River and illuminate opportunities to improve watershed services

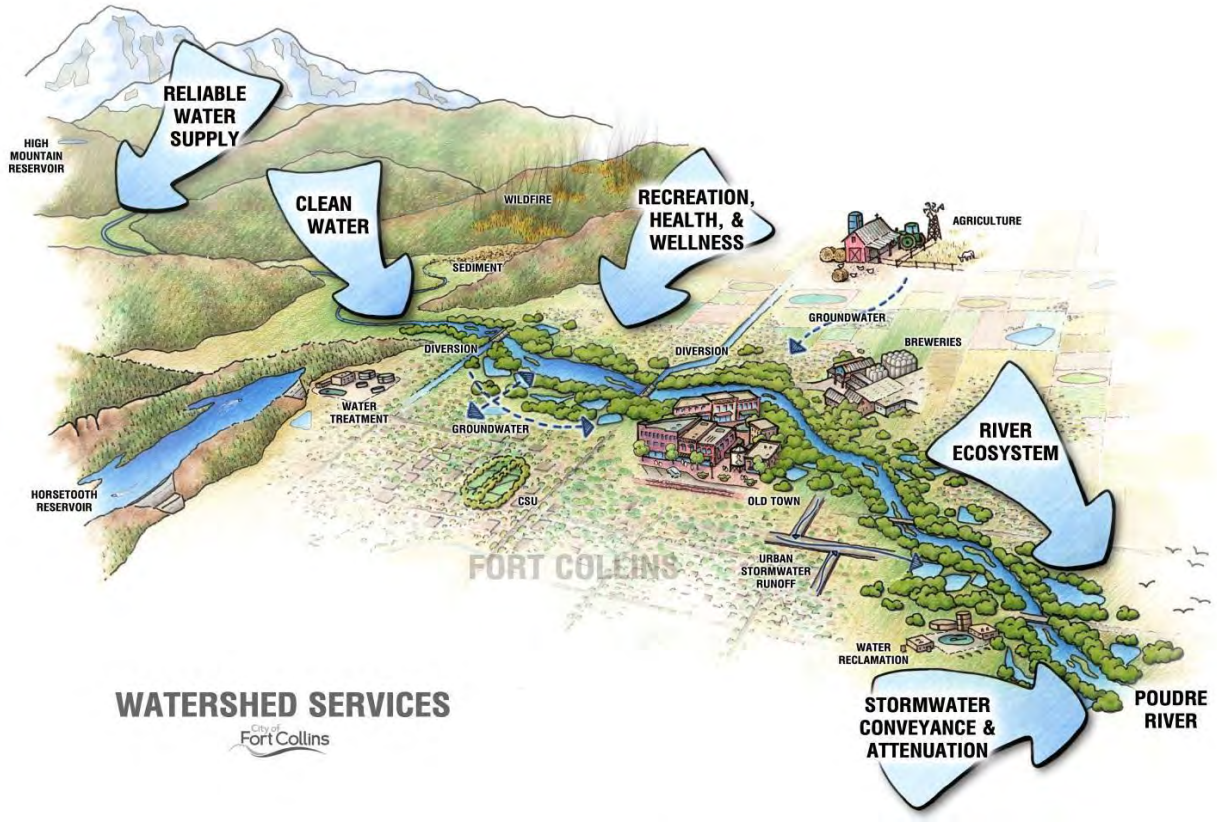


Figure 1.1: The watershed services provided by the Poudre River include consistent and clean water supplies, flood mitigation, fish and wildlife habitat, and recreational opportunities.

1.3 Community benefits of a healthy and resilient river

Figure 1.2: A healthy and resilient river is a river that sustains basics functions (such as water quality) during the years with average precipitation and also provides protective benefits such as (floodwater attenuation and infrastructure protection) during extreme wet or dry years.

The *health* of the river system is a reflection of its ability to perform its normal suite of functions, thereby providing the benefits our community values and depends upon (Figure 1.2). *Resilience* of the Poudre River is interpreted from two perspectives in this assessment:

- As a component of long-term river health, resilience is the ability of the system to maintain or regain its fundamental characteristics and functions after a major disturbance such as an extreme flood, drought, or fire.
- From the human point of view, resilience is the ability of communities to keep functioning during and after major disturbance or natural disasters. In this sense, resilient systems are those where human safety and infrastructure are not threatened by the river's response to disturbance.

The 2013 flood event provided excellent examples of river and community resilience across the Colorado Front Range. In general, reaches where rivers had ample natural floodplain capacity and room to move and adjust recovered quickly after the floods, and damage was minimal. Reaches where floodplain development and infrastructure relied on artificial stabilization tended to have the greatest river health impacts and the most infrastructure damage.

2 Methods

2.1 River health is measured through function

In taking a functional approach to understanding river health, the underlying question is not how the ecosystem looks, but rather, how well the system is functioning. A functional assessment conveys information about the condition of, and inter-dependencies between, many different components of the river ecosystem. It affords the advantage of not only revealing the current stressors (human impacts- past or present- that impair river health), but also how management actions and other changes may affect the future health and resilience of the river. The methods used herein are adapted from the Functional Assessment of Colorado Streams (FACStream) protocol (Beardsley, et al. 2015) and are fully documented in the City's "*River Health Assessment Framework" (*City of Fort Collins, 2015).

The River Health Assessment Framework (RHAF) is structured around ***indicators*** of river health which are informed by indicator-specific ***metrics***, to provide a thorough evaluation of how well the system is functioning. Indicator and metric scores and their corresponding grades were calibrated to categorical definitions relating to the degree of functioning or impairment (Table 2.1). The grade ranges take into consideration the conditions necessary to support a functioning river ecosystem in the contemporary context with reasonable expectations for future change and potential improvement. An A grade represents the highest level of functionality and F the lowest.

Table 2.1: General guidelines used for calibrating indicator and metric grades in the Poudre River Health Assessment Framework.

Grade	Score	Descriptor	Explanation
A	90 – 100	Reference standard	Condition of the indicator or metric is self-sustaining and supports functional characteristics appropriate to sustain river health. Little or no management is needed to sustain and protect this level of function, given the minimal from the modern landscape.
B	80 – 89	Highly functional	Condition maintains essential qualities that support a high level of function, but there is some influence of stressors at a detectable, yet minor, level. Requires limited management to sustain and protect against stressors.
C	70 - 79	Functional	Condition is altered by stressors that substantially impair functionality, basic natural river functions are still sustained. Periodic, and at times intensive, management is required maintain the river's functional role.
D	60 - 69	Functionally impaired	Condition is severely altered by stressors that impair basic natural river functions and the overall health of the river. Active management is required to maintain the river's functional role.
F	50 - 59	Non-functional	Condition is profoundly impaired by massive or overwhelming stressors that render it incapable of supporting basic natural river functions or it is otherwise unable to sustain biological river communities.

These reference definitions provide direction and the foundation for development of metric specific grading guidelines which are presented in full in Appendix A.

The final step in development of the RHAF was to determine a recommended range for each metric that, if achieved, would contribute to an overall healthy and functioning system. These recommended ranges are reproduced in Section 5 of this report to provide context that will convey a picture of today's river conditions compared to conditions needed for a healthy river. It is important to note that while these recommended ranges represent a goal to work *towards*, they are not an edict or mandate for the City. Initiatives aimed at improving any specific metric must be considered within the context of other City goals, as well as legal and jurisdictional limitations. River health goals can at times or in specific places be in conflict with other City goals which may take priority, particularly for the provision of essential services such as drinking water, public safety, and protection of infrastructure.

2.2 Assessment framework

The framework consists of nine indicators and 25 metrics (Table 2.2). Some refinements of the original Poudre RHAF were implemented during this assessment in response to data availability and field trials (these changes are outlined in Appendix B). This SOPR baseline assessment is the first application of the Poudre RHAF and it represents a snapshot of the river's health during the 2015 and 2016 period.

Table 2.2: Summary of indicators and metrics included in the State of the Poudre River baseline assessment.

Indicator	Metrics
Flow regime	Peak flow, base flow, rate of change
Sediment regime	Land erosion, channel erosion, continuity
Water quality	Temperature, pH, nutrients, dissolved oxygen
Floodplain connectivity	Floodplain extent
Riparian condition	Vegetation structure, habitat connectivity, contributing area
River form	Planform, dimension, profile
Resilience	Dynamic equilibrium, recovery potential
Physical structure	Coarse-scale structure, fine-scale structure
Aquatic life	Aquatic insects, aquatic habitat connectivity, native fish, trout

The RHAF indicators serve as the framework to organize information from river-related scientific disciplines and to make it easier to understand the ramifications for river health. The metrics are the backbone of the RHAF and represent aspects of the river ecosystem which can be practically measured. They are defined in the RHAF and the grading guidelines for each metric are provided in Appendix A; an abbreviated list of metric definitions was also included in the glossary as a quick reference to assist readers throughout the rest of this document.

Figure 2.1: Team member and geomorphologist, Johannes Beeby, conducts a rapid assessment of the river form, resilience and physical structure metrics.

2.3 Study area

The SOPR study area encompasses the Poudre River and its associated riparian area from just upstream of the Munroe Diversion (above Gateway Natural Area in the Poudre canyon) to Interstate 25. The river varies greatly through the study area with a range of geologic and ecological settings and different types of human influence. To account for this variability and meaningfully convey the state of the Poudre River, the study area was divided into four zones: Canyon, Rural, Urban, and Plains. These four zones were further subdivided into a total of 18 reaches to define relatively homogenous assessment units (Figures 2.2. 2.3, Table 2.3)

As a natural ecological transition zone, the changes that occur to the river through the SOPR study area are extensive and even greater changes are brought by anthropogenic impacts (Figure 2.3). The Canyon zone is relatively steep (average slope of 0.65%) and forested, and the river corridor is geologically confined. It is mostly unaltered except for several diversion dams and Colorado Highway 14, which parallels the river. The Rural zone, stretching from the canyon mouth to Overland Trail, is on the upper piedmont which remains relatively steep (average slope of 0.55%). Here, the floodplain opens up and the river is mostly unconfined, except for a few points where it flows through water gaps in the hogbacks. Rural-land uses dominate the landscape, but some higher-density residential development is situated adjacent to the river in the Town of Laporte and diversion dams segment the river.

In the Urban zone, the river flows through Fort Collins where there is a high level of residential, commercial, and industrial development, along with many bridges and diversion dams. The river is less steep in this zone (with an average slope of 0.40%) and is naturally unconfined. However, floodplain encroachment, channelization, and artificial stabilization have confined the river through most of this zone. Below Fort Collins, the Poudre exits the piedmont to flow into the plains. Average river slope in the Plains zone is 0.27%, but there is an abrupt change from 0.35% to 0.15% at the toe of the piedmont near the Environmental Learning Center (ELC). The natural geologic channel confinements in this zone are few, and the historic valley bottom would have been at its widest here. Even though the dominant land uses on the plains are rural and industrial (mostly gravel mining), the floodplain extent is tightly confined by artificial features such as berms, roads, and bridges.

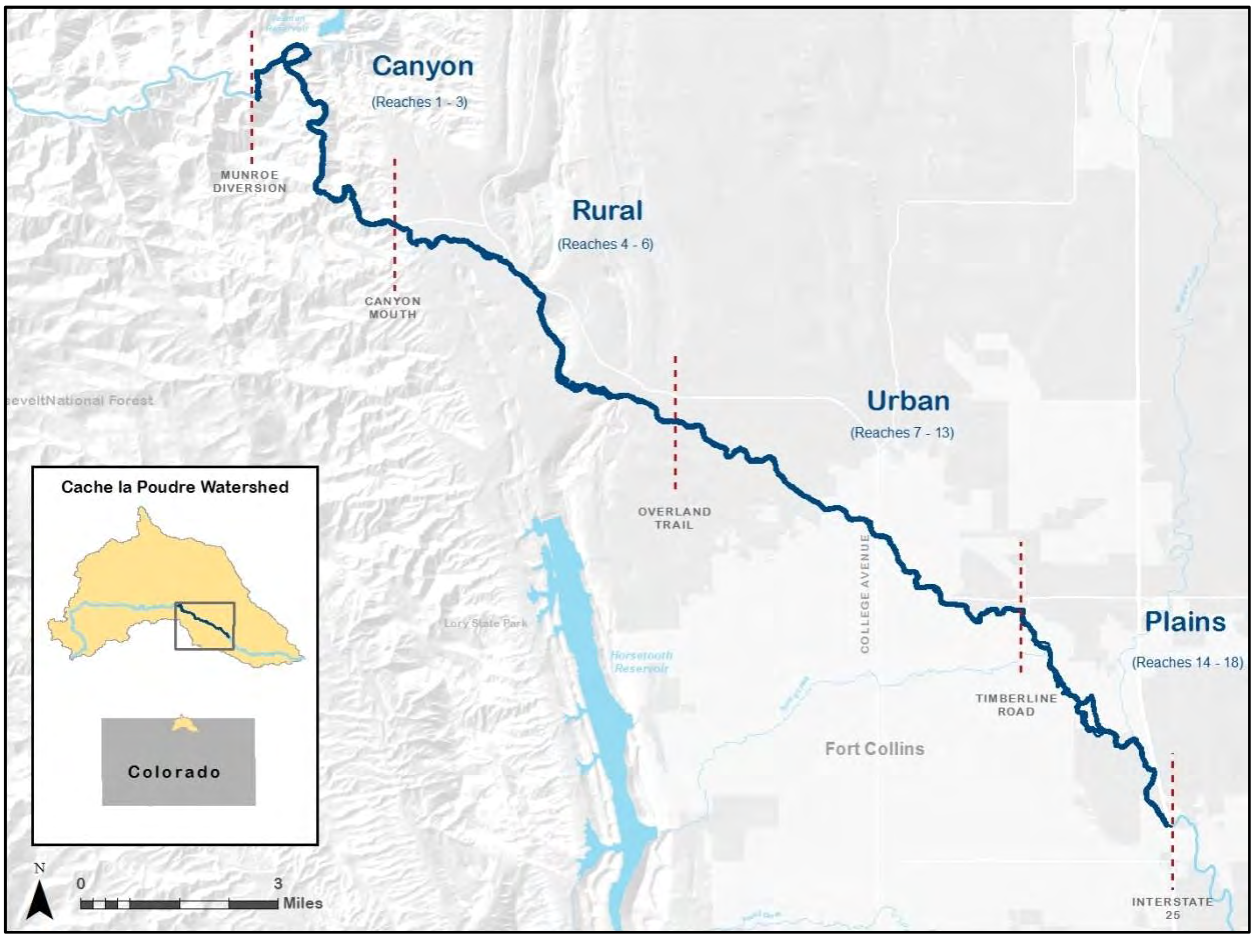


Figure 2.2: Map of the State of the Poudre River (SOPR) study area depicting the four study zones.

The four zones are divided into 18 reaches. Reach breaks mark important changes in river form, land use or water use (Figures 2.3 a-d). Because each sub-discipline in river science evaluates the condition of its resource at a subject-appropriate scale and using distinct approaches and data sets, all assessment results were translated to the 18 reaches during analysis and reporting. Appendix C provides further explanation of subject-specific sub-reaches and study site nomenclature established in other monitoring or research programs.

Table 2.3: A list of the landmarks used to define the upper and lower end of each of the 18 study reaches.

Location descriptions for each SOPR study reach
1. Munroe Canal Diversion to North Fork Poudre River
2. North Fork Poudre River to Poudre Valley Canal
3. Poudre Valley Canal to Greeley Diversion
4. Greeley Diversion to County Road 54
5. County Road 54 to Rist Canyon Road
6. Rist Canyon Road to just below Overland Trail*
7. Just below Overland Trail to Larimer Weld Canal
8. Larimer Weld Canal to Shields Street
9. Shields Street to College Avenue
10. College Avenue to Lincoln Street
11. Lincoln Street to Mulberry Street
12. Mulberry Street to Timnath Reservoir Inlet Canal
13. Timnath Reservoir Inlet Canal to Timberline Road
14. Timberline Road to Prospect Road
15. Prospect Road to Fossil Creek Reservoir Inlet Diversion
16. Fossil Creek Reservoir Inlet Diversion to Boxelder Creek
17. Boxelder Creek to Rail Road Bridge
18. Rail Road Bridge to Interstate-25

*The break point for this reach is at the downstream end of Butterfly Woods Natural area, which is located just downstream of Overland Trail.

Figure 2.3a and b: Each zone in the SOPR study area and their corresponding reach breaks shown on land imagery.

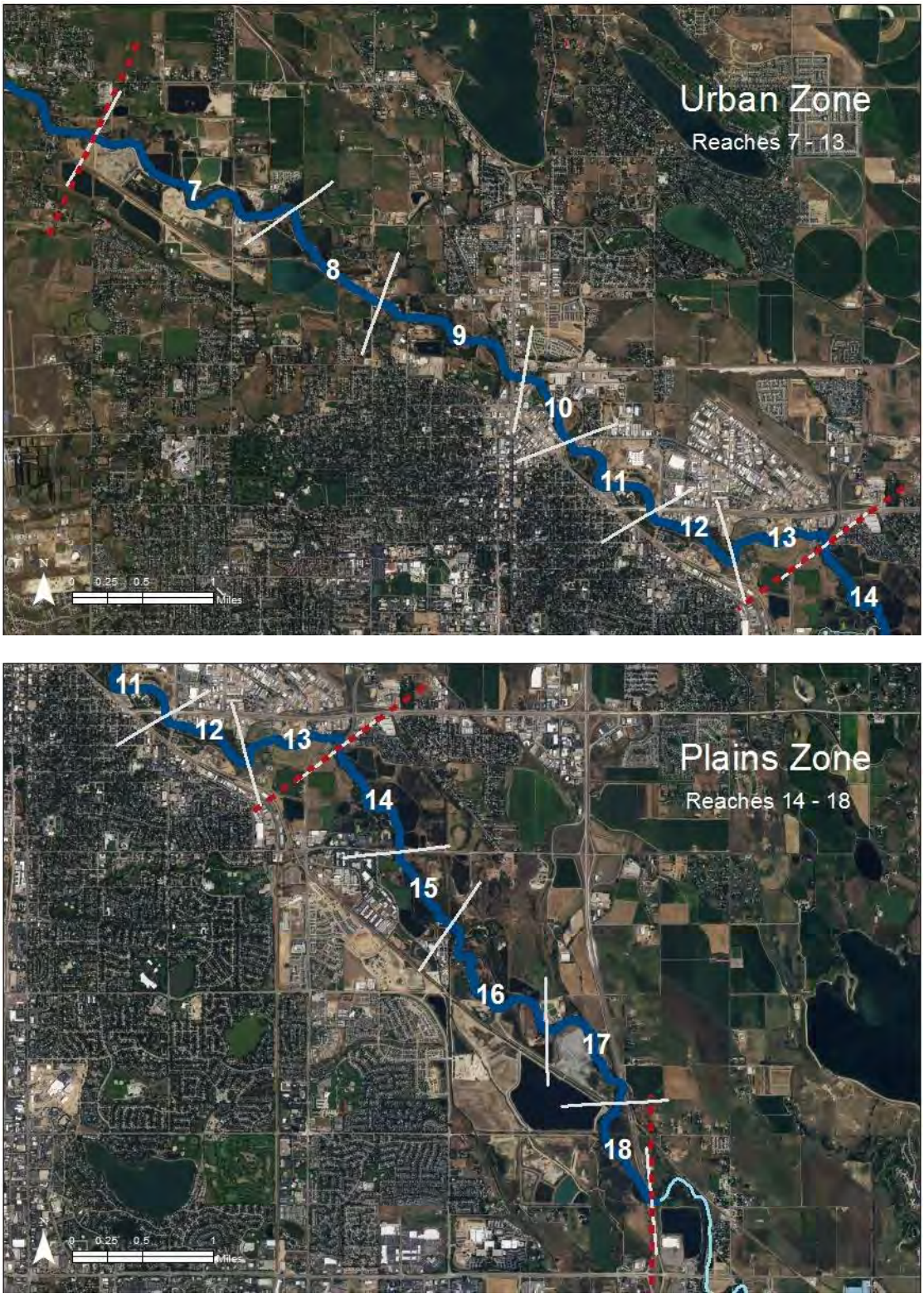
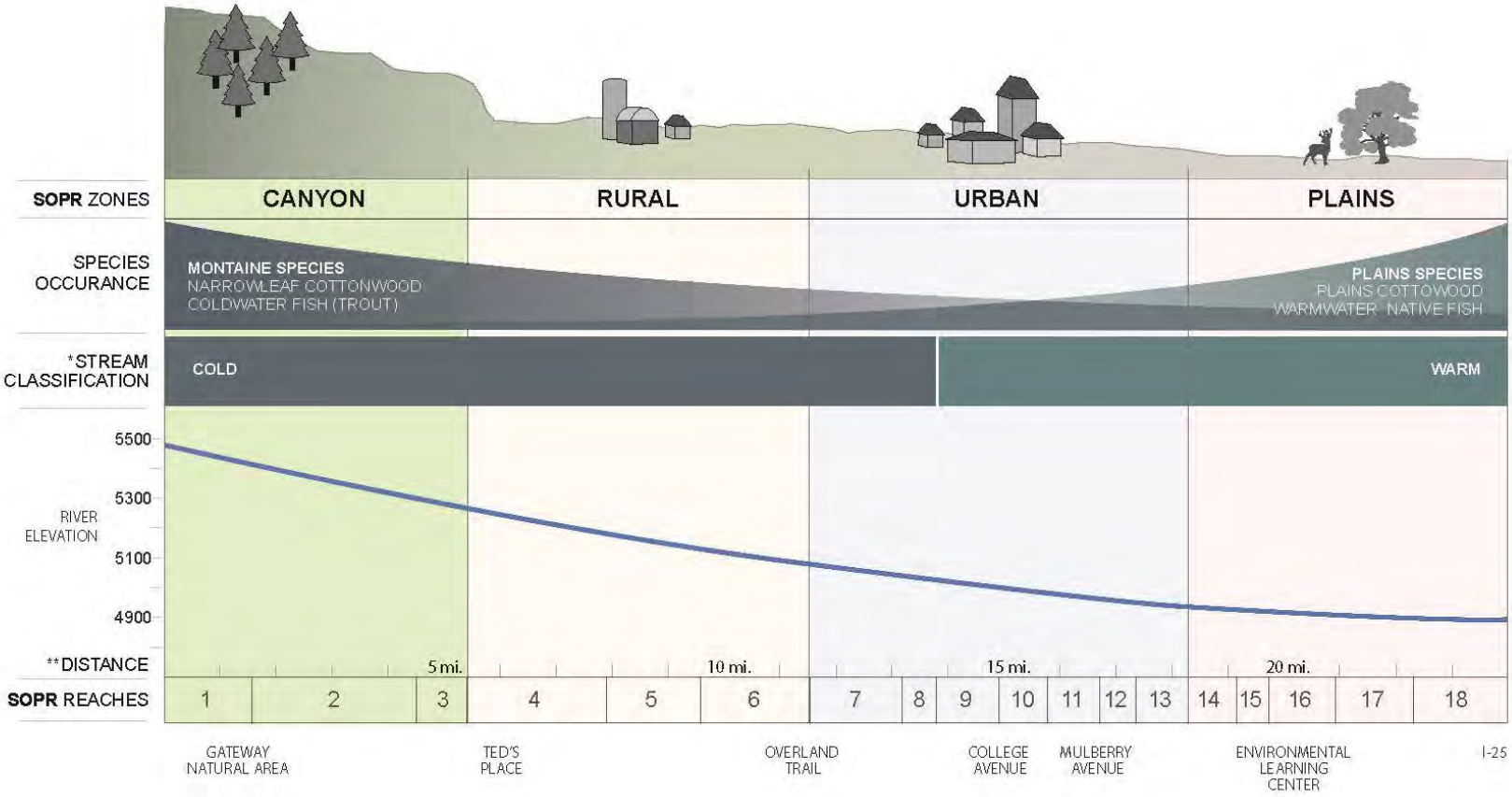


Figure 2.3c and d: Each zone in the SOPR study area and their corresponding reach breaks shown on land imagery.

Figure 2.4: Conceptual diagram illustrating the transitioning nature of the river within the study area. Landmarks are presented at the bottom of this graphic. The specific zone and reach break points are listed in Figure 2.2, 2.3 and Table 2.3.



***Stream classification refers to the aquatic life use designated by the Colorado Department of Public Health and Environment. This transition zone includes three classifications (from upstream to downstream) aquatic life cold 1, aquatic life cold 2, and aquatic life warm 1. Temperature criteria for these classifications are cold stream tier II for both aquatic life cold classifications and warm stream tier II.**

**** The distance line in this graph shows the river miles within the study area, where zero miles is at the Munroe tunnel. The 24 miles SOPR study area sits approximately in the middle of the entire Cache la Poudre river which runs for a total of 126 miles.**

2.4 Scoring process

Throughout this report, metrics and indicators are presented as numeric scores or the corresponding letter grade for ease of interpretation. At the finest scale, metric scores were assigned to each assessment unit (a reach, sub-reach, or habitat patch) based on the specific scoring guidelines. Metric scores were then combined per the procedures described in Section 2.5 to produce indicators scores. Indicator scores were then combined into a river health grade for each reach and zone using a weighted average, and finally zone grades were combined to provide an overall health grade for the Poudre within the SOPR study area (Figure 2.5).

When combining indicators to develop zone based health grades, the framework takes into account the natural hierarchy in the influence that different indicators have on river health. That is, while there are many connections within and among the indicators, hydrological and physical indicators tend to influence biological indicators more than *vice versa* (a further explanation of this can be found in the RHAF). Therefore, the framework weights each indicator based on its relative influence on river heath, to provide a more accurate portrayal of river health.

The relative contribution of each indicator to the overall health score in the SOPR assessment is:

- Flow regime – 20%
- Sediment Regime – 5%
- Water Quality – 10%
- Floodplain Connectivity – 10%
- Riparian Condition – 20%
- River Form – 10%
- Resilience – 10%
- Physical Structure – 10%
- Aquatic Life – 5%

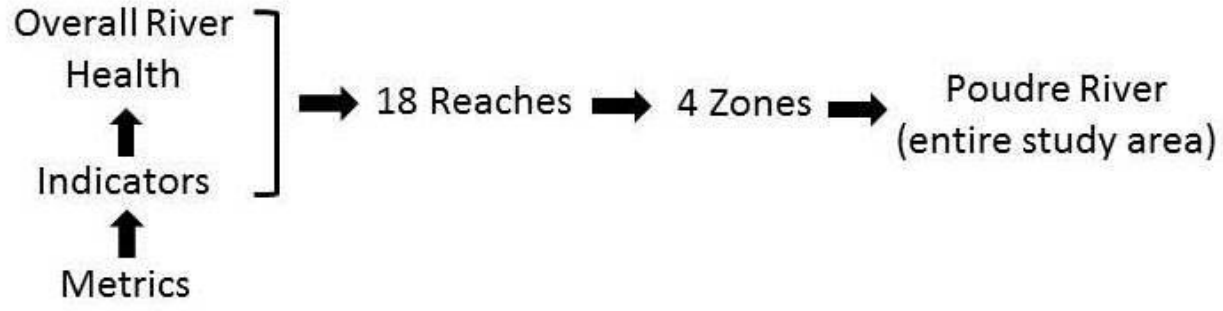


Figure 2.5 In this assessment, individual metrics are combined into indicator scores and then into holistic river health scores for the reaches, zones, and the entire Poudre River study area.

2.5 Field application of the River Health Assessment Framework

The specific methods used to grade each metric and indicator in this SOPR baseline assessment are described in this section. A combination of existing data, remote survey data, and field assessments was used to score each metric according to the revised Poudre RHAF guidelines. The complete and updated description of the grading guidelines for each metric is provided in Appendix B.

Flow regime

The flow regime indicator grade consists of three metrics: **peak flows, base flows,** and **rate of change**. These metrics were assessed using historical discharge data collected at three gages along the Poudre located at: the canyon mouth, Lincoln Street, and near the confluence with Boxelder Creek. Each gage represents a section of the river, and the SOPR employs the assumption peak flow conditions are uniform between gages. Reaches represented by each gage section were assigned a grade based on conditions measured at the gage. No attempt was made in this study to interpret impacts, such as diversions, at a finer scale within these three sections. Canyon zone reaches upstream of the gage at the canyon mouth were given the same grade as those below the canyon mouth, in the Rural zone.

As per the RHAF guidelines, a quantitative approach using sub-metrics for peak *three-day magnitude* and *frequency* was used in scoring peak flows. The grading guidelines were expanded upon from the RHAF in order to provide "+" and "-" modifiers for grades. This information is included in the grading guidelines for flows in Appendix A.

Trends in base flow magnitude, duration, and timing observed on plotted hydrographs for each gage were considered when scoring the **base flow** metric. To score the base flow metric, mean and minimum winter daily average discharge values were calculated for the period of record at each gage and compared to numerical standards. These calculations were then viewed in light of the other qualitative assessment scoring criteria to produce the final grade. The flow regime indicator grade was calculated using a weighted average of the three metric scores with 50% weight assigned to the peak flow metric and 25% apiece to the base flow and rate of change metrics.

Sediment regime

The sediment regime indicator has three metrics. The **land erosion** metric was graded using evidence for land disturbance that is visible on current aerial imagery, including: road density, devegetated slopes, clear-cuts, and human-caused mass erosion. The greatest land disturbance in the watershed is the burn scar left behind by recent wildfires. GIS layers outlining the burn scars by degree of intensity were used to calculate the percentage of burned area in the contributing watershed for each reach as part of the scoring for this metric. Land erosion metric scores in the Canyon and Rural zones are, therefore, closely tied to the proportion of burned area in the contributing watershed. In the Urban and Plains zones, sediment from other land uses and outfalls becomes more important. The combined influences of these sources were evaluated qualitatively during rapid field assessment.

A grade for **channel erosion** was applied to each of 99 river sub-reaches using evidence of channel erosion on current aerial imagery, and knowledge gained through field-based observations which

included on foot survey of most of the river in the project area in Fort Collins. Remotely assigned grades were re-evaluated during field surveys (see the river form, resilience, and physical structure sections, below). Sub-reach scores were weight-averaged by length to calculate grades for the respective reaches.

In-line dams affect sediment **continuity**, and the proportion of the contributing watershed from which sediment is retained was a primary basis for grading. Additional impacts to sediment continuity by smaller in-line diversion dams and transport limitations caused by flow regime and river form impairment were considered secondarily. Evidence of sediment-continuity impairment from these secondary sources was evaluated during field surveys.

The sediment regime indicator score was calculated as straight average of the three metrics.

Water quality

The water quality indicator grade was determined by evaluating data for four metrics **temperature**, **nutrients**, **pH**, and **dissolved oxygen** at several monitoring sites situated along the Poudre River (Appendix C). Data were collected in 2015 from seven monitoring sites associated with the Upper Cache la Poudre (CLP) Collaborative Water Quality Monitoring Program and the Lower CLP Water Quality Monitoring Program (Figure 2.6). Water quality data collected in 2015 were used here because the 2016 were not yet available at the time of the SOPR assessment.

Figure 2.6: At left, Jill Oropeza, Water Quality Services Manager analyzes water quality in the upper Poudre River. To the right, clear water, clean cobbles and low levels of undesirable algae are signs of good water quality.

The Poudre River was divided into eight reaches for the water quality assessment to evaluate impacts of potential stressor on water quality through the project extent. Reach breaks were established based on contributions from major tributaries and reservoirs, changes in Colorado Department of Public Health and Environment (CDPHE) Stream Segment and Classification, known dischargers to the Poudre River, and the location of water quality monitoring sites (Appendix E). Water quality data collected at monitoring sites located within a specified reach were used to grade the entire reach. In the one circumstance where a water quality monitoring site was not located within the reach (WQ3), data collected from the nearest downstream site (PLNC) were used to grade the upstream reach (WQ3). The

lowest elevation water quality reach (WQ8) was downstream of the end of the SOPR study area, but this reach was included in the grading assessment for water quality because the City's water treatment operations extend downstream of I-25.

Numeric grades for the eight water quality reaches were determined by evaluating metric data compared to updated RHAF grading guidelines for water quality (Appendix E). The overall water quality indicator grade was calculated using a formula that equally weights the average of the metric scores and the lowest of the metric scores [*water quality = 50% (average of metric grades) + 50% (minimum metric grade)*]. This method recognizes the cumulative effects of multiple water quality factors and also that one factor may serve as a limit to water quality. Water quality reach grades were then translated to the 18 SOPR reaches for consistency with other indicators and to be included in the calculation of the overall river health grade.

Floodplain connectivity

The floodplain connectivity indicator has only a single metric, **floodplain extent.** This is a measure of the width of the riparian zone that is flooded on a regular basis and which supports riparian species and processes (Figure 2.7). The extent of the five-year return interval floodplain was mapped using a Hydraulic Engineering Center – River Analysis System (HEC-RAS) model provided by the City of Fort Collins. Digital terrain data for the model came from a 2014 LiDAR survey and additional channel cross-section data from land surveys (King Surveyors, Spring 2013 and Spring 2014). The model covered the river reach from just upstream of Shields Street to just downstream of I-25. Channel widths were manually measured using aerial imagery at each modeled cross-section and then subtracted from the modeled water surface width to get the resulting floodplain width. For reaches upstream of where HEC-RAS model results were available, current aerial imagery was used to estimate the width of the 5-year floodplain. The degree of floodplain encroachment was estimated by evaluating evidence of land-use change and comparison to similar reaches for which modeled results are available.

Figure 2.7: A riparian area with good floodplain connectivity as demonstrated by the seasonal flooding that occurs and the healthy riparian forest sustained by floodwaters.

Riparian condition

The lateral extent of the SOPR riparian zone was defined as the edge of the natural floodplain or 100 meters from the river bank, whichever was narrower. In the SOPR riparian zone 3 metrics were assessed to develop riparian condition indicator grades. For the **vegetation structure** metric, the complex mosaic in the riparian zone was mapped by delineating patches (polygons) and classifying them by land cover using ten categories: native montane mesic, canopy forest, sub-canopy forest, scrub-shrub, herbaceous, emergent wetland, urban, developed, bare ground, or lentic open water. Patches were also classified by land use type, development level, and floodplain position using 2015 aerial imagery. City of Fort Collins Natural Areas mapping, National Wetland Inventory maps, and imagery from other years were also viewed to provide additional perspective. Mapped and classified patches were then evaluated to score the riparian condition metrics.

A two-level approach was used for evaluating the vegetation structure metric. The Level 1 approach was mainly a desktop exercise that relied on remote data such as aerial imagery and limited ground truthing. Field observations were incorporated at level 2. Assessment level was dictated by land cover and access. For instance, level 1 is sufficient for evaluating vegetation structure on urban, developed,

bare ground, and lentic (non-flowing) open water land cover types. Patches of simple herbaceous vegetation such as turf and lawns are also easily evaluated remotely, but field assessments are needed to suitably evaluate sites with more complex natural vegetation. As many complex vegetation patches as practicable were evaluated using level 2 methods, including 100 of the 218 canopy forest patches, 41 of 88 sub-canopy patches, 22 of 78 scrub-shrub patches, and 12 of 36 emergent wetland patches. The remaining patches in these classes were evaluated at level 1, using field evaluations to inform grading by comparing them with similar patches evaluated in the field.

Level 1 grading involved assigning grades based on evidence of vegetation structure visible in aerial imagery, and then downwardly adjusting the grade a little more than half a letter grade (7%) when patches were artificially isolated from the river (*e.g.*, when behind berms). For level 2 grading, nine sub-metrics were evaluated in the field:

- Vertical complexity – number of vegetation layers (herbaceous, shrub, sub-canopy, canopy)
- Canopy species – proportion of native species in the canopy layer
- Sub-canopy species – proportion of native species in the sub-canopy layer
- Shrub layer – abundance of shrubs
- Problem herbaceous species – abundance of non-native herbaceous species that alter function
- Problem woody species – abundance of non-native woody species that alter function
- Patchiness and interspersion – structural diversity by area, rated: none, low, moderate, high
- Native woody species regeneration – number of native, woody-species age classes
- Floodplain position – position on the floodplain, based on hydraulic connectivity to the river (riverine, depressional, or terrestrial)

Full description of the grading criteria for each of the riparian sub-metrics can be found in Appendix D.

Figure 2.8: Riparian forest with moderate structural diversity (left). Recently deposited plains cottonwood seeds on bare moist soil, shown in the photograph at right illustrate the ideal conditions for successful cottonwood germination.

The **habitat connectivity** metric was evaluated using aerial imagery to determine the amount of continuous riparian habitat remaining within the SOPR riparian corridor. Transverse breaks in habitat caused by development and infrastructure, such as roads, were then considered as possible migration and dispersal barriers. Where barriers are present, grades were lowered accordingly to reflect the degree of habitat isolation. The **contributing area** metric was also evaluated using aerial imagery to characterize land use in the 200-meter buffer area surrounding the delineated riparian zone.

The riparian condition indicator grade was calculated using a weighted average of the three metric scores with 80% weight on the vegetation metric and 10% each on the habitat connectivity and contributing area metrics.

River form

River form was rated using the average score of three metrics that describe key aspects of river shape: **planform, dimension,** and **profile**. All three of these metrics were graded at the sub-reach scale during field surveys by fluvial geomorphologists with experience on the Poudre and other Front Range rivers. 22.6 miles of the 23.9-mile study area was assessed in the field. The remaining 1.3 miles (on private land with no access) were scored using remote data such as aerial imagery. Scores reflect the degree of departure from natural reference river form for the respective reach using evidence of anthropogenic impacts, or stressors. Reach scores were then calculated as the average of the component sub-reach's scores, weighted by length.

Planform was assessed using aerial imagery and site observations for changes to river branching and braiding patterns, sinuosity, belt width, meander length and width, amplitude, and bend radius of curvature. Direct evidence of planform impairment was documented during field visits by noting areas of floodplain encroachment, channelization, realignment, and bank or channel armoring.

The **dimension** metric evaluates cross-sectional shape and size of the river channels, its associated floodplain, and flood-prone area. It is evaluated using three sub-metrics:

- *Entrenchment* – Degree to which the river channel is artificially confined or isolated from the floodplain. It is scored by evaluating criteria for the width of flood-prone area and the ratio of bank height to the height of water surface at bankfull discharge, or "bank height ratio". Entrenchment was not used to evaluate dimension in the Canyon zone since the river in that zone is naturally entrenched.
- *Width-depth ratio* - Degree to which the channel top width is has become wider or narrower relative to mean depth at bankfull discharge.

Profile describes a river's bed grade, or longitudinal slope. The metric is evaluated by documenting changes to overall slope, usually due to altered planform, and to localized changes caused by dams, grade control structures, or geomorphic responses such as aggradation zones or head-cuts.

Resilience

The resilience indicator grade is an average of two metrics: dynamic equilibrium and recovery potential. Both metrics were first remotely evaluated using historical aerial photos to document stability trends, changes to river form, lateral migration, avulsions, and erosion. Field observations were then made during site visits to observe stressors and direct signs of instability. For the **dynamic equilibrium** metric, stressors such as altered peak flow and sediment regimes, channel evolution stage, changes to stream form, and direct impacts such as channel and bank hardening were all taken into account. Signs of channel instability observable during field surveys included excess deposition, scour, or bank erosion, pool filling, unnatural bar development, and severely over-widened or entrenched channel form.

Recovery potential was graded considering the apparent potential for the reach to recover characteristic functioning after disturbance, while also considering risks to public safety and infrastructure damage. Two general criteria guided grading:

- *Channel migration zone* is the width of the corridor in which the river can freely migrate, unconstrained by artificial structures and without causing significant infrastructure damage. The width of the existing channel migration zone was compared to the historical condition, using evidence of past fluvial features and human impacts that restrict lateral movement of the river.

- *Reliance on artificial stabilization* measures was rated as the degree to which channel stability depends on artificial stabilization, such as engineered structures or routine maintenance.

Physical structure

The physical structure indicator grade is the average of two metrics that consider different scales of river structural diversity (Figure 2.9). The **coarse-scale** and **fine-scale** physical structure metrics were both graded based on field observations of the 22.6 river miles that were visited. Grades for the reaches on the 1.3 miles that were not observed in the field were extrapolated from similar reaches, guided by aerial imagery. Coarse-scale physical structure grades were based on qualitative estimation of the diversity of water depth/velocity combinations, topographic complexity of the bed and banks, and physical structure of the reach compared to the natural reference (Figure 2.9). Fine-scale structure grades relied heavily on field observations of interstitial space availability, bed armoring, embeddedness, and algae in riffles (Figure 2.10).

Figure 2.9a-d: Examples of different coarse-scale habitat conditions (clockwise from top left) include a) steeper plane-bed channel in the Canyon zone with large boulders providing diverse habitat, b) pool-riffle sequencing with large-wood helping create pool scour, c) homogenous run habitat lacking diverse coarse structure especially pool habitat, and d) homogenous glide habitat created from backwater conditions at the diversion dam downstream.

Figure 2.10: Field observations of interstitial space availability, bed armoring, embeddedness, and algae in riffles helped inform the fine-scale metric grades.

Aquatic life

The **aquatic insects** metric was evaluated using aquatic insects community data from samples taken from 13 sites in 2015 and 2016 (Appendix C). Results for six sub-metrics were used to calculate a single index score using the CDPHE Multi-Metric Index (MMI) tool, and the index values were converted to aquatic insect metric grades for each sampling site using RHAF guidelines. According to the MMI tool, a single index score (the MMI) was calculated for each sample as the average index from six sub-metrics. Aquatic insect metric grades were assigned based on the grading criteria in the Poudre RHAF. All reaches represented by a station were scored the same. The six sub-metrics used in calculating the MMI were selected based on their known sensitivity to a variety of types of human induced stressors in this region:

- EP taxa – a measure of community richness based on the number of Ephemeroptera and Plecoptera (mayfly and stonefly) taxa present
- Chironomidae – relative abundance of the family Chironomidae (non-biting midges)
- "Sensitive plains" families – percentage of certain sensitive taxa identified by CDPHE to be common on healthy Colorado plains' rivers
- Predator/Shredder taxa – relative abundance of taxa in the predator and shredder feeding groups
- Clinger taxa – relative abundance of taxa classified as clingers
- Non-insect taxa – relative abundance of non-insect taxa

The **aquatic habitat connectivity** metric was graded based on the distance between fish passage barriers, which are primarily diversion dams along the Poudre River. A structure is considered a barrier if it prevents fish from moving past (up) it for the majority of the year. All structures are passable in the downstream direction during the highest flows but currents under these flow conditions are too swift for upstream movement.

The length of the habitat connectivity segment between successive barriers was measured and scores were assigned. The aquatic habitat connectivity segment scores were overlaid on the 18-reach scale and then weight-averaged to determine final scores for each reach. The score for the most downstream reach is based on the distance to the Greeley Canal #2 diversion structure, which is the next significant barrier downstream, even though it is outside the study area.

Five stations were sampled in 2015 between College Avenue and I-25 by either CPW or the Colorado State University Larval Fish Laboratory (CSU-LFL) to assess **native fish** species composition (Appendix C). Seine nets and electrofishing methods were used at each station to capture live fish and determine the presence or absence of multiple life stages of native fish species (Figure 2.11). Metric grades were assigned based on two sub-metrics:

- *Number of native species* – Number of native fish species captured in sample efforts
- *Number of species with multiple life stages* – Number of species for which fish of multiple life stages were captured

Only reaches with 2015 sample stations were graded.

Figure 2.11: Colorado Parks and Wildlife staff electrofishing in a plains stream.

Trout are expected on the Poudre upstream from approximately the mid-point of the Urban zone. The **trout** metric was evaluated on these reaches by Colorado Parks and Wildlife (CPW) biologists who used two-pass electrofishing sample methods to monitor trout populations at several stations along the Poudre River annually. One station is at Gateway Park on Reach 1 (Munroe Diversion to North Fork) in the Canyon zone. Another is at Lee Martinez Park on Reach 9 (Shields to College) in the Urban zone. Results from these two stations, sampled in 2016, were used to grade the trout metric based on six sub-metrics:

- *Age classes* – Number of age classes of brown trout
- *Recruitment* – Number of Age-0 brown trout, assessed as low, medium, or high
- *Recreation potential* – Number of quality-size (> 9 inches) brown trout, assessed as low, medium, or high
- *Relative weight* – Average relative weight for stock-sized (> 6 inches) brown trout. Relative weight – the ratio of actual fish weight to the weight of a healthy fish of the same length – is a measure of fish health
- *Biomass*– Biomass of stock-size (> 6 inches) brown trout, in pounds per acre.
- *Population number* – Number of stock-size brown trout per mile of stream, assessed as low, medium, or high

The aquatic life indicator grade was calculated using a weighted average with 70% weight on the aquatic insects metric and 30% on the habitat connectivity metric. Trout and native fish scores are not included in scoring the indicator aquatic life since fish data for this assessment year was not available for the Rural zone and broad extrapolation of site specific data to the zone as a whole would have increased inconsistencies. Trout populations and native fish community structure mainly represent ecosystem response variables, rather than drivers of overall river health. Therefore, for this year's assessment fish grades are only provided where data was directly available.

3 Ecological stressors

The Poudre River, like all ecosystems, developed and evolved naturally in step with the geologic, climatic, and biological processes at play in the environment. The river's natural condition was one which defines ecological health – the river ecosystem was functioning in a dynamic equilibrium with climate and geology. The system was ever changing and often profoundly disrupted by shifts in the environment and extreme events. But the river's natural condition was resilient, and it would reshape itself based on the new constraints of the climate and landscape. Ecological health can be influenced—and functional capacity weakened—by human impacts. Stressors are the human impacts— past or present—that impair river health, resulting in decreased functioning if left unmanaged. Some forms of natural disturbance can be exacerbated by human activity and turned into stressors on the river ecosystem. One example is a wildfire that is either started because of human activity or exacerbated because of previous forest management that suppressed fires. The important ecological stressors affecting Poudre River health are described in this chapter (Table 3.1).

Table 3.1: Ecological stressors affecting Poudre River health.

	Stressors	Explanation
Watershed and contributing area	Diversions (withdrawals)	Exported water (withdrawals)
	Transbasin diversion (augmentation)	Imported out-of-basin water (augmentation)
	Large dams/reservoirs	Large in-line dams and reservoirs on the Poudre or major tributaries
	Wildfire/burn scars	Wildfire burn scars in watershed
	Channel erosion (in watershed)	Sediment supply from eroding channels (includes artificially low supply from stabilized channels)
	Impervious surfaces/urban stormwater runoff	Flows from impervious surfaces, urban drainage (including any pollutants)
	Irrigation runoff/return flows	Return flows (including any pollutants)
	Wastewater effluent	Effluent from treatment plants or facilities
River and riparian zone	Development	Riparian land use: commercial/industrial, infrastructure, transportation corridor, residential
	Rural/agricultural land use	Riparian land use: rural, pasture, light agriculture, intensive agriculture
	Open space and parks	Riparian land use: naturalized open space, parks, disturbed open land
	Gravel pit/ponds	Riparian land use: gravel pits, ponds
	Road/bridge	Roads and bridges in riparian and channel area
	Berms/channelization	Berms and channelized river segments
	Bank/channel armor	River segments stabilized with engineered structures, armored banks (*e.g*. rip-rap)
	Channel structures (dams/weirs)	Diversion structures, dams, weirs
	Woody material recruitment/removal	Lack of woody material recruitment (due to stabilization or riparian degradation) or removal
	Exotic plant species/weeds	Exotic plants in riparian area

3.1 Watershed and contributing area stressors

Stressors occur in the watershed or surroundings, and they are "inherited" by a river reach. Stressors in the watershed caused by land-use changes or other impacts primarily affect flow regime, sediment regime, water quality, and aquatic life, but river health may also be indirectly impaired in other reaches. For example, diversions in the headwaters that impair flow by truncating peak flows may also affect floodplain connectivity by reducing the return interval of overbank events far downstream. Similarly, the water quality of a reach may be impaired due to chemical impacts that occur far upstream. From the perspective of the City of Fort Collins, the critical difference between stressors occurring on properties under City management and those occurring elsewhere in the watershed is that the former may be addressable through changes in management practices, whereas the latter must largely be accepted as an inherited condition or improvements must be pursued by engaging in collaborative efforts.

Diversions *(flow withdrawals)*

There are numerous diversion points on the Poudre River upstream of I-25 where water is drawn out of the river for agricultural, industrial, and municipal uses. The major diversions were recently summarized for the City of Fort Collins Natural Areas Department (Figure 3.1) using records to quantify capacity and average annual volume. Fort Collins Utilities diverts roughly one-half of its water supplies from the Poudre River. Diversions occur at Gateway Park just upstream from the North Fork confluence. Other operations, such as exchanges and gravel pit operations, affect flows within the Urban and Plains Zones.

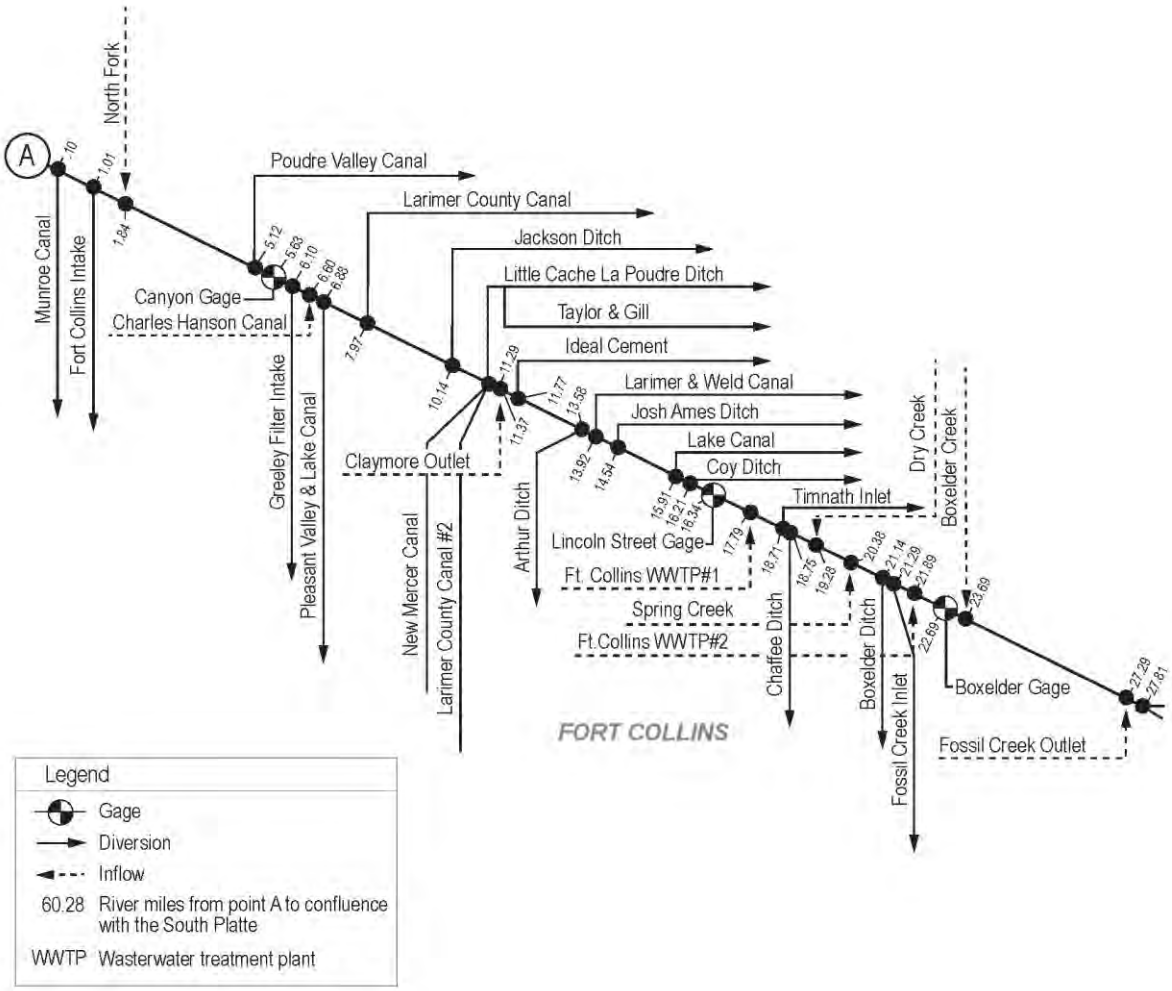


Figure 3.1: Line diagram of diversions and inputs on the Poudre, including the distance between each structure in the SOPR study area. This diagram illustrates how fragmented aquatic habitat is in the SOPR study area (provided by Northern Colorado Water Conservancy District, 1996).

Diversions directly affect components of flow regime, including peak flow, base flow, and rate of change. Peak flows can be truncated by diversions made during spring and summer, while base flows are commonly decreased by diversions during fall and winter or during drought. Rates of flow change can be impacted when diversions are opened and closed, especially during periods of low flow. The average rate and annual volume of water diverted during winter months (November through March) were also calculated for each diversion point. An average of about 38,000 acre-feet per year is diverted from the Poudre in or above the study area during winter months, and wintertime dry-ups sometimes leave the river with little to no flow (Table 3.2).

Flow withdrawals can also affect water quality and physical structure. Excessively low flows elevate radiant heating and cooling, making the river vulnerable to extreme temperatures with increased highs in summer, decreased lows in winter, and greater diurnal fluctuation. Low flows may also exacerbate chemically-related water quality issues such as nutrient loading and suppressed dissolved oxygen content by lessening the effectiveness of dilution, altering biogeochemical processes, and limiting the effectiveness of turbulence and mixing. The amount, availability, and diversity of physical structure (*i.e.*, riverbed habitat available to fish), may be severely limited during low flow periods, which can directly affect aquatic species survival especially during critical late summer, fall, and winter flow periods. Low flows are more of a stressor in some reaches during late summer and fall and some reaches are particularly affected by wintertime diversions (Table 3.3).

Table 3.2: Annual average volume, wintertime average volume, and wintertime average discharge values for the indicated period of record (Bishop-Brogdan Associates, 2015).

Poudre River Wintertime Diversion summary				
Diversion	Wintertime average diversion (Nov-Mar)			
	AF	CFS	Frequency	Period
Worster/Eaton Reservoir	420	1.4	fairly constant	1997-2013
Halligan Reservoir	3,900	13.0	fairly constant	1997-2013
North Poudre Canal	3,500	13.0	each year since 2002	1997-2013
Milton Seaman Reservoir	570	1.9	sparse (since 2001)	1997-2013
Long Draw Reservoir	690	2.3	fairly constant	1997-2013
Peterson Lake Reservoir	N/A	N/A	sparse	1997-2013
Joe Wright Reservoir	540	1.8	fairly constant	1997-2013
Chambers Lake Reservoir	1,650	5.5	fairly constant	1997-2013
Barnes Meadows Reservoir	30	0.1	sparse	1997-2013
Munroe Canal	210	0.7	some since 2009	1997-2013
Fort Collins Pipeline	1,900	13.0	fairly constant	1997-2013
Poudre Valley Canal	270	0.9	sparse	1997-2013
Greeley Filters Pipeline	6,225	20.8	almost always	1997-2012
Watson Lake Diversion	25	0.1	constant	1997-2012
Little Cache Diversion	1,150	3.8	fairly constant	1997-2012
Larimer and Weld Canal	3,330	11.0	fairly constant	1997-2012
Timnath Reservoir Inlet	5,010	16.7	constant	1997-2012
Fossil Creek Reservoir Inlet	6,190	20.6	constant	1997-2012
Total	**37,980**	**126.6**		

Table 3.3: Base flow statistics for points just downstream from five of the diversion points on the Poudre for the period 1970 to 2010. (Bishop-Brogdan Associates, 2015).

Base Flow Criterion	Greeley Filters Pipeline Diversion	Little Cache Diversion	Larimer Weld Canal Diversion	Timnath Reservoir Inlet Diversion	Fossil Creek Reservoir Inlet Diversion
Average number of days per year with continuous flow below 35 CFS	102	104	135	136	178
Average percent of winter days with flow below 35 CFS	77%	74%	75%	74%	79%
Average number of days per year with continuous flow below 10 CFS	28	31	75	70	111
Average percent of winter days with flow below 10 CFS	38%	27%	51%	52%	65%
Average number of days per year with continuous no flow	3	9	12	16	24
Average percent of winter days with no flow	6%	6%	19%	17%	23%

Transbasin diversion *(flow augmentation)*

At the higher elevations of the Upper Poudre Watershed, transbasin diversions import water to the Poudre River from other drainages through the Wilson Supply Ditch, Laramie-Poudre Tunnel, Grand River Ditch, and Michigan Ditch. Colorado-Big Thompson water is delivered to the Poudre through the Hansen Supply Canal via Horsetooth Reservoir. Flow augmentation via transbasin releases can have opposite effects of diversions. Releases timed with natural runoff or storm flow peaks can increase peak flow magnitude or duration, and releases during winter or other periods of low flow can supplement naturally low discharge, thereby offsetting some of the impact of diversions. Transbasin diversion releases introduce another mechanism by which flow rates can be artificially and rapidly changed and they can also impact river water quality depending on how water quality differs between the Poudre and the imported water.

Large dams/reservoirs

There are multiple reservoirs within the Upper Poudre Watershed and two large dams on the North Fork that impact the flow and sediment regime along the Poudre River. Halligan and Seaman Reservoirs are both created by large in-channel dams that regulate flow regime and cut off sediment supply to the Poudre mainstem downstream. The effects on base flow vary depending when calls on water rights are made by downstream users. However, reservoir management has the potential for exacerbating low-flow impairment and altering the rate of flow change. Reservoirs also effectively trap the vast majority of the natural and anthropogenic supply of bedload and suspended sediment, delivering mostly sediment-free discharge downstream which can exacerbate channel and bank erosion.

Other potential impacts from large dams and reservoirs include changes in water quality. Because reservoirs expose large surface areas to the sun, deep reservoirs can become thermally stratified during the summer months, resulting in warmer surface waters and colder bottom temperatures. Depending on whether reservoir water is released via a surface spillway or a bottom outlet, stream temperatures may be warmed or cooled accordingly. In this way, dams can impact the natural temperature regime of downstream receiving waters. Seasonal thermal stratification in reservoirs can also result in oxygen depletion of the bottom waters. Under these low oxygen conditions, biological processes mobilize nutrients and metals bound to bottom sediments, which can result in seasonal spikes in dissolved nutrient and metals concentrations in waters released from reservoirs. Dams are also a clear example of an extreme barrier to passage of fish and other aquatic organisms.

Wildfire *(burn scars)*

Recent wildfires in the Poudre watershed left burn scars with decreased forest cover and exposed soils that are more susceptible to runoff and erosion and deposited large amounts of ash and fine sediment into the river (Figure 3.2, 3.3). Until the vegetation sufficiently recovers, the burn scars will have a significant impact on sediment regime (land erosion) and flow regime (peak flows and rate of change). Wildfire is a natural part of the geological and ecological setting within which the Poudre River evolved. Nevertheless, decades of fire suppression in the watershed have altered the frequency, magnitude, and distribution of fires, thereby increasing tributaries.

Figure 3.2: Post fire erosion creating turbid waters.

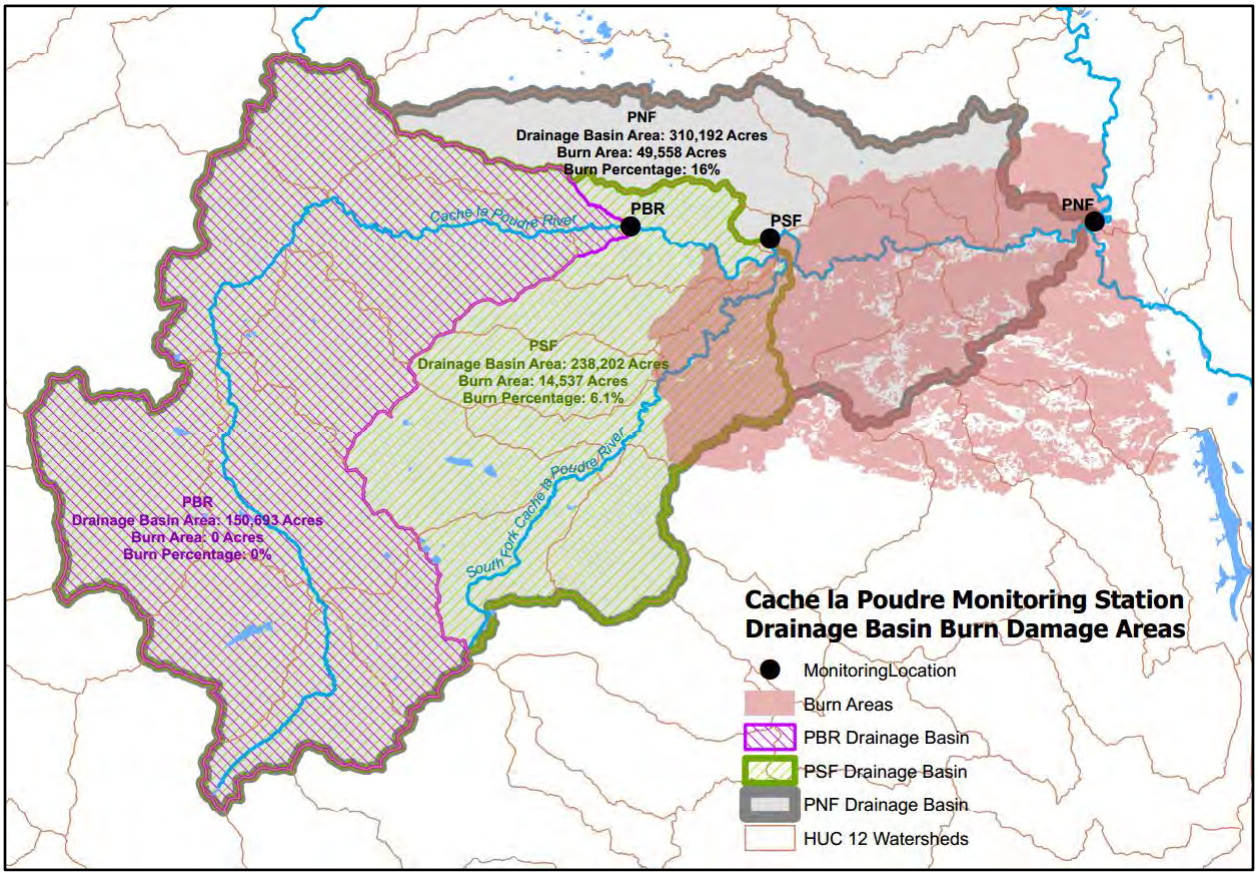


Figure 3.3: Percentage of burned area for watersheds at different points on the river (From Hohner et. al., 2016)

Channel erosion

The river is in a state of equilibrium when the sediment supply and transport capacity are in balance. Changes to land use, hydrology, or the river itself can shift this balance causing the channel to incise, aggrade, or widen as it adjusts towards a new dynamic equilibrium. Channel erosion is a natural process that allows the river to achieve this new dynamic equilibrium, resulting in the release of sediment. However, channel erosion is not always acceptable in a given location, and artificial measures such as riprap and grade control structures used to stop channel erosion are common on the Poudre and its tributaries. Artificially-stabilized river and stream sections deliver less sediment downstream, except during extreme events.

Irrigation runoff and return flows

Return flows and runoff from irrigated lands recharge flows in the river and often introduce non-point-source pollutants—particularly nutrients—which come from decaying organic material and fertilizer. Return flows offset depletions since they represent the return of diverted water back to the river, but less water is returned than was diverted because of consumptive losses, and that water is returned to a point downstream of the diversion, leaving the upstream reach dewatered.

Treated wastewater effluent

Treated wastewater effluent enters the Poudre River in three locations within the study area. Additionally, the outflow from Fossil Creek Reservoir discharges a mix of river water, wastewater from two water treatment facilities, and localized stormwater runoff into the Poudre just downstream of the study area (this site is discussed in Section 4). Treated wastewater effluent discharges are permitted by the State of Colorado and must meet quality standards designed to protect designated uses, such as aquatic life. However, despite the use of advanced technologies for nutrient removal and regulated quality standards, wastewater effluent water is typically warmer and higher in nutrient concentrations than the ambient river water, and as such, represents a potential stressor on river health. Its impact, however, depends on the time of year, streamflow, and the proportional volume of effluent in the river.

Because nutrients and temperature typically exert strong influences over productivity in local streams, excessive nutrient and thermal loads have the potential to increase algae growth and drive changes in community composition of both algae and aquatic macroinvertebrates, as well as dissolved oxygen content. Furthermore, native fish have specific temperature tolerance ranges, beyond which their ability to survive and reproduce may be impacted.

3.2 River and riparian zone stressors

Development

All commercial, industrial, infrastructure, transportation, and residential land uses in the riparian zone may be considered stressors (Figure 3.4). Commercial/industrial land uses are mainly retail and manufacturing facilities that introduce a substantial amount of artificial roof, impervious surface, bare ground, or open water cover types to the riparian zone. Infrastructure areas contain the structures, systems, or facilities that serve the public interest. Roads and railways were mapped as transportation corridors, and paved paths were considered part of the transportation corridor when they were associated with a road. Residential development is typified by suburban moderate-density housing. Residences in the riparian zone are relatively few, with most being single-family units with manicured/landscaped lots or lawns. Some high-density housing units are present in the Urban zone. These land uses are considered direct impacts to the riparian condition, affecting vegetation structure, habitat connectivity, and contributing area. They also severely limit active floodplain function since they need to be protected via channelization, berms, and fill.

Figure 3.4: Development in the historical riparian area is a stressor on reaches in the Urban and Plains zones.

Rural and agricultural land use

Ten percent of the riparian zone was mapped as "rural or agricultural" (Figure 3.5). Rural development areas are still largely vegetated, but vegetation cover is often dominated by disturbance-loving or exotic species. These lands include occasional buildings, structures, and unpaved roadways with pastureland,

and light to intensive agriculture. Most pastureland was developed by clearing woody riparian vegetation from the riparian area then managing it as grassland. Light agriculture includes hay fields and open land used for livestock grazing. Row crops, penned livestock, or confined animal feeding operations are in the intensive agriculture category. These riparian and floodplain land uses vary greatly in their effect on river health. Light agriculture and pasture is generally compatible with flooding and they provide some basic floodplain functions where they have not been drained or physically cut off by berms.

Figure 3.5: Rural development covers ten percent of the mapped riparian zone.

Open space and parks

Sixty-four percent of the riparian zone remains open space (under various forms of management) and park land (Figure 3.6). These lands include properties holding remnants of preserved native habitat, or areas that were settled and altered in the past that have since been managed with the express goal of maintaining or enhancing native species and natural system function. Even with current management by open space programs, these lands continue to exhibit a wide degree of impacts remnant from previous land uses. The most disturbed open areas—such as vacant lots, abandoned roads, and naturalized roads and berms—tend to have less vegetation and are often dominated by weedy or exotic species. On the other end of the spectrum, some properties have been restored specifically to support river function by improving river-floodplain connectivity and creating the ideal physical conditions for the native flora and fauna to flourish.

These lands are also managed to provide recreation opportunities and so include infrastructure such as paved multi-use trail, bathrooms, and pavilions all of which influences natural system function. Parks dominated by turf, recreational infrastructure, parking lots and sidewalks also fall into this stressor category. Parks impair function to a much greater degree than the naturalized open spaces, because of their lack of structural diversity and contribution of nutrients and other chemicals to the river.

Figure 3.6 While open space and parks management of lands in the floodplain primarily has a positive influence of river health, infrastructure such as the bike bath in this photo is often located so close to the river that it's protection disconnects the river from a functional riparian zone .

Gravel pits and ponds

Gravel pits and ponds account for eight percent of the SOPR riparian zone land cover (Figure 3.7). Gravel mining has been a prominent industry along the Poudre floodplain corridor almost since the town was first settled. In the City of Fort Collins natural areas alone, there are more than 30 former gravel pits and ponds. Most of these are excavations filled with alluvial groundwater that are separated from the river by berms or dams. Gravel ponds represent a conversion of vegetated riparian habitat into open water, and therefore they are a direct and severe impact on riparian condition. In some cases—where they are not fully surrounded by berms and gravel pits—ponds still offer some floodplain function by providing area for overbank flows to spread, but ponds provide no floodplain roughness. Bermed gravel pits and ponds contribute to instability and poor resilience by introducing the risk of catastrophic failure and avulsion (*i.e.*, rapid abandonment of a river channel and the formation of a new one). Recovery from massive avulsions is slow and unpredictable, and it can be quite expensive if the issue must be actively addressed. The numerous examples where Front Range rivers cut new channels through gravel pits and ponds during the 2013 flood provide direct evidence of these potential risks and the consequences. Gravel pits and ponds also affect groundwater dynamics, habitat connectivity, and (potentially) water quality.

Figure 3.7: Gravel pits and ponds are a common floodplain land use in the Urban and Plains zones.

Roads and bridges

Roads and bridges affect river health in several direct and indirect ways. Highway 14 parallels the river through the Canyon zone (Figure 3.8). The valley bottom is so confined and narrow in this zone that road encroaches on the riparian zone, the floodplain, and even on the channel itself where it affects floodplain connectivity, riparian condition, river form, and resilience. Below the canyon, roads also contribute to floodplain encroachment, especially where perpendicular cross-fills consolidate flows through bridges openings. Two bridges span the Poudre in the Canyon zone, four on the Rural zone, twelve in the Urban zone, and four in the Plains zone (Figure 3.9). Bridge effects vary by design and span length, but they generally limit floodplain extent, impact riparian condition, and reduce resilience. In most cases river form and physical structure are also directly affected.

Figure 3.8: Highway 14 road fill encroachment in the riparian floodplain is common in the Canyon zone.

Figure 3.9: Twenty-two bridges span the Poudre in the study area. At left, a railroad trestle and College Avenue and at right Prospect Road.

Berms and channelization

Downstream of the Canyon Zone, a majority of the river is channelized and/or bounded by berms (Figure 3.10). These practices are important for protecting floodplain development and infrastructure, but they also have a significant impact on river ecology and health. In addition to limiting floodplain extent, which is their intended purpose, channelization and berms directly impact riparian condition and all the geomorphic indicators of river form, resilience, and physical structure. Channelized reaches have decreased sinuosity and length, limited branching or braiding, narrow and often entrenched channel dimension, increased slope, and typically homogenous bed and bank structure. Resilience is compromised by the reliance on engineered structures to maintain river form and to protect human life and property. When berms breach or when channelized reaches avulse, as they occasionally do, there is little potential for passive recovery.

Figure 3.10: Channelization and berms are common on the Poudre River as shown in the two photographs here.

Bank and channel armor

Armor—such as engineered streambanks, riprap, and concrete— is used to strengthen the riverbed and banks to maintain channel resistance and to prevent its migration or movement (Figure 3.11). These treatments work by increasing channel hardness or resistance to scour, usually with the intent of protecting development, infrastructure, and property from channel migration or erosion. Combined with channelization and berms, bank and channel armor limits the width of the channel migration zone, which is the area within which the river can safely and effectively migrate. By arresting the natural processes by which the river moves, adjusts, and maintains habitat diversity, channel and bank armor directly impacts river form, resilience and physical structure. Revetments provide resistance to these processes so that the river maintains its form despite changes that may be occurring in the channel dimension and profile upstream. The physical structure indicator is impaired by armoring since armored banks prevent the increased channel sinuosity and lateral scour that would normally maintain lateral scour pools and bank undercuts.

Figure 3.11: Bank and channel armoring is employed to increase channel resistance, protect above and below ground infrastructure or prevent river migration.

Channel structures *(such as dams, weirs)*

There are 19 dams and several other weirs and grade control structures on the Poudre in the study area. Four of the dams are in the Canyon, five in the Rural, six in the Urban, and four in the Plains zone (Figure 3.12). Dams, weirs, and grade control structures are additional channel armoring features that resist erosion and lock the channel in place. Most of the dams serve as control structures for the major water diversions, while other structures provide grade control and channel stability functions. Regardless of their intended function, most of these structures have severe local impact on river form, resilience, and physical structure. Like armoring, rigid structures prevent channel movement and adjustment, and they impose an artificial channelized dimension and planform. With heights that reach eight or more feet, diversion dams are a major impact to river profile, creating long flat slackwater sections upstream where deposition leads to homogenous plane-bed structure at the coarse scale, while at the fine scale substrate becomes embedded or armored. Most of the structures are engineered to resist scour and failure due to erosion even in extreme floods, but when they do fail there is little to no recovery potential, and expensive emergency repairs are often necessary.

Figure 3.12: There are nineteen major structures or dams on the study area. Some pose major barriers for fish (left), while others are much lower and may be passable at some times of the year (right).

Woody material recruitment and removal

Woody material was historically a very important driver of river form and function on the Poudre, but in-stream wood has become scarce in its modern-day stabilized and channelized form (Figure 3.13). Riparian development and deforestation led to a decreased supply of wood, but berms, channelization, and armoring are also important factors that limit accumulation of woody material. Unconfined rivers normally accumulate wood as they migrate through forested riparian zones, entraining trees via active bank erosion or when dead wood on the floodplain is rafted in during floods. Both of these mechanisms are now severely limited in the study area. Moreover, when large woody material does become entrained in the river, it is often physically removed as part of maintenance programs. In a natural state, large woody material and log jams in the river create overhead cover, hydraulic diversity, and structural diversity by impounding water and/or inducing localized scour that forms pools. Even today, some of the deepest pools and most complex habitat are in locations where wood has been allowed to collect and become integrated into the channel.

Figure 3.13: Large woody material in the river creates important structural complexity and habitat diversity for fish and other aquatic life (left). Beavers play an important role in the cycling of large wood in river systems (right).

Exotic vegetation

The list of exotic vegetation in the riparian corridor includes a suite of species from regulated noxious species to species that are less noxious but extremely aggressive and prolific in nature. Noxious species are not a great concern in most of the study area because there has been proactive management in City of Fort Collins Natural Areas to eradicate them over the past decade. Properties managed by other entities may have greater problems with noxious weeds, and those properties can act as a nuisance seed source to surrounding managed lands.

Non-native species impair ecosystem functions where they dominate habitat niches formerly occupied by native species. Three species that are known to heavily impact Poudre River riparian forest function are: crack willow, reed canary grass, and smooth brome. While these are non-native, none are regulated as noxious species, yet all are extremely successful at establishing and spreading, and eventually dominating habitats. As they take over, these exotic species are resistant to scour and infiltration by other species, leading to a static vegetative community that hinders the natural processes of forest renewal by decreasing the number of sunny bare sites needed for native woody species regeneration.

4 Assessment results for the indicators and metrics

4.1 Overview of river health grades

Compiled *indicator scores* produced **river health grades of B- to C- for the 18 reaches of the Poudre River** (Table 4.1). The overall grade for the Canyon zone was a B-, while the Rural, Urban, and Plains zones were all in the mid-C range. The causes of impairment to the Poudre vary by reach and zone (see Chapter 3). This chapter describes the effects of those stressors on each indicator and metric of river health.

Table 4.1: Summary of river health indicator scores and letter grades organized by zones and reaches. Numerical scores are provided to illustrate the often subtle differences in the condition of health indicators. The assessment framework for the Poudre River uses a straight academic grading scale, where 90 and greater is an A grade, 80 and greater a B grade and so on. Letter grades are indicated through color coding. A key is presented below the table.

Zone	Canyon			Rural			Urban							Plains				
Reach	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Flow Regime	77	75	75	74	74	73	73	72	72	72	69	69	69	69	69	70	77	77
Sediment Regime	91	84	84	83	82	81	83	82	81	79	79	80	79	79	79	79	79	79
Water Quality	88	77	77	77	87	87	87	87	89	89	89	89	88	88	88	86	83	83
Floodplain Connectivity	78	82	85	74	65	85	62	61	87	50	67	73	70	77	50	98	82	71
Riparian Condition	85	87	85	77	73	74	64	69	76	63	65	70	71	73	70	76	71	68
River Form	82	74	72	79	68	78	67	74	76	70	78	74	75	77	67	74	75	69
Resilience	82	79	76	79	75	76	67	77	78	69	79	77	74	75	71	76	74	68
Physical Structure	76	74	71	82	72	79	66	77	79	77	81	70	77	76	63	74	74	69
Aquatic Life	80	81	78	76	76	76	77	78	72	74	79	79	85	85	85	78	78	78
River Health	82	79	78	77	74	78	70	74	78	70	74	74	75	76	70	78	76	73
	80			76			74							75				

Grading Scale		
	A	100-90
	B+	89-87
	B	86-83
	B-	82-80
	C+	79-77
	C	76-73
	C-	72-70
	D/F	69 or low er

Before diving further into the metric level results it is helpful and important to acknowledge uncertainty and variability within this vast project. The SOPR assessment team recognizes there are various levels of uncertainty in the results across reaches because of distinctions between scientific disciplines, river reaches and local context, data sources, data years available and combinations of qualitative and quantitative assessment approaches.

4.2 River health grades by indicator

Flow regime

The flow regime indicator grades range from C to C- suggesting substantially-impaired functionality throughout the study area (Table 4.2). Impairment mainly arises from the effects of water management. Most of the fundamental physical and life-support functions are still sustained, but higher-level functioning requires active management to accommodate or mitigate the altered flow regime.

When considering the results for all three flow metrics, note that there are various degrees of uncertainty in the results across the zones corresponding to data availability or lack thereof. Most notably, the Canyon zone was evaluated using the general qualitative grading guideline descriptions and a general high level evaluation of changes to flows, in contrast to the lower three zones that were assessed quantitatively. Furthermore, the quantitative assessment for the lower three zones was conducted using gage data and grading guideline "thresholds" that originate from specific locations on the river. Therefore the further one moves from these locations, the greater the uncertainty.

Table 4.2: Summary of flow regime indicator scores and grades organized by zones and reaches.

Zone	Canyon			Rural			Urban							Plains				
Reach	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Peak Flow	81	78	78	78	78	78	78	78	78	78	72	72	72	72	72	75	88	88
Base Flow	72	72	72	68	68	65	65	62	62	62	62	62	62	62	62	58	58	58
Rate of Change	73	73	71	70	70	70	70	70	70	70	70	70	70	70	70	71	75	75
Flow Regime	77	75	75	74	74	73	73	72	72	72	69	69	69	69	69	70	77	77
	76			73			71							73				

Peak flows

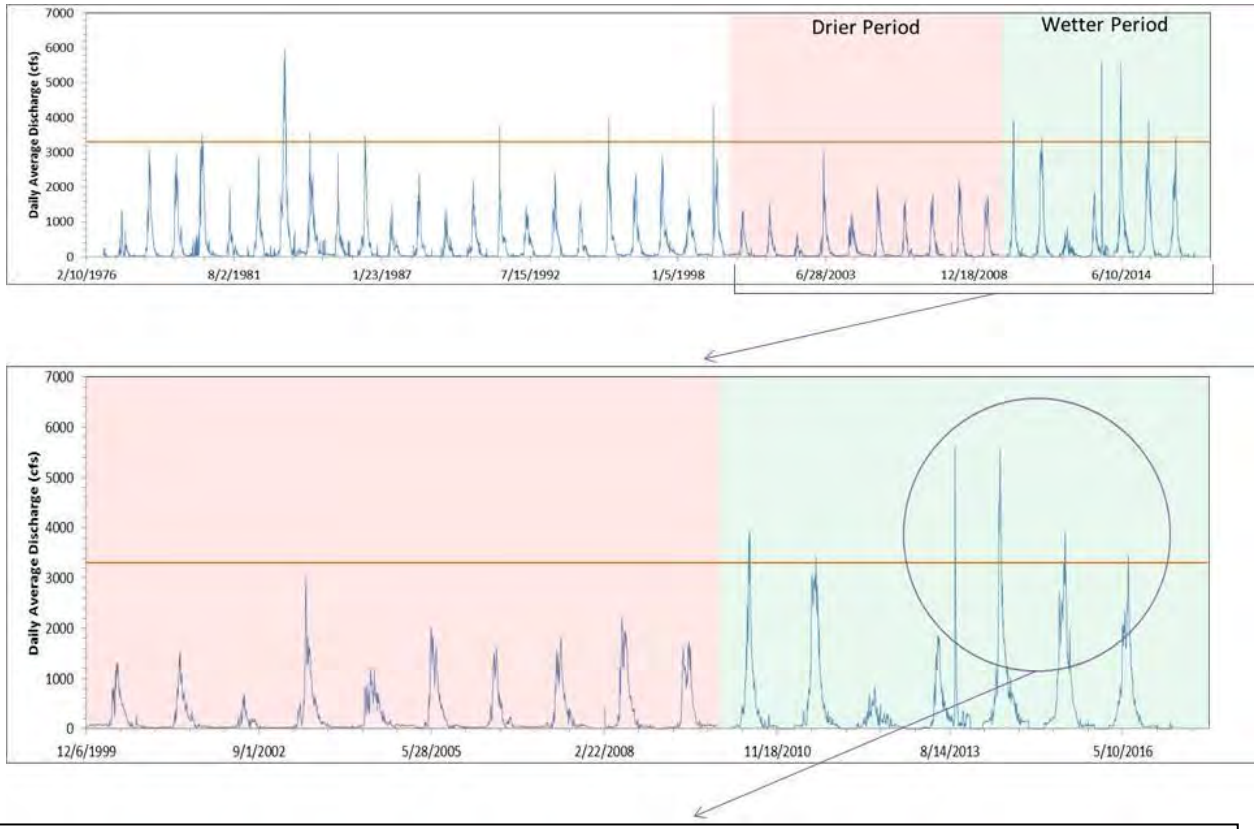
The reduction of peak flows results in an adverse effect on the river's ability to carry out vital functions. The C+ to C- zone level grades for this metric indicate that flows sufficient to mobilize and flush bed material do occur, but less frequently and with less certainty than needed to help support a functionally healthy and resilient river. From the upper reaches of the study area a C+ grade is reported for each reach until halfway through the Urban zone where at reach 10 the cumulative impact of multiple diversions drives the score down to a C-. In the lowest two reaches in the Plains zone, peak flow metric grades jump from C- to B+. This grade improvement represents an increased ability for the peak flows to move sediment, rather than larger or more characteristic peak flows. The improvement in functioning is due to the smaller sediment size found here, which require lower flow magnitudes to accomplish the same bed-mobilization functions. In other words the magnitude and frequency of peak flows downstream from the Boxelder gage is sufficient to support natural channel maintenance functions, such as scour and bed flushing, at a higher functioning level (B+).

The grading guidelines for the peak flows metric are based on the thresholds for river bed mobilization modeled in the ERM. Bed mobilization is critical for maintaining habitat and the life cycle needs of aquatic insects and fish that rely on clean interstitial spaces between coarse bed materials. Another important role of bed mobilization is to prevent armoring, or conversely, sedimentation. These

processes can have a cascading effect on a spectrum of other important functions associated with a healthy river. The peak flow thresholds needed to perform other functions such as algae scour, channel maintenance and certain riparian processes may correlate to (but are unlikely to be the same as) the bed mobilization thresholds. But these other important functions were not explicitly analyzed for this metric.

Flows that mobilize the median-sized bed material for a given reach do not occur every year, nor must they to maintain river health. Peak flows must be analyzed over various time scales to determine whether flushing thresholds are exceeded often enough (referred to as the return interval), and for enough duration, to maintain river health. For this analysis of peak flows, the period of record from 1976-2016 for each of the three gages was analyzed for peak flow magnitude, duration, and frequency thresholds (Figure 4.1). A longer-term record is needed to compute a return interval and to characterize ecological processes and cycles that occur over long periods (decades to centuries). Looking at this 40 year period is needed to compute a return interval and is appropriate since many ecological processes and cycles occur over much longer periods (decades to centuries). However, long-term patterns do not provide information on the occurrence of recent bed mobilization in this SOPR study period (*i.e.*, 2015-2016).

A second line of evidence helps convey the current condition of the critical ecological functions driven by the peak flows. The embeddedness of riffles, as measured in the fine scale metric (page 70), provides field-based evidence indicating the degree of bed flushing that has occurred recently. Using the fine-scale structure metric alone, without analysis of the longer flow record, could be misleading, since rivers naturally experience climate driven wet-dry cycles that span years to decades. For instance, during a dry period, when flushing has not occurred for several years, the riffles may appear more embedded with fines. Therefore, the SOPR assembled multiple lines of evidence covering multiple time scales to produce a better understanding of the single most driving factor in Poudre River health.



Recent activity of flushing flows is measured in the "**fine-scale"** physical structure metric. See page 70

Figure 4.1: Daily average discharge at the canyon mouth gage (1976-2016) was analyzed for peak flow magnitude, duration, and frequency thresholds. The horizontal orange line indicates flow of 3300 cfs which was calculated in the ERM as the threshold required to mobilize the median grain size in the Rural and Urban zones. Long, medium, and short time scales are considered in the comprehensive interpretation of flushing flow functions. The fine-scale physical structure metric provides another line of evidence to determine whether flushing has occurred in the past few years.

Base flows

Base flow grades ranged from C- to F+. There is a slight downward trend in grades from the Canyon through the Plains zones due to the cumulative depletion of water during low flow periods from the 16 major diversion points located throughout the study area. Depletions during low-flow periods cause lower base flow and/or prolonged periods of low flow (Figure 4.2). Some segments of the Poudre run dry below diversions during winter. Point flow models indicate that at least three days with no flow occur per year, on average, below Greeley's water supply diversion, and occur again at other diversion structures downstream, increasing the number to 24 days of no flow per year at the Fossil Creek Inlet Diversion (see Figure 3.1 and Tables 3.2 and 3.3).

Figure 4.2: Extremely low base flows occur regularly in reach 13.

Rate of change

Rate of change grades ranged from C to C-. Most reaches either contained at least one diversion, or have one in a proximate upstream reach. These diversions are managed such that rates at which flows rise and fall can be rapid enough to stress native plants and animals. Abrupt changes in flow that can occur when diversion gates are suddenly opened and closed can negatively impact the aquatic biota, especially during low flow periods. This metric's scores highlight an important stress on the rivers aquatic ecosystem.

Sediment regime

Sediment regime grades ranged from A- in the Canyon to C+ in the Plains zone, indicating that the sediment regime is largely in good condition (Table 4.3). Impairment of continuity as a result from in-line reservoirs and dams was the most influential downward driver of grades.

Table 4.3: Summary of sediment regime indicator scores and grades organized by zones and reaches.

Zone	Canyon			Rural			Urban							Plains				
Reach	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Land Erosion	82	88	88	92	92	92	92	92	85	85	85	85	85	85	85	85	85	85
Channel Erosion	95	95	95	84	83	79	81	80	82	78	78	80	78	78	78	78	78	78
Continuity	95	68	68	72	72	72	75	75	75	75	75	75	75	75	75	75	75	75
Sediment Regime	91	84	84	83	82	81	83	82	81	79	79	80	79	79	79	79	79	79
	86			82			81							79				
Zone	Canyon			Rural			Urban							Plains				

Land erosion

Land erosion grades ranged from A- to B-. The only significant land erosion stressor in the Canyon and Rural zones is from the land cover change within the burn areas of recent wildfires. Erosion from burned areas affects the Poudre most on the reach between the Munroe Diversion and the confluence with the North Fork. Approximately 16% of the watershed area contributing to this reach is burn scar, and the reach is graded B-. The contributing watershed area more than doubles below the confluence with the North Fork, so the percent burned area in the contributing watershed drops to 7% at this point, yielding a grade of B+. The effects of the fire diminish from this point downstream.

Other stressors from land erosion such as construction disturbance, impervious surfaces, and urban stormwater runoff, become more important in the Urban and Plains zone. Some of these impacts increase sediment runoff, but most of them decrease the supply of sediment. The net effect of land erosion impacts on overall sediment regime on the Poudre is minimal, warranting a grade of B or higher through the Urban and Plains zones. Land erosion is not a critical limiting factor to the health of the Poudre River.

Channel erosion

Channel erosion grades ranged from A to C+. The Canyon zone scored the highest (A) with no significant stressors. The Poudre River is a threshold channel through the Canyon zone, where geologic controls naturally limit the amount of channel erosion. Most of the banks are also armored. Tributary watersheds in the Canyon zone are mostly undeveloped with few to no anthropogenic stressors affecting rates of channel erosion.

In the Rural, Urban, and Plains zones, the Poudre was historically an alluvial channel with river bed and banks that moved and adjusted with natural patterns of erosion and deposition. Artificial stabilization is a major human impact in these zones, where armored banks, riprap, channelization, berms, dams, weirs, and grade control structures have been employed to keep the river in place. Natural processes of erosion, deposition, and migration are severely limited by these treatments. The river through these zones behaves much more like a threshold channel in that erosion and migration occurs only during

extreme events. Most of the time, there is little to no channel erosion and therefore little to no contribution of sediment from channel erosion on these reaches. While the overwhelming trend is towards a stabilized and static river channel with little erosion, there are localized segments with acute channel erosion issues. Some stabilization measures, such as the extensive use of riprap, have accelerated bank erosion in adjacent segments that are not armored, and in some cases failed stabilization efforts have exacerbated erosion.

The same impacts are present on most of the tributary streams that enter the Poudre within the lower zones. Artificially-stabilized streams usually contribute less sediment than they would in their natural state —but in some cases the opposite is true. Channel incision and accelerated bank erosion on a few tributary streams elevate sediment supply above natural levels. Some of these tributaries are streams on which stabilization measures failed. Others evolved into incised channels in response to land and water use practices and are still eroding. Retention ponds on some of these eroding tributaries capture sediment before it enters the Poudre. Overall, sediment supply from tributary reaches has probably decreased compared to natural conditions.

Continuity

In-line dams and reservoirs have the greatest impact on sediment continuity. Reservoirs trap essentially the entire sediment supply from the North Fork basin, which adds up to 54% of the Poudre's contributing watershed area when they join. Because of this impact, sediment continuity scores drop from A to D+ at the confluence, and then gradually increase moving downstream as the sediment-blocked North Fork drainage area becomes a smaller and smaller proportion of the contributing watershed. Other impediments to sediment continuity such as small in-line dams and diversion structures may be insignificant to sediment continuity because the volume of sediment trapped and stored is small compared to the annual yield and these structures are likely filled to capacity with sediment.

Water quality

When averaged across the entire study area, water quality on the Poudre River was graded B, indicating a highly functional condition, with reach scores ranging from B+ to C+ (Table 4.4). Local impairment issues are apparent, however, when the river is assessed at finer resolution. At the B grade, water quality may be impaired enough to affect the distribution and community assemblage of aquatic life, but it is still supporting essential functions well. Stressors to water quality are mostly managed or mitigated.

Table 4.4: Summary of water quality indicator scores and grades organized by zones and reaches.

Zone	Canyon			Rural			Urban							Plains				
Reach	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Temperature	86	69	69	69	86	86	86	86	90	90	90	88	88	88	88	87	85	85
Nutrients	94	92	92	92	91	91	91	91	94	94	94	88	88	88	88	86	85	85
pH	91	92	92	92	87	87	87	87	87	87	87	90	90	90	90	92	89	89
DO	89	87	87	87	89	89	89	89	89	89	89	92	92	92	92	89	84	84
Water Quality	88	77	77	77	87	87	87	87	89	89	89	89	88	88	88	86	83	83
	80			83			88							87				

Issues with temperature and dissolved oxygen concentration are the most important downward drivers on water quality and its grade. The higher water quality grades in Urban zone versus the Canyon zone may seem contrary to expectations, however, the grading criteria are set relative to water quality standards, which vary as the river changes in character. Therefore, grades relate to a correspondence with standards rather than some absolute measure of water "purity". Nutrient levels downstream of I-25 may be elevated enough to affect biological function, specifically in respect to potential changes in algal productivity and/or algal species composition in the river (a "reach 19"—downstream of the study area—was evaluated for certain water quality measures as explained below). Water treatment and ongoing active watershed management are critical to mitigate potential water quality issues and support aquatic life in these reaches below the study area.

Water temperature

Water temperature grades ranged from A- to D+. The reach upstream of the North Fork in the Canyon zone (reach 1) was graded B. Although this reach is part of the CDPHE Stream Segment 10a, which is on the state 303d list of impaired waters for temperature, an evaluation of temperature records showed that state temperature standards were not exceeded on this specific reach between 2013 and 2015. Below the North Fork confluence on reaches 2-4, however, several exceedances of the acute maximum daily temperature standard were observed over the same period, as well as exceedances of the chronic standard, maximum weekly average temperature (MWAT). These data confirm the 303d listing for this portion of Segment 10a for temperature issues, resulting in a D+ grade. Although seasonal average temperature (Apr-Oct) is within the B range, a 303d listing automatically confers a grade of D or less by RHAF grading guidelines.

The D+ grade and water quality standard exceedences for reaches 2-4 must be interpreted with broader perspective, otherwise these measures may convey an incomplete and potentially misleading picture of

river health within these reaches. In general, maximum daily temperature standard exceedances occurred during two times of the year, in late March and in the summer months from June - September. Temperature standards change abruptly from cold to warm season values on April 1. It is usually during this time of year, known as the shoulder season, when warmer air temperatures begin to increase water temperatures, and exceedances may occur depending on the timing and magnitude of the spring warm-up period. Summer exceedances occur during particularly warm years, and/or when river base flows are low. Regardless of the timing of the standard exceedances, the data record indicates they are generally infrequent and of short duration. For the large majority of the time during the years 2013-2015, temperatures are well within the standards. The exceedances, do however, highlight the importance of continued temperature monitoring for both aquatic life and water quality perspectives, as increases in the frequency and magnitude of exceedances may signal the presence of anthropogenic stressors, or climatic trends toward hotter and drier summers and earlier spring snowmelt, both of which could have considerable impact on overall river health and function.

The exact causes of the observed standards exceedances in reaches 2-4 are currently unknown, although a variety of factors may act together to result in relatively warmer water temperature in the river including the proportion of North Fork and Mainstem Poudre flows, overall river flow volume, diversions and inflows, in-channel reservoirs and weather. Figure 4.3 further illustrates the higher temperatures in reaches 2-4, as compared to upstream and immediate downstream reaches.

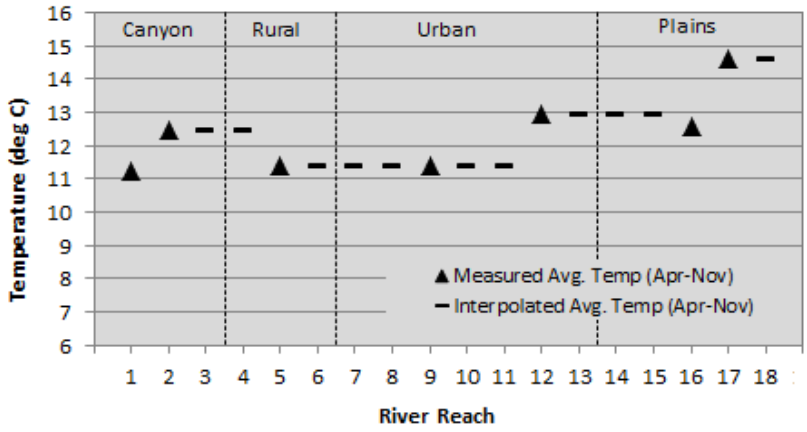


Figure 4.3: Reaches 2, 3 and 4 of the Poudre showed warmer temperatures than upstream and immediate downstream reaches, as shown in this graph of 2015 average temperatures by reach for the months of April – November, 2015.

Water temperature grades improve to B in reach 5 of the Rural zone, just downstream of the 303d-listed segment. This segment receives cold-water discharge from Horsetooth Reservoir via the Hansen Supply Canal which may mitigate some of the higher temperatures that drive exceedances in the river upstream. According to CDPHE Regulation #38, the river transitions from a cold-water to a warm-water designation at Shields Street, between reaches 8 and 9. Since water temperature standards are based on excessive heat, the warm-water designation at this point means that standards below Shields Street

are warmer. While water temperature continues to increase through the Urban zone, the improved grades (A-) on reaches from Shields to Mulberry are more a reflection of the change in designation from cold-water to warm-water and the less-stringent standards that go with it.

Both cold and warm season average water temperatures increase gradually downstream through the Urban and Plains zones, and this trend is reflected by a corresponding decrease in grades from A- to B for reaches from Mulberry to I-25. Increasing temperature may be attributed to the cumulative effects of decreased streamflow due to diversions, as well as inputs of treated wastewater effluent and urban stormwater runoff, which are usually warmer than river water. Temperature monitoring east of I-25 indicates that the warming trend continues downstream below the study area.

Nutrients

Nitrogen and phosphorus monitoring reveals little to no nutrient impairment anywhere in the study area. Grades for the nutrient metric (average of nitrogen and phosphorus grades) are in the A to B range, indicating reference standard to highly functional condition throughout— though there is a slight downward trend through the Urban and Plains zones. The slight increase in nutrient enrichment on the lower reaches is likely due to return flows from irrigated and fertilized areas within the urban and residential developments, agricultural runoff, and treated wastewater effluent.

Consistent with other indicators and methods employed in this SOPR assessment, water quality conditions are evaluated and reported for the 18 reaches of the study area, which ends where the Poudre River crosses I-25. However, it is recognized that the influence of the City on water quality is not fully represented by this geographical scope. It was, therefore, determined that water quality would be evaluated further east of I-25, below the point where discharge from Fossil Creek Reservoir enters the Poudre, as this location includes the return of local communities' reclaimed wastewater to the River. Although presentation and discussion of results throughout this report include only the common 18 reaches, where notable, water quality results for the additional site, termed reach 19, are included.

Within reach 19, measured nitrogen concentration was in the C range, and measured phosphorus was in the F range, resulting in a combined nutrient metric grade of a D for this reach. Given the drastic increase in nutrients at this station, and the lack of any other apparent stressors, Fossil Creek Reservoir discharge is the most probable cause of nutrient loading. The water quality in Fossil Creek Reservoir reflects the combined influences of Poudre river water, reclaimed municipal wastewater, local stormwater runoff, and seasonal reservoir dynamics. Total phosphorus concentration at this site exceeded CDPHE's proposed warm-water standards of 170 µg/L (based on Colorado's Water Quality Control Commission Regulation #31—The Basic Standards and Methodologies for Surface Water) more than once over the last five years. If CDPHE formally adopts the 170 µg/L phosphorus standard, this section of the Poudre will be considered impaired due to nutrient loading.

pH

Measured pH values were within normal ranges (6.5 - 9.0) at all stations during the monitoring period, indicating no functional impairment on any of the study reaches. Grades ranged from A- to B+, owing to

slight variations and occasional readings at the margin of the A-grade range. The grade decreased slightly to B downstream of Fossil Creek Reservoir outlet in reach 19, reflecting the influence of wastewater effluent and/or discharge from Fossil Creek Reservoir on river water quality.

Dissolved oxygen

Grades for dissolved oxygen were A- to B, and all sites met the water quality standard for spawning fish. Most sites throughout the study area scored a B+, but the lowest two reaches in the Plains zone (17 and 18) scored a B. These reaches on the river have the lowest seasonal flow conditions and receive warmer, nutrient-rich water from two upstream wastewater reclamation facilities. These inputs can reduce dissolved oxygen concentrations in the river water when biological oxygen consumption from metabolism and aerobic decomposition outpaces oxygen production from photosynthesizing aquatic plants and algae. Other stressors that may decrease dissolved oxygen concentrations include a lack of turbulence or physical mixing, stagnant water, elevated temperatures, and the accumulation of fine sediment that further increases oxygen demand. Dissolved oxygen concentrations drop further into the B- range in reach 19, below the confluence of Fossil Creek.

Floodplain connectivity

Overall, the floodplain connectivity indicator received a C grade (Table 4.5). Only one metric (floodplain extent) influenced this grade, as discussed below.

Table 4.5: Summary of floodplain connectivity indicator scores and grades organized by zones and reaches.

Zone	Canyon			Rural			Urban							Plains				
Reach	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Floodplain Extent	78	82	85	74	65	85	62	61	87	50	67	73	70	77	50	98	82	71
Floodplain Connectivity	78	82	85	74	65	85	62	61	87	50	67	73	70	77	50	98	82	71
	81			75			68							79				

Floodplain extent

The floodplain extent metric considers the physical (topographical) connection between the river channel and its floodplain and the frequency at which flows inundate the floodplain. Conditions vary considerably through the study area, resulting in a wide range of scores. In the confined Canyon zone, there is limited natural floodplain, and connectivity depends almost entirely on the degree to which road fill for Highway 14 encroaches on it. Diversion dams and bridges are additional physical factors affecting floodplain connectivity where they consolidate flows between wing walls and over spillways. The river in the Rural, Urban, and Plains zones is not geologically confined and, historically, the natural floodplain area was up to two miles wide in places. Over time, however, that width has been deliberately decreased—through berms and channelization—to make use of the floodplain for a variety of purposes.

Floodplain connectivity is a keystone indicator because it is a fundamental requirement for a functional and resilient riparian habitat (Figures 4.4). An undeveloped floodplain that is well-connected to the river is critical for maintaining riparian habitats and dissipating potentially damaging flood energy. A healthy and resilient river needs an effective channel migration zone within which the river can move and adjust to disturbance. The C and C+ grades for floodplain connectivity on the Rural and Plains zones indicate a an impaired, but still modestly-functional floodplain. The D+ grade for the Urban zone highlights the legacy of land uses in the floodplain, many of which are difficult (or slow and costly) at best to rectify. The reach-scale grades vary considerably with most reaches scoring from B+ to D. Two reaches scored F, indicating a profoundly impaired and non-functional condition. Reaches with low grades for floodplain connectivity also tend to have poorly functioning riparian areas and low capacity for resilience (Figure 4.5).

Figure 4.4a: The five-year water surface extent between College Ave. and Lincoln St. (reach 10) shows an entrenched channel with limited floodplain connectivity due to natural bedrock and constructed berms.

Figure 4.4b: The five-year water surface extent from the Woodward campus to upstream of the Timnath Canal Diversion (lower end of reach 11 and upper half of reach 12) shows a less entrenched channel with a better-connected floodplain.

Figure 4.5: Floodplain connectivity is critical for river health, and it also reduces risk to infrastructure. During extreme high flow events, where floodplain-river connectivity is poor and development in the riparian zone is extensive, there is greater risk of flood damage to infrastructure. The photograph at left shows a connected floodplain at a former golf course (currently the Woodward site and Homestead Natural Area). Near the bottom left of the photograph, however, the intersection of Lemay Avenue and Mulberry Street limits floodplain connectivity and floodwaters threatened to over top Lemay Avenue. In contrast (right), at the ELC, the riparian zone is managed for natural habitats and the topography allows for the river to be connected to the immediate zone next to the river, resulting in a resilient situation

Riparian condition

Vegetation structure is the primary metric informing the riparian condition score, with the other two metrics of habitat connectivity and contributing area exerting a relatively smaller influence. The riparian condition indicator scores varied from B to D indicating that all reaches still maintain at least a rudimentary riparian zone (defined as the corridor extending 100m from each bank) (Table 4.6).

Table 4.6: Summary of riparian condition indicator scores and grades organized by zones and reaches.

Zone	Canyon (100 ac.)			Rural (449 ac.)			Urban (571 ac.)							Plains (427 ac.)				
Reach	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Riparian Acreage	*16*	*59*	*25*	*178*	*95*	*176*	*149*	*77*	*105*	*46*	*72*	*57*	*65*	*75*	*53*	*161*	*63*	*75*
Vegetation Structure	83	86	83	75	70	72	64	68	74	64	65	70	70	71	68	74	69	66
Habitat Connectivity	92	92	92	88	81	84	63	72	88	60	68	75	78	82	78	92	79	79
Contributing Area	92	92	92	80	88	81	68	70	76	62	60	62	67	78	78	80	74	76
Riparian Condition	85	87	85	77	73	74	64	69	76	63	65	70	71	73	70	76	71	68
	86			75			68							73				

Zone Canyon Rural Urban Plains

Vegetation structure

The vegetation structure assessment considered various factors needed for sustainability and resilience of riparian habitat such as land use and cover type, habitat patchiness and interspersion, diversity in height structure, presence of problematic non-native species, and regeneration of native tree species. The reach scores are informed by the composite scores of individually-mapped patches or "polygons." The assessment was conducted at the patch level and averaged across each reach. There was often diversity in scores across the patches within a reach, with forested patches tending to have higher scores than non-forested ones.

Vegetation structure grades range from B to D with a strong demarcation of scores between reaches secondary to changes in land use and land cover and degree of connection with the river. Vegetation is absent or greatly altered in large portions of the historical riparian zone. In cases where no appreciable vegetation was present, the assigned grade was an F. Patches with vegetation structure more closely resembling natural conditions scored higher. Land cover determines the potential to support healthy riparian habitats. For the analysis, land use and land cover were the first filters to determine grading and also to identify candidate patches for field assessment. Appendix D provides the results corresponding to these classes, along with a basic description, a summary of grades, and the relative cover of each class.

Patches of quality riparian habitat may be present even on reaches with low vegetation structure scores (Figure 4.6a and b). Remnant patches of forest, scrub-shrub, and wetland are commonly embedded in more developed landscapes, especially on City of Fort Collins Natural Areas parcels. Remnant patches of high-quality riparian vegetation may have positive habitat benefits that exceed their contribution to overall reach scores since they provide urban habitat oases and refugia (Figure 4.6a and b).

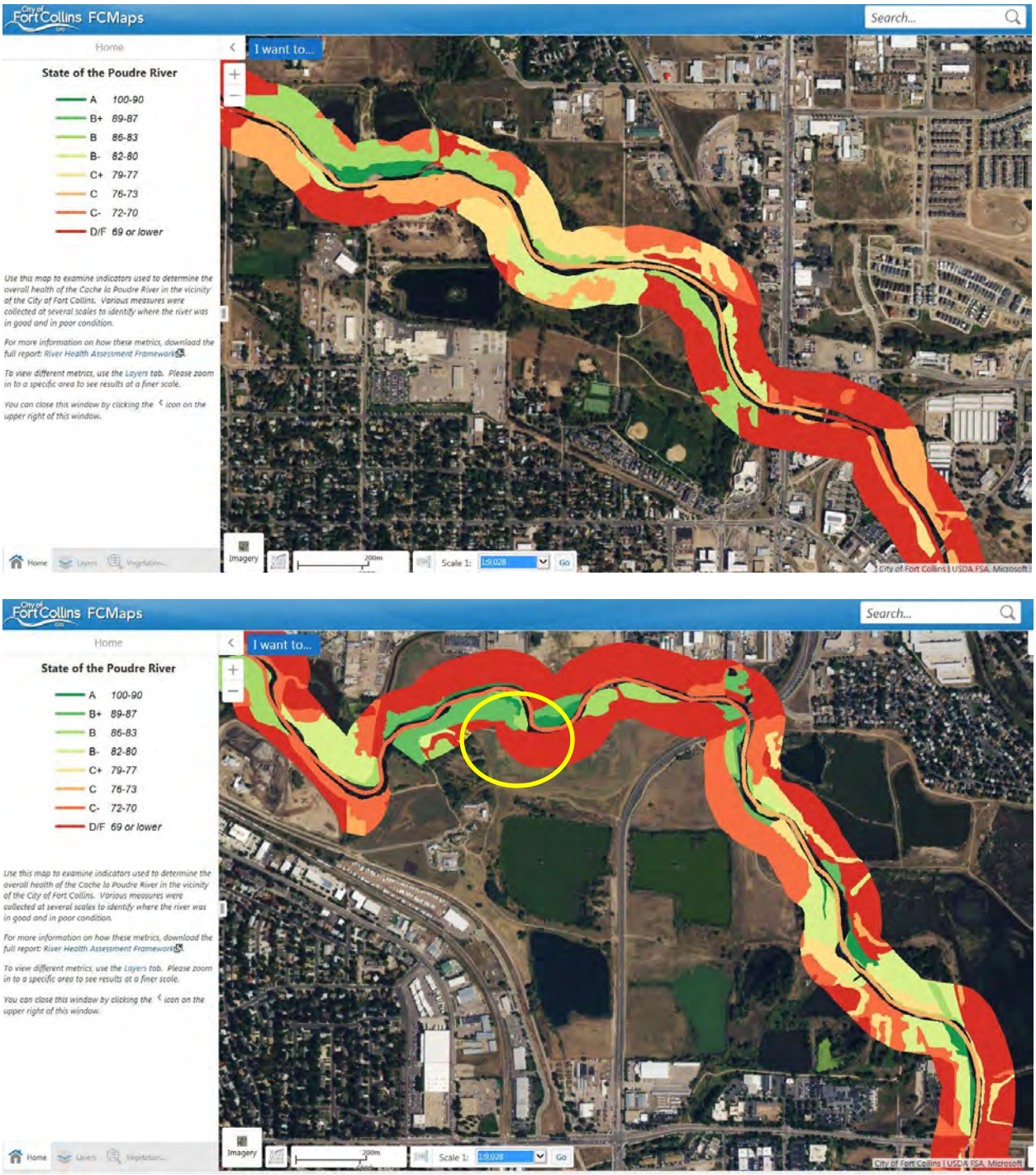


Figure 4.6a and b: Images from the SOPR online mapping tool illustrate how patches of naturalistic riparian vegetation provide high quality habitat amidst otherwise developed areas. The top image shows Shields Avenue to Linden Street in downtown Fort Collins (reaches 9, 10, and 11). The bottom image shows the river above and below Timberline road (reaches 12, 13, and 14). The primary driver of vegetation structure is connectivity with river flows which is particularly poor in the areas from College Avenue to Linden Street (bottom right Figure 4.6a). The yellow circle on Figure 4.6b shows the location of the photograph shown in Figure 4.7

Figure 4.7: A highly functional riparian forest can be adjacent to very poor-scoring riparian zone. This location of this photograph is provided in Figure 4.6b.

Eight sub-metrics were used to grade vegetation structure of patches with natural cover types such as forests. A majority of the field-graded habitat patches (especially within the Urban and Plains zones) are located on public lands managed by the City of Fort Collins (Natural Areas or Parks Departments) or CSU.

Comprehensive results for all polygons for all submetrics are also presented in Appendix D. As well, comprehensive results are presented for public lands only that are owned and managed primarily for conservation of natural habitats (like the City of Fort Collins Natural Areas.)

Vertical Complexity

Vertical complexity of wooded patches was graded B, on average, indicating highly functional condition with minor impairment. Wooded habitat typically has three layers of vegetation: herbaceous, shrub, and tree and all of the patches evaluated had at least two vegetation layers. When a stratum is missing, it is usually the shrub layer. There are several reasons for the loss of shrubs in forests. Primary causes are agriculture or landscaping, hydrologic alteration, overgrowth of crack willow that results in large

patches of shaded areas for long periods of time, and lack of natural physical disturbance that maintains and renews shrub populations.

Canopy species

Native cottonwoods are most commonly the dominant canopy species, although crack willow sometimes dominates and is often the second most -common species. The average score for canopy species submetric in canopy forest patches is B.

Sub-canopy species

Sub-canopy composition also generally leans toward a native-dominated composition, with exotics such as Chinese elm and crack willow commonly next in frequency. An increasing presence of green ash is observed in the Urban and Plains zone. While this species is considered native, it is likely to alter the trajectory of these forests and their future composition, but exactly how is not well understood yet. Grades for the sub-metric are B, on average, in the Canopy and Sub-canopy Forest patches, while scrub-shrub sub-canopies grades average C+.

Figure 4.8: Canopy and subcanopy dominated by native cottonwoods and associated desirable "vertical complexity" are observed adjacent to the multi-use Poudre Trail at Lions Park in the Rural zone.

Shrub layer

The shrub layer is significantly diminished in riparian forest habitats along the Poudre (as explained above), but where it exists it is still usually a functional stratum with grades of C to C+. In scrub-shrub cover class the stratum tends to be in outstanding condition (A) — being dominated by a dense coverage of native sandbar (aka, coyote) willow. Scrub-shrub habitat has become limited in distribution, however. Almost all of the scrub-shrub habitat patches are immediately adjacent to the river where a narrow band of fluvial disturbance along the channel still supports willows and other shrubs that require the bare ground and wet conditions to reproduce and establish. Areas farther away from the stabilized river channel are only exposed to fluvial disturbance during extreme flood and they tend to be dry, and are therefore not conducive to shrub establishment.

Problem herbaceous species

Problem herbaceous species are a significant cause of impaired function on some riparian habitat types. Canopy forest, sub-canopy forest, and scrub-shrub patches scored in the B to C+ range, while emergent wetlands averaged C-. In wooded habitat, reed canary grass, Canada thistle, and leafy spurge are the common problem herbaceous species, but infestations are rarely extensive. Broad-leaved cattail,

a common problem species, dominates most of the emergent wetland adjacent to the Poudre, often to the near exclusion of other herbaceous species.

Problem woody species

Problem woody species are not a major issue on most wooded riparian habitat along the Poudre, and scores for this sub-metric averaged A- to B. Crack willow is not considered a significant problem where it is only present occasionally, but it is a problem where it forms homogenous thickets or dense, impenetrable forest canopy. It is by far the most common problematic woody species yet its impact on function can be both positive - for instance as it provides bank stabilization- and negative when it significantly limits resources available for native species. Tamarisk—an invasive species that is common in neighboring watersheds— was only observed in one small stand of a few individuals at the ELC. Russian olive, an invasive tree species, occurs throughout the Rural, Urban, and Plains riparian zones, but extensive eradication efforts over the past decade by the City of Fort Collins has been effective such that very infrequently is it dominates the forest sub-canopy.

Patchiness and interspersion

Results for patchiness and interspersion follow a similar pattern to those for vertical complexity. In wooded habitats the average grade is B-. Decreased patchiness is often the result of direct impacts such as tree and shrub removal, land clearing, or development. Riparian vegetation structure has also become homogenized due to an altered disturbance regime and a reduction in system dynamism. Much of the river is artificially stabilized so that the natural meandering, avulsion, and deposition processes that would normally drive plant succession, diversity, and forest regeneration have been lost. Wetland emergent habitats usually have poor patchiness and interspersion because most of them have become overgrown by cattails.

Native tree species regeneration

Regeneration of native tree species—particularly cottonwoods— has been substantially curtailed by effects of water management and disconnection of the river from its floodplain. Owing to various floodplain alterations, such as channelization and berms, the opportunity for establishment of native trees has been limited, but it does still occur and it was common in forested and subcanopy patches (Figure 4.9). In cover types where native tree species regeneration would be expected—including canopy and sub-canopy forest, scrub-shrub and emergent wetland—this metric averaged a C, ranging from D+ in wetlands to B- in scrub-shrub patches. Regeneration was good in scrub-shrub patches because they tend to be near the channel and exposed to overbank flows. [Note that the lack of tiny seedlings or very young saplings was not taken to indicate a lack of regeneration, because regenerative floods are relatively uncommon events. Therefore, the main criterion for judging regeneration was the presence or extent of a multi-generational age structure.

Figure 4.9: Germinating cottonwood seedlings established readily at McMurry Natural Area when physical connectivity was restored such that annual spring flows provided basic habitat conditions.

Floodplain position

This sub-metric uses the floodplain position patch classification, which includes three categories: riverine, depressional, and terrestrial. Sixty-two percent of the riparian zone is riverine, meaning that is still effectively connected to the river. Eleven percent of the floodplain is now depressional (*i.e.,* mostly gravel ponds) and disconnected from the river by berms. The remaining 27 percent of the riparian zone has been terrestrialized and isolated from the river, except perhaps during the largest flood events.

Habitat connectivity

The habitat connectivity metric is a measure of the degree to which riparian habitat is biologically connected with surrounding riparian habitat, or conversely, the degree to which habitat has become fragmented or isolated. Habitat connectivity ranged from an A- in the Canyon zone and ELC to a D- in the heart of the Urban zone. While D- indicates very poor connectivity, it also signals that connectivity has not been totally eliminated. Organisms can still move throughout the entire study area, even if rates of movement may be greatly reduced through the urban bottleneck). Connectivity has been fairly well preserved upstream and downstream of the developed urban areas, and even in the Urban zone there are islands of good-quality riparian habitat that provide refuge to the animals that do make it through dangerous and stressful areas (Figure 4.10).

Contributing area

This metric reflects the level and type of land-use change that has occurred in the area surrounding the riparian corridor. Certain land uses, such as parks, still have some positive benefit as buffers between

riparian habitat and developed areas. Riparian areas directly in contact with more intensive land uses such as urban development, on the other hand, are adversely affected. Reach-scale contributing area metric grades from A- to D- roughly parallel scores for habitat connectivity since contributing area is affected by the same types of land-use stressors. Generally speaking, the contributing area is in fairly good condition, reflecting the rural uses surrounding most of the riparian zone. The obvious exception to this is in the Urban zone, where the contributing area has a generally negative effect on river health.

Figure 4.10: The presence of mink along the Poudre near is an indication that the food webs they rely on as predators (and associated habitats of their prey) is fairly intact.

River form

On the reach scale, river form grades ranged from a D to a B-, averaging a C for each zone (Table 4.7). Planform shape of the river was the most impaired of the three metrics, while cross-sectional profile was the least. The planform shape of the river has generally been straightened and simplified through channelization and armoring. The other two metrics of river form have often been able to adjust, at least in part, to the newly derived planform shape.

Table 4.7 Summary of river form indicator scores and grades organized by zones and reaches.

Zone	Canyon			Rural			Urban							Plains				
Reach	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Planform	78	74	73	77	66	72	68	71	73	62	75	77	70	67	64	71	72	65
Dimension	84	74	71	78	70	78	66	75	77	69	77	71	76	79	69	76	75	69
Profile	85	73	72	81	68	85	66	77	79	80	83	76	80	85	68	75	77	72
River Form	82	74	72	79	68	78	67	74	76	70	78	74	75	77	67	74	75	69
	76			76			73							73				

Planform

Planform describes the river's form in terms of length, sinuosity, meander patterns, and branching. Reach-scale planform grades range from C+ to D- with the lowest score occurring in the channelized, heavily riprapped, and bermed reach between College Avenue and Lincoln Street. At the sub-reach scale, scores range from A- to F (Tables 4.8a and b). The highest scores are on reaches that are not channelized or stabilized by armored banks, grade control, or bridge crossings. On these reaches, the river is able to meander naturally and adjust its planform in response to changing boundary conditions. The lowest scores occurred on channelized reaches with diversion structures, bridges, and heavily armored banks.

The Poudre River is channelized through most of the Rural, Urban, and Plains zones. The naturally complex, meandering, braided, and branched channel form has been simplified to a much straighter and single-threaded channel form which is maintained with berms, riprap, and grade control structures. It has essentially been converted from a dynamic "alluvial" river system—one that would naturally move and adjust in a gradual fashion—to a "threshold" system that is artificially locked into place and can only move or adjust catastrophically when stabilization measures are overwhelmed during extreme events.

When the river does overcome stabilization measures, and it begins to meander or form branch channels, it is usually reconstructed into its artificial, single-channel form. Lyons Park is a prime example of this back-and-forth pattern. During the 2013, flood this section of channelized river eroded through its armored bank and migrated 50 feet laterally to increase sinuosity and decrease slope. Within two years the river channel was returned to its pre-flood position, and the bank was backfilled and re-armored. In most cases, maintaining the present channelized and relatively straight single channel river planform is necessary to protect infrastructure and development, but this generally has negative impacts on river form, function, and resilience.

In some cases the channelized and straightened river form may have arisen due to a combination of natural and anthropogenic reasons. On the ELC in the Plains zone, approximately 3100 feet of the river became straightened when it avulsed into a large ditch on the floodplain in the 1990s (Figure 4.11).

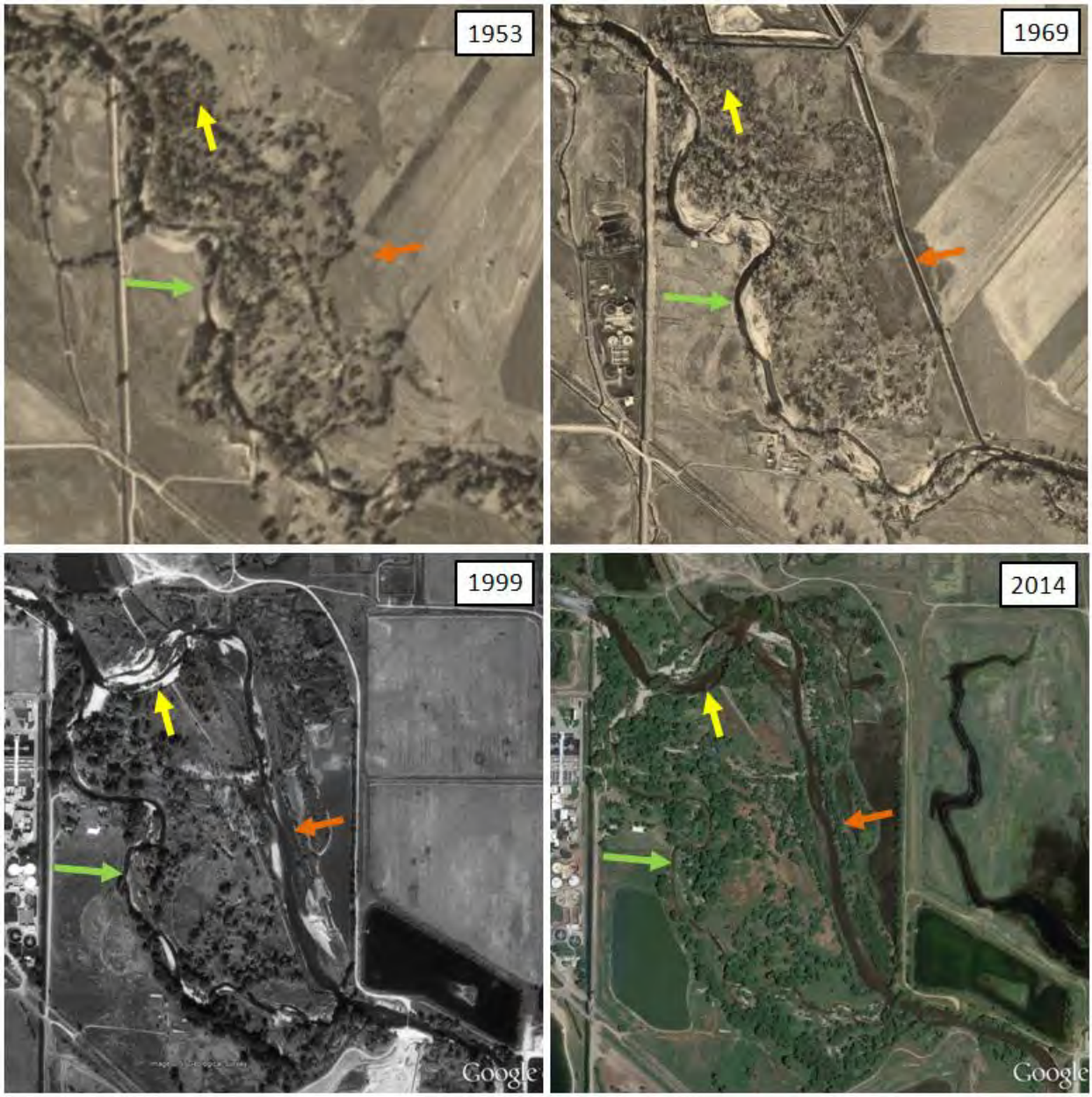


Figure 4.11: The straight single-channel planform of 3100 feet of the Poudre River on the Environmental Learning Center was formed in the 1990s when the river cut into and started flowing through a large floodplain ditch, abandoning its historic sinuous alignment. The time sequence of aerial photos shows the historic channel alignment (green arrow), avulsion point (yellow area), and current alignment through the ditch (orange arrow).

Table 4.8a: Chart showing grades of the geomorphic metrics and indicators in the two upper study zones. Colors corresponding to metric grades are shown for each of the 99 sub-reaches. Colors corresponding to indicator grades are shown for the 18 reaches. Bar lengths are scaled to the actual length of reaches and sub-reaches. Segments affected by floodplain encroachment, bank/channel armor, and bridge or dam structures are also shown.

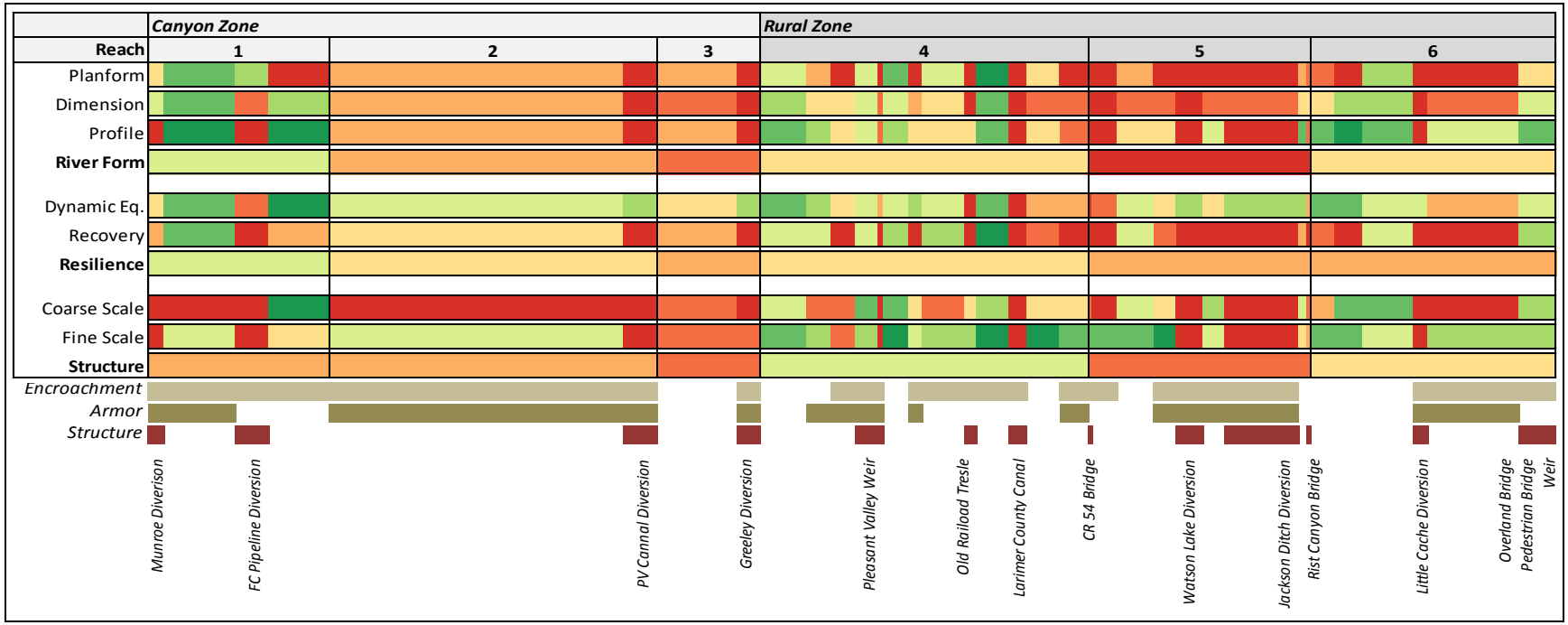
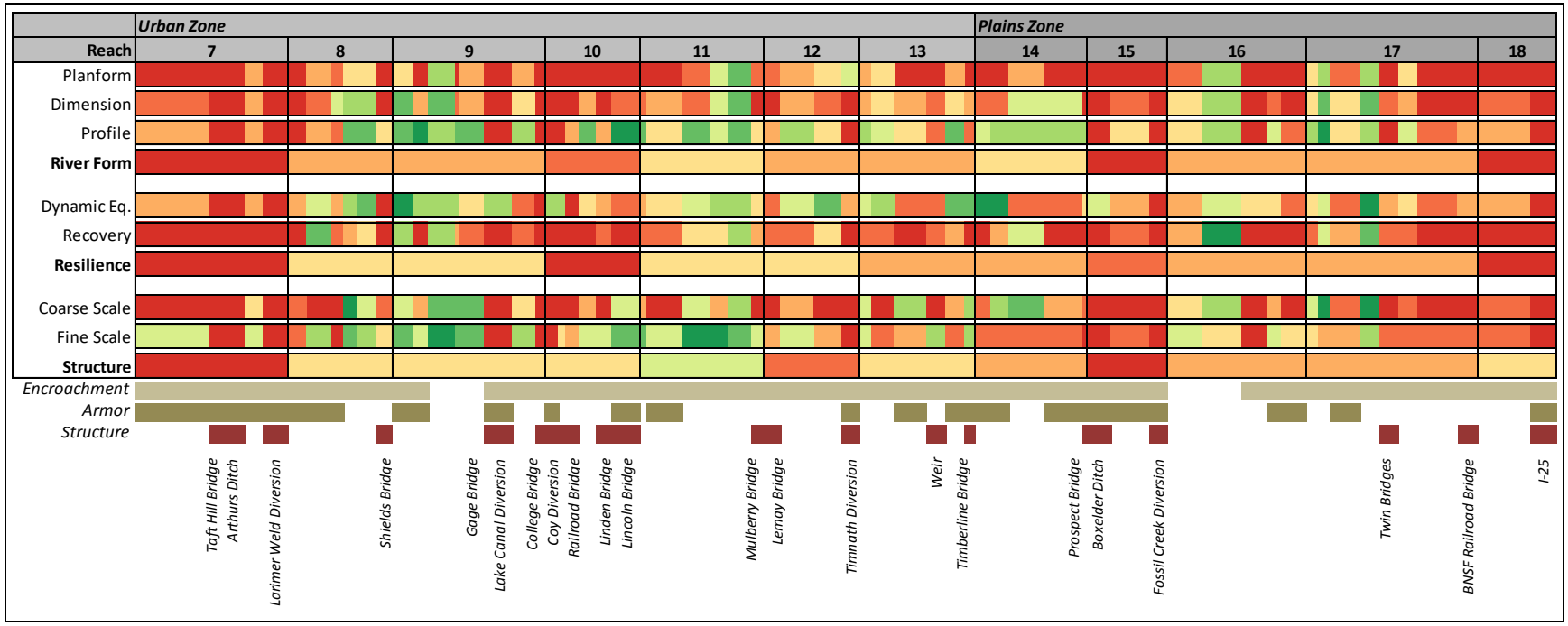


Table 4.8b: Chart showing grades of the geomorphic metrics and indicators in the two lower study zones. Colors corresponding to metric grades are shown for each of the 99 sub-reaches. Colors corresponding to indicator grades are shown for the 18 reaches. Bar lengths are scaled to the actual length of reaches and sub-reaches. Segments affected by floodplain encroachment, bank/channel armor, and bridge or dam structures are also shown.



Dimension

Dimension defines the cross-sectional size and shape of the river channels and floodplain. Dimension grades range from B to D over the 18 reaches, and sub-reach grades range from B+ to F (Tables 4.8a and b). The farthest upstream reach, from Munroe Diversion to the North Fork, scored highest, as there are few stressors directly affecting channel dimension in the geologically-confined canyon setting. Downstream of the canyon, increasing channel modification and direct impacts increase entrenchment, channel volume, and width-depth ratio to varying degrees. The lowest grades occur at channel structures such as diversion weirs, dams, and bridges where the channel is often moderately entrenched, enlarged, and either over-wide or over-deep. Berms, and elevated road grades and pedestrian trails along the river disconnect it from its floodplain, creating moderately to severely entrenched channel conditions. In most of the channelized reaches, the active channel dimension has been greatly enlarged to accommodate peak flows and floods. This means that during most of the season, low flows are spread thinly and discontinuously over wide channel bottoms.

Profile

Profile describes the longitudinal slope of the river bed. At the reach scale, grades for profile range from B to D, and sub-reach grades range from A to F- (Tables 4.8a and b). Channel profile is altered by changes to planform shape and in-channel structures. On the reaches in the Canyon zone, river sinuosity is unchanged, but many of the Rural, Urban, and Plains zone reaches have been channelized and straightened. Decreased branching and sinuosity leads to an overall increase in slope over the length of the river. Therefore, the river is steeper than it was naturally, but most of the increased gradient occurs over very short segments at the drops below diversions dams and grade control. Every diversion weir and dam acts as a grade control structure that creates a flattened bed slope upstream and a sudden steep drop below.

The lowest grades for the sub-reaches are often just above diversions. Sub-reaches with the large diversion dam structures such as the Larimer-Weld Diversion and Cache la Poudre Reservoir Inlet Canal score in the F range, indicating severe changes to profile represented by long segments of very low gradient bed slope upstream and steep drop of four to eight feet or more on the downstream side of the structure. Grade control at most of the major bridges has a similar—though less extreme—effect. The lowest-scoring reaches are reach 5 from County Road 54 to Rist Canyon Road in the Rural zone, and reach 15 from Prospect Road to Fossil Creek Reservoir Inlet Ditch on the Plains zone. Both of these reaches have multiple large diversion dams and bridges that create an artificial stepped-slope river profile.

Resilience

In the four zones resilience indicator zone grades ranged from B- to C and for the 18 reaches the grades ranged from B- to D (Table 4.9). Dynamic equilibrium is at least functional along the entire SOPR study area and half of the reaches fall in the highly functional B range. Score for the recovery metric, on the other hand, ranged from C+ to D-, and this metric drove down the overall resilience indicator score. Recovery potential was low mainly because of the reliance on artificial channel stabilization. When artificial stabilization measures do ultimately fail, it leaves the system in such a state that it has little chance of recovering to a healthy and stable state on its own.

Table 4.9: Summary of resilience indicator scores and grades organized by zones and reaches .

Zone	Canyon			Rural			Urban							Plains				
Reach	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Dynamic Equilibrium	86	82	79	81	81	80	71	79	82	75	81	81	79	77	75	77	76	72
Recovery	79	77	73	76	68	72	63	75	73	62	77	73	69	72	67	74	72	64
Resilience	82	79	76	79	75	76	67	77	78	69	79	77	74	75	71	76	74	68
	80			77			74							73				

Zone Canyon Rural Urban Plains

Dynamic equilibrium

Dynamic equilibrium is a component of stability that depends on the balance of sediment supply and river energy. Excess sediment supply or decreased energy leads to accumulation of material—a process known as aggradation. Decreased sediment supply or increased energy leads to excess scour and erosion that can cause channel incision and/or widening. In the Canyon zone, the Poudre is a threshold river which means that sediment transport capacity, a function of energy, is much greater than sediment supply. Dynamic equilibrium is not normally important for maintaining stability on these types of reaches since it is maintained by a resistant bed and banks of bedrock and boulders. Decreased grades for dynamic equilibrium on the Canyon zone reaches, therefore, reflect acute impacts to sediment transport capacity from in-line dams that cause sediment to aggrade upstream.

Downstream of the Canyon, in the Rural, Urban, and Plains zones, the Poudre was historically an alluvial river. Alluvial river channels are not held in place by naturally-resistant bed and banks—rather, the bed and banks consist of material that can be moved by the river. They naturally move and change shape due to scour and deposition processes. Dynamic equilibrium is normally very important for maintaining stability on alluvial rivers, as the balance between sediment supply and river energy is what maintains proper size and shape. Although the river was historically an alluvial channel in these zones, it is now mostly functioning as a threshold channel due to artificial channelization and stabilization. Grade control structures and bank armor are the resistant features that hold the river in place on many reaches, rather than natural geological features or dynamic equilibrium.

Grades for dynamic equilibrium on the Rural, Urban, and Plains zones generally reflect the degree to which the reach depends on artificial structure to maintain stable form. Reach grades are B- to C- and sub-reach grades range from A- to F+ (Tables 4.8a and b), reflecting the degree to which existing channel configuration maintains sediment transport in the existing flow and sediment regime without either

aggrading or degrading. Grades in the A-B range indicate reaches where the alluvial dynamic equilibrium processes are still functioning. Most reaches are in the C range, indicating the presence of moderate to severe stressors such as channel incision and/or widening that is mitigated with bank armoring and/or grade control structures.

Recovery potential

The recovery potential metric rates the ability of the river system to recover from major disturbance. The predominant factors are (1) whether the river has a sufficiently-wide floodplain and channel migration zone within which it can move and adjust unimpeded by artificial structure, and (2) whether the riparian zone is in sufficiently good condition to support rapid natural vegetation recovery. Sub-reach grades have a wider range, from A- to F- (Tables 4.8a and b). Failing grades indicate sub-reaches that depend entirely on artificial stabilization, engineered structures, or routine maintenance to maintain functional condition, and have no capacity to recover naturally if these fail. In these areas, severe infrastructure damage or safety risks are often the probable consequences of bank failure. A serviceable channel migration zone and the potential for natural channel recovery are virtually nonexistent on these segments.

Scores in the C to D range indicate some potential for recovering function after disturbance, but direct intervention would probably be needed for recovery to occur in a reasonable amount of time. These river segments have significantly diminished channel migration zones, obstructions to physical movement and adjustment, and limited vegetation cover due to a lack of local source material, dispersal barriers, impediments to establishment, or presence of exotics. Infrastructure and human safety are at risk in major events. The important factors limiting recovery potential are: encroachment onto floodplains, channel migration zones, and riparian areas by berms, development, and infrastructure. Infrastructure in the river itself such as dams and bridges are particularly influential drivers of river health and the scores for this metric specifically.

Reach-scale grades ranged from C+ to D-, however, it is important to recognize that the major impediments to recovery that result in failing grades occur on short sub-reaches in association with sub-reaches that are less impaired. Since reach scores are calculated as the weighted-average sub-reach scores, the short, high-risk segments are averaged with low-risk segments within a reach, which tempers the grade at the reach scale.

Physical structure

The physical structure indicator ranged from B- to D across the 18 reaches and averaged C to C- across the four zones (Table 4.10). Coarse-scale structure was in poorer condition on most reaches (relative to fine-scale), with grades ranging from B- to F; only one reach was in the B range. Except in two reaches in the Plains zone, fine-scale structure was always at least in the C range and almost half the reaches were in the B range.

Table 4.10: Summary of physical structure indicator scores and grades organized by zones and reaches.

Zone	Canyon			Rural			Urban							Plains				
Reach	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Coarse-scale	76	67	70	78	70	75	59	74	77	73	75	65	77	80	60	73	73	68
Fine-scale	76	80	72	85	74	83	72	80	80	81	87	74	77	72	65	74	75	69
Physical Structure	76	74	71	82	72	79	66	77	79	77	81	70	77	76	63	74	74	69
	74			78			75							72				

Coarse-scale structure

The fundamental shift in river dynamics from alluvial conditions to an artificially-stabilized threshold channel through most of the study area has significant ramifications on coarse-scale physical structure, affecting the diversity of characteristic depth-velocity combinations and physical features. The natural processes that maintain structural diversity on dynamic alluvial rivers such as lateral bend scour, bar deposition, and accumulation of large woody material are rarely present on channelized and artificially-stabilized reaches. Structural diversity on these impacted reaches depends on artificial material and engineered features. Patterns in sub-reach grades for the coarse physical structure metric, which range from A- to F- (Tables 4.8a and b), generally correlate with the degree of channelization, but acute impacts from in-channel dams and diversion weirs are also an important factor. Dams and weirs create flat slack water where sediment accumulates and scour is limited, resulting in structural homogenization at both the coarse and fine scale.

Sub-reaches with failing grades have severely homogenized structure in the form of glide habitat caused by in-line diversions. Sub-reaches scoring in the D range lack some characteristic depth-velocity combinations or structural elements at most flow levels. In most cases, structural homogenization on these segments is caused by artificial stabilization, low scour potential, and lack of large woody material in the river. Despite the widespread impacts of channelization, channel and bed armoring, in-stream structures, and impaired flow regime, some sub-reaches are less impacted and still maintain a high degree of structural diversity due to natural or artificial mechanisms. Less developed segments in between diversions in the upper part of the Rural zone have highly functional coarse physical structure grades in the B range. Even in the Urban and Plains zones at Lee Martinez Park and the ELC, for instance, some sub-reaches were graded in the B range. Reach-scale scores range from B- to F+, reflecting the average of several more diverse sub-reaches within each reach.

Fine-scale structure

Fine-scale structure grades are based primarily on streambed characteristics at a scale relevant to aquatic insects and larval fish. The predominant factor is availability of interstitial space within bed material, which may be reduced by bed armoring, embeddedness, fine sediment accumulation, or excessive algae growth which are primarily caused by a decreased frequency of flushing flows (Figure 4.12). Grades were similar to coarse-scale grades because the same types of stressors affect them both. Fine structure sub-reach grades ranged from A- to F- (Tables 4.8 a and b).

Figure 4.12: Fine sediment deposited following fires clogs spaces between the cobbles. This eliminates important habitat for aquatic insects and spawning fish (left). Team member Johannes Beeby reaches down to check the embeddedness of cobble while scoring the fine scale metric.

As with coarse-scale structure indicators, failing grades were assigned to flat sub-reaches just upstream of diversion dams and bridge constrictions that form backwater conditions at high flow. On these segments, the bed is static and armored or embedded with fine sediment or algae. There is little to no available interstitial space. Clean and unarmored sub-reaches exist throughout the study area where the river is unaffected by in-stream structures. The 2013 flood, followed by several years with above-average peak flows, may affect the interpretation of results based on field observations for this metric. Flows during these events appear to have been high enough to mobilize coarser bed material and flush fines from the majority of riffles. These observations confirm that bed mobility and bed flushing functions are still intact, to varying degrees, along most reaches of the Poudre, justifying a range of scores in the B to C range for reaches that are not highly impacted by in-stream structures or dams.

Aquatic Life

Aquatic life indicator scores ranged from B- to C, with roughly one-half of the reaches in the B range (Table 4.11). Surprisingly, three reaches in the Urban and Plains zones received higher grades for aquatic life than three of the Canyon zone reaches; however, the overall aquatic life scores from the Canyon zone were higher than the Urban zone. In the majority of stream reaches, breaks in habitat are caused by cross-channel structures severely impact the aquatic habitat connectivity grades. Habitat segmentation caused by these structures is the main cause for the depression of aquatic life scores in the Canyon zone. The lack of cross-channel structures improved habitat connectivity in the downstream portion of the Urban zone and within the Plains zone. While the ability to support a fishery is a critical

and highly valued aspect of the river, it was important to represent available data accurately without introducing additional uncertainty. Because fish sampling data are infrequent and conditions of the river can be variable, it was decided to not extrapolate fish sampling data between sampling stations for this baseline assessment. Therefore**, information and grades for native fish and trout were included in the SOPR, but they were not factored into the overall indicator score.**

Table 4.11: Summary of aquatic life indicator scores and grades organized by zones and reaches.

Zone	Canyon			Rural			Urban							Plains				
Reach	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Aquatic Insects	85	85	88	85	85	85	85	85	78	78	85	85	85	85	85	75	75	75
Habitat Connectivity	61	71	55	55	55	55	59	61	59	64	65	65	85	85	85	85	85	85
Native Fish										65			75	55		65		70
Trout	85								95									
Aquatic Life	80	81	78	76	76	76	77	78	72	74	79	79	85	85	85	78	78	78
	80			76			78							80				

Aquatic insects

Aquatic insects can be impacted by a wide range of anthropogenic activities. These organisms are particularly sensitive to changes in water quality and habitat modifications such as increases in fine sediment and algal growth. As the aquatic insect community responds to certain impacts, other aquatic life (such as fish) may also be influenced. To provide an assessment of impacts from stressors, this study considered six sub-metrics, each representing a different aspect of aquatic insect community structure and function. Index scores for the six sub-metrics at the 13 sample stations are shown in Table 4.12, along with the aquatic insect grades for each stream reach. Index scores are measured on a scale of 0 to 100; however, **these values do not do not relate to the academic grading scale**. Index scores are translated into health grades in a separate step.

Stream reaches with high aquatic insect grades generally supported a well-balanced and diverse insect community that included a variety of sensitive taxa. Aquatic insect grades ranged from B+ to C throughout the study area, and most reaches scored in the B range (Table 4.12). The highest grades (A- to B+) were assigned to the Canyon zone (and upstream), and these scores were an indication that the aquatic conditions support a healthy benthic macroinvertebrate community. The lowest scores were produced in reaches 9 and 10 in the Urban zone (78) and reaches 16-18 in the Plains zone (75). Although these scores were somewhat lower than the rest of the study area, results from the six sub-metrics suggest that aquatic conditions support adequate community structure, including some taxa that are considered sensitive to stress. An evaluation of each sub-metric has been included to provide a more thorough evaluation of the macroinvertebrate communities in each sampling reach.

Table 4.12: Index scores (MMI) for the six sub-metrics aquatic insect at the 13 sample stations along with the grades for each reach. A map of these sampling locations is presented in Appendix C).

Zone	Upstream			Canyon			Rural			Urban							Plains				
Reach	N/A			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Sample Station	PRMB	PRLSF	PRabvMD	PRabvNF	PRbNF	PRbPWC	PRbBSC		PRaLP		PRabvSSB	PRaLM		PLIWC			PROS		PBOX		
EPTaxa	100	100	100	100	100	100	100		100		100	100		100			92		81		
% Chironomidae	88	73	81	89	80	81	72		67		71	48		62			70		55		
% Sensitive Families	16	34	49	32	46	46	46		21		44	11		81			47		19		
Predator/Shredder Taxa	71	79	86	93	64	71	71		64		71	71		50			57		36		
Clinger Taxa	100	100	100	100	100	100	100		100		100	100		100			100		100		
% Non-Insect Taxa	44	71	69	62	59	67	78		76		63	59		41			70		56		
MMI	70	76	81	79	75	78	69		71		75	63		72			73		58		
Aquatic Insects Metric Score	85	85	92	88	85	88	85	85	85	85	85	78	78	85	85	85	85	85	75	75	75
	N/A			80			76			78							80				

EP Taxa *(Mayflies and stoneflies)*

The EP Taxa metric measures community richness based on the presence or absence of Ephemeroptera and Plecoptera (mayfly and stonefly, respectively) taxa, two insect orders that are sensitive to a variety of human-induced changes in water quality and habitat (Figure 4.13). All of the sites in the Canyon, Rural, and Urban zones received a score of 100 from this sub-metric suggesting that mayfly and stonefly taxa were well-represented at each sampling station (Table 4.12) A decrease in sensitive taxa was observed in the Plains zone which may have been an indication that impacts were increasing downstream from Prospect Avenue; however, the decrease in EP Taxa scores exhibited at sites PROS and PBOX were relatively minor and a variety of other sensitive taxa continued to exist at these sites in the Plains zone.

Figure 4.13: A common species of stonefly (*Claassenia sabulosa)*, represented one of the sensitive taxa measured with the EP Taxa sub-metric within the Cache la Poudre River.

Percent Chironomidae *(non-biting midges)*

The Percent Chironomidae sub-metric measures the relative abundance of the family Chironomidae (non-biting midges). Chironomidae are typically considered more tolerant to changes in aquatic conditions than other insect taxa, so changes in the proportion of Chironomidae can be a good indicator of stress. The Percent Chironomidae sub-metric is sensitive to a variety of potential stressors including increased nutrients. Scores from this metric were somewhat variable within the study area; however, there appeared to be a slight increase in stress (represented by lower scores) at most sites in the Rural, Urban, and Plains zones. The highest proportion of non-biting midges were found at the farthest downstream site (PBOX) in the Plains zone which produced the lowest Percent Chironomidae score (55). As with the EP Taxa sub-metric, these results suggest that macroinvertebrate communities have been somewhat disturbed in areas of the river near urban areas.

Sensitive Plains Families

The Sensitive Plains Families sub-metric was designed by the CDPHE specifically for Colorado plains streams. It is a general measure of aquatic condition based on the presence or absence of key taxa that are known to occur in lower elevation Colorado streams (Figure 4.14). Results from this sub-metric produced scores ranging from 11 at site PRaLM to 81 at site PLINC – both stations are in the Urban zone. This sub-metric is a CDPHE regulatory requirement; however, it is possibly biased at high elevations since the natural range of many of the indicator taxa does not extend beyond the plains. Because of these limitations, the low scores produced at higher elevation sites may not be indicative of poor aquatic conditions. On the other hand, the lower scores for the Sensitive Plains Families in the Urban and Plains zones probably detect real health impairment caused by land use and management.

Figure 4.14: A mayfly (*Leptophlebia cupida*) that is a representative from one of the Sensitive Plains Families (Leptophlebiidae).

Predator and Shredder taxa

The Predator/Shredder Taxa sub-metric measures the abundance of taxa in the predator and shredder feeding (food acquisition) groups. Both predators and shredders are moderately sensitive to ecological disturbances that alter the availability of food in the stream. Results from this sub-metric provide evidence of high numbers (represented by higher scores) of these sensitive taxa within most of the study area with decreasing scores in the lower reaches of the Urban zone and throughout the Plains zone. Like the other sub-metrics, the decrease in the number of predators and shredders within the Urban and Plains zones provides additional evidence that stress has increased in these downstream reaches.

Clinger Taxa

The Clinger Taxa sub-metric measures the number of insect taxa that cling to clean substrate surfaces in riffle habitat (Figure 4.15). These taxa are often reduced when the natural substrate material becomes embedded or covered by fine sediment or algae. All the sample sites in the study area produced the highest possible score for this sub-metric (100) which showed that clingers are well-represented throughout the entire study area, even in regions that may be susceptible to urban or agricultural runoff.

Figure 4.15: This species of caddisfly (*Brachycentrus americanus*) is an example of a Clinger Taxa.

Percent Non-Insect Taxa

Insects are generally more sensitive to changes in water quality or habitat alterations than non-insects (such as snails, worms, mites, etc.), therefore high proportions of non-insect taxa in benthic communities can be another indicator of stress. Results from this sub-metric showed that the proportions of non-insect taxa were somewhat variable in the study area and the lowest proportions of

these taxa (represented by higher scores) were produced at the two sites within the Rural zone. Despite its location upstream the SOPR study area and above most known sources of stress, site PRbRB produced one of the lowest non-insect taxa scores (44) (Table 4.12). The macroinvertebrate community at this location contained a high proportion of aquatic worms belonging to the family Naididae, a group known to be tolerant to nutrients as well as a variety of other aquatic disturbances. It is possible that the high proportion of worms at this site was a response perturbations occurring upstream near the community of Rustic, Colorado. Elevated numbers of Non-Insect Taxa were also observed at site PLINC; however, scores from this sub-metric improved farther downstream in the Plains zone.

Aquatic habitat connectivity

As described previously, the many cross-channel structures present in the SOPR study area severely fragment the aquatic habitat. The longest section of unobstructed flow is about 11 miles. This reach lies between the Timnath Reservoir Inlet Diversion and Greeley Canal No.3 Diversion. With 16 diversion dams in the study area, the majority of reaches scored a D or lower indicating that most unobstructed reaches are less than two miles long. Reaches within the Rural zone scored lowest, with diversion dams blocking fish passage occurring nearly every mile (see Figure 3.1).

Native fish

At least 20 (and likely more) native fish species historically occupied the Urban and Plains zones of the Poudre River (Colorado Parks and Wildlife, Aquatic Research Station, 2016). The loss of more than half the local species over the past 50 or so years is alarming (Figure 4.16). At least four species have not been captured since the mid- to late-20th century and are thought to be locally extirpated. These are the central stoneroller, common shiner, northern plains killifish, and bigmouth shiner. The orange spotted sunfish, red shiner, and brassy minnow have not been observed on the Poudre upstream of I-25 since 2003, 2005, and 2010, respectively, while the creek chub is becoming increasingly rare.

Figure 4.16: The number of native fish species in the Poudre River has steadily declined over time.

In 2015, ten native fish species were captured across the five sampling stations, including creek chub, fathead minnow, Johnny darter, longnose sucker, longnose dace, plains topminnow, sand shiner, and white sucker (Figure 4.17). The plains topminnow has special status in Colorado, where it is listed as a Tier 1 species of greatest conservation need in CPW's State Wildlife Action Plan (Colorado Parks and Wildlife, 2015). Flathead minnow, longnose sucker, and white sucker were captured at all five stations. Longnose dace and green sunfish were found at four of the five stations, Johnny darter at three, plains topminnow and sand shiner at two, and creek chub at just one.

Figure 4.17: The Johnny darter is a small-bodied plains fish that is still present in the Fort Collins reach of the Poudre.

The native fish metric is based on the number of native species still present in sustainable populations, measured as the number of species and number of life stages captured in samples. The number of species, life stages, and corresponding metric grades are shown in Table 4.13. Five reaches were sampled in the Plains and Urban zones, and the number of species present ranged from four to eight, with multiple life stages represented for only about half the species at each site. Consequently, grades ranged from C to F.

Table 4.13: Native fish indicator scores in five reaches of the Poudre River.

Zone	Canyon			Rural			Urban							Plains				
Reach	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Sample Station										P1			C1	P2		P3		P4
Number of Species										6			8	4		6		7
Life Stages										half			half	half		half		half
Native Fish										65			75	55		65		70

The disappearance of native fish parallels fundamental changes in the river system and is, therefore, a powerful indicator of the degree of biological impairment. The most likely stressors contributing to this negative trend in species diversity are de-watering (impaired base flow regime), habitat fragmentation from man-made barriers to fish migration (*i.e.,* aquatic habitat connectivity impairment), decreased habitat complexity (*i.e.,* physical structure impairment), altered temperature regime (*i.e.,* water quality impairment), and competition with non-native species. Even temporary degradation of habitat conditions can have permanent or long-term effects on native fish because when a reach becomes uninhabitable, even for a short time, it is often improbable or impossible for them to return owing to the numerous fish migration barriers.

Native fish diversity tends to be correlated with local habitat complexity; however, there is a larger landscape-scale trend of extirpation. Fish species are disappearing from the river altogether as their longitudinal range shrinks. The red shiner and bigmouth shiner were previously detected in the Plains zone, but are now found only east of I-25. In addition to the species already extirpated from the study area, the plains topminnow's range appears to be contracting upstream since it was found only at the two most upstream sampling stations. The sand shiner was found only at the two downstream stations, and its range appears to be contracting downstream.

Trout

Brown trout are not native to the Poudre River, but the species has become dominant on most Colorado Front Range rivers including the Poudre. It is a valued game fish and also a common biological indicator of aquatic habitat conditions. Trout populations were sampled at two stations in the study area in 2015, and data were used to grade the trout metric for the two reaches represented (Figure 4.18).

The uppermost reach of the Canyon zone, between Munroe Diversion and the North Fork was graded B for brown trout. Multiple-age classes and a high-biomass estimate indicate a naturally-sustaining population with high biomass. While there are high densities of brown trout, a large proportion of them are below quality-size (*i.e.,* less than nine inches), in the six - nine inch range and with a below-average relative weight. These characteristics brought down the overall reach score. Population estimate data suggests 436 brown trout per mile greater that are quality-size or greater. This is considered a moderate or mediocre recreational fishery.

Figure 4.18: Brown trout thrives in much of the study area (photograph courtesy of Colorado Parks and Wildlife).

The reach between Shields Street and College Avenue in the Urban zone was graded A, due to age class diversity as well as high biomass and population estimates. Multiple age classes, high recruitment level, and high numbers of adult fish indicate a well-supported and natural- sustaining trout population. Population estimates suggest 625 quality-size fish per mile and biomass; this exceeds "gold medal" standards for trout, indicating a viable recreational fishery and good support of faunal food webs (Figure 4.19). Results for the six sub-metrics are detailed in Table 4.14.

Table 4.14: Trout indicator scores in two reaches of the Poudre River.

Zone	Canyon	Urban
Reach	**1. Munroe to North Fork**	**9. Shields to College**
Sample Station	Gateway Park	Lee Martinez Park
Age classes	> 4 age classes	> 4 age classes
Recruitment	Low (600 age-0 trout/mile)	High (1100 age-0 trout/mile)
Recreation potential	Moderate (360 quality trout/mile)	High (590 quality trout/mile)
Relative weight	Below average (0.86)	Average (0.94)
Biomass	69 lb/acre	73 lb/acre
Population number	High 1430 stock size trout/mile	High 792 stock size trout/mile
Trout Metric	**85**	**95**

Trout populations are sensitive to a suite of stressors. Common factors limiting trout populations on the Poudre include poor coarse physical habitat diversity, water quality (especially temperature regime and dissolved oxygen), critically low flows during summer and winter, seasonal dry-ups, and migration barriers. Healthy, naturally-sustaining trout populations (at least for the short term) indicate that none of these factors are currently critical on the two reaches that were sampled. The exceptional trout population in the Urban zone in 2015 is partially due to several years in a row of higher-than average flow. A self-sustaining population of trout on this historically warm-water reach, combined with the evidence of declining native warm-water fish species, suggests that the current water temperature regime is cooler than it was historically, but it is difficult to tease apart all the factors affecting temperature and fish populations.

Figure 4.19: Osprey live and hunt along the Poudre River and rely on fish and a central food source.

5 River health scores and key issues by zone

5.1 Overview of Poudre River health

Land-use changes in the Poudre River corridor have been pervasive since European settlement in the middle 1800's. The once-broad and complex river-riparian corridor on the plains has been dramatically narrowed and simplified. We will never know exactly what the Poudre looked like before these lands were settled (Figure 5.1). Even by the time the town of Fort Collins was established around 1870, more than a decade of farming and ranching had occurred in the area, and nearly 30 years before that, the fur trade had essentially extirpated beavers from the region. Today, no part of the river system remains untouched. The river is channelized, confined, and armored for much of its length, and flows are heavily managed to meet water-use needs. Much of the historic riparian zone and floodplain has been developed or converted to other land uses.

Figure 5.1: *On the Cache la Poudre River*, painted by Worthington Whittredge in 1876, is the earliest depiction of the Poudre River on the plains that we have. Farming and ranching land uses had already been established for decades by this time, and the river and riparian zone appear to be already impacted through clearing of the understory. Conversely the canopy was sparser historically, as this painting depicts the river before exotic trees such as crack willow invaded and crowed the canopy.

And yet, all things considered, the Poudre is still a relatively healthy and resilient river. Overall, this assessment gives it a C rating, meaning that it is functionally healthy. The river still supports the basic

natural river and riparian functions—even through the Urban zone—despite a suite of ecological stressors that affect all aspects of river health.

The SOPR is a baseline against which the City can measure progress towards its vision of "…*sustaining a healthy and resilient Cache la Poudre River"*. The health assessment scores (Section 4) reveal the ramifications that stressors (described in Section 3) have on ecosystem condition and the degree of impairment observed in each zone and reach. Here in Section 5, the focus shifts to an overview of river health, describing the link between stressors and impairment for each of the four zones. Poudre River health indicator grades for each zone are compared to the ranges recommended by river experts and resource managers—as described in the Poudre RHAF—to highlight best and the most impaired aspects of river health. This section also includes an analysis of the causes of impairment and reveals which problems may be practically solved.

Patterns of land and water use vary across the four zones, but the most influential stressors are consistent throughout the study area. To provide a succinct summary of key issues that affect modern-day river health, Table 5.1 provides a matrix illustrating the relative contribution of each stressor on each indicator. The City has influence over some of these stressors—and therefore an opportunity to improve river conditions—and less or no influence over others. This section describes the general approaches the City could take towards improving river health based on a summary of conditions for each of the four zones. This report, however, does not make recommendations for specific projects or actions to manage factors that contribute to river health, as these decisions must involve the broader set of stakeholders.

For this chapter, the summaries of river health by zone are organized generally by indicators or groups of indicators that are related (for example, floodplain extent and the riparian condition indicators can be discussed together.

Table 5.1: Matrix that relates the causes of impairment (stressors) on the vertical axis with the degree of impairment (indicator scores) on the horizontal axis. The degree of impairment is based on a high, medium, and low scale (dark grey to light grey, respectively).

Poudre River Stressor Matrix										
Stressors	Flow Regime	Sediment Regime	Water Quality	Floodplain Connectivity	Riparian Condition	River Form	Resilience	Physical Structure	Aquatic Life	River Health
Diversions (withdrawals)										
Transbasin diversions (augmentation)										
Large dams/reservoirs										
Wildfire/burn scars										
Channel erosion										
Impervious surfaces/urban stormwater runoff										
Irrigation runoff/return flows										
Wastewater effluent										
Buildings and roads										
Rural/agricultural land use										
Open space and parks										
Gravel pit/ponds										
River crossings										
Berms/channelization										
Bank/channel armor										
Channel structures										
Woody material recruitment/removal										
Exotic plant species/weeds										

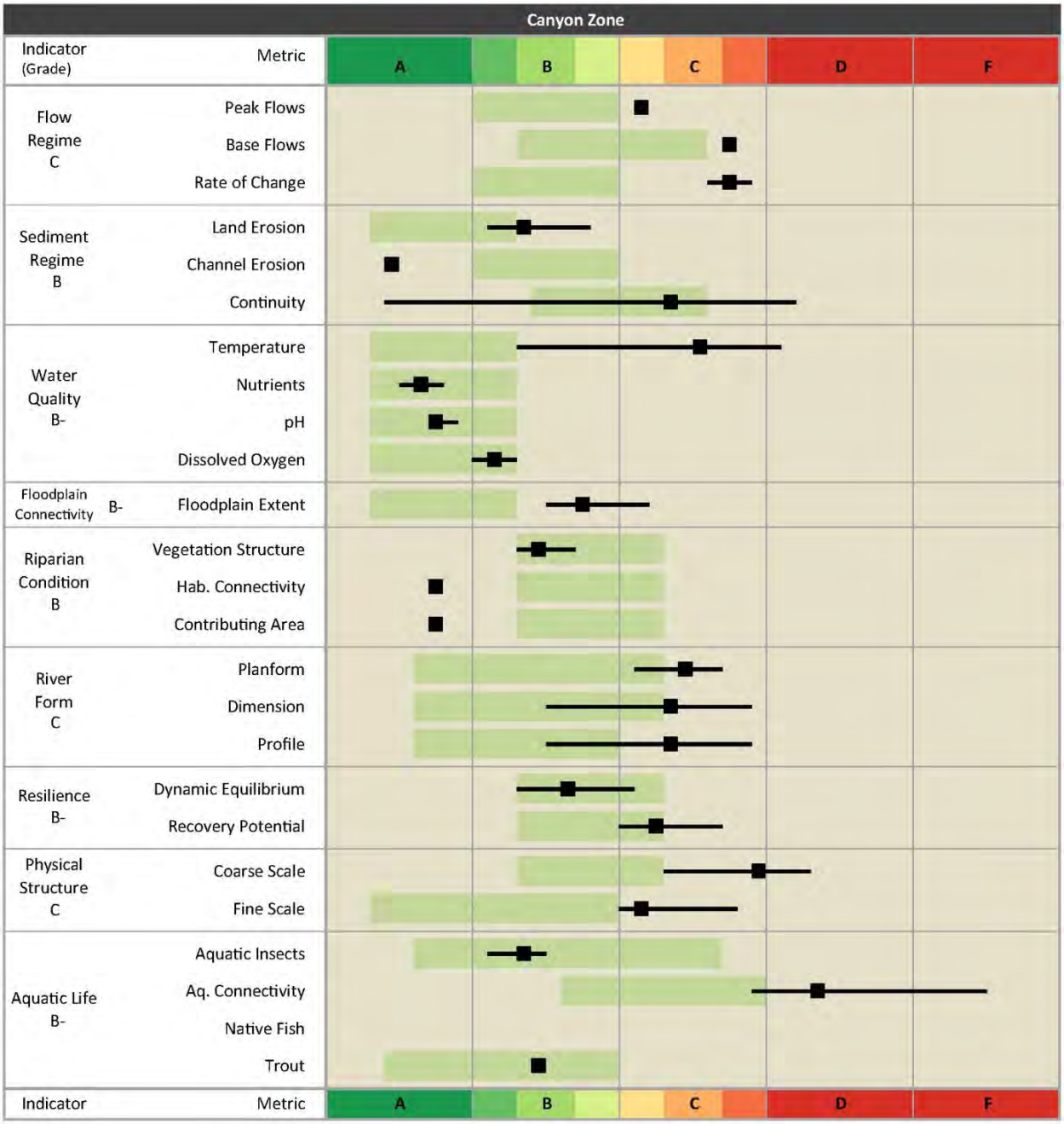
High	Med	Low

5.2 Canyon zone

Figure 5.2: In the Canyon zone, the river is bounded by a narrow floodplain and confined between steep canyon walls, rocky hills and/or the CO Highway 14.

Geology governs the character of the Canyon zone. Relatively steep and straight, the river is bounded by a narrow floodplain and riparian corridor that is confined between steep canyon walls and rocky hills (Figure 5.2). The influence of peak flows on the floodplain is therefore limited, and naturally-resistant rock banks are insensitive to the rushing waters. A narrow band of riparian vegetation provides wildlife habitat and a critical migration corridor. The forested watershed is mostly undeveloped, and to a large extent, its natural hydrologic, geomorphic, and biogeochemical processes are intact, providing support for river health (Table 5.2).

Table 5.2: Metric grades in relation to recommended ranges for the Canyon zone. Recommended ranges (green bars) represent expert opinion for reasonable and practical potential metric grades given existing land and water-use constraints. Points (square black boxes) present the average grade for the given metric for this zone. The black lines show the range of results across the reaches within this zone.



Flow regime scores are below recommended ranges for all three metrics on the Canyon zone, suggesting some room for improvement in peak flow, base flow, and rate of change, albeit the concerns are less than the downstream zones. Cumulative impacts from within the watershed and various dams are responsible for some of the alterations to flow regime, but flows are most directly impacted by

diversions that occur within this zone. The scores for all three metrics are closely linked to the magnitude and timing of diversions, storage, and releases.

The overwhelming sediment regime stressors are the large dams that interrupt sediment continuity, so scores for the continuity metric fall below the recommended range downstream of the North Fork confluence. The land-erosion metric scored slightly below the recommended range due to the impacts from recent fires, and this score will improve as the burn scars revegetate. In addition, the Coalition for the Poudre River Watershed and several stakeholder groups, including the City of Fort Collins Utilities, have developed an Upper Poudre Resilience Watershed Plan. The purpose of the plan is to improve watershed resilience through watershed restoration activities aimed to reduce risk of future wildfires and post-fire erosion (Figure 5.3).

Figure 5.3: Post-fire land erosion causing a major debris flow into the Poudre near the upper Landing Campground.

The channel erosion metric for the sediment indicator was above the recommended range. In the Canyon zone channel erosion is altered by riprap banks along Highway 14. However, sediment supply from bank erosion would naturally be limited in this confined canyon setting.

Water quality

Nutrient, pH, and dissolved oxygen scores in the Canyon zone fell within recommended ranges. Water temperature is within range upstream of the North Fork confluence, but fell to D+ immediately downstream due to seasonal regulatory standards exceedances. The D+ grade may overestimate the degree of temperature impairment, however, since exceedances are rare and limited to shoulder seasons (see Section 4, water quality subsection). The City's monitoring data do confirm that temperatures on the North Fork are generally warmer than the mainstem between April and November, however. This may be because the North Fork basin is a naturally warmer habitat, or it could be an effect of Seaman Reservoir. The direct influence of Seaman Reservoir on water temperatures is not straightforward. A review of temperature data collected through the City of Fort Collins cooperative monitoring program shows that the reservoir can have both warming or cooling effects on the North Fork, most likely depending on the timing, volume, and nature of reservoir releases. Whether releases are made from the spillway or bottom outlet is of particular importance. The somewhat warmer temperatures downstream of the confluence likely result from combination of natural and anthropogenic factors.

River channel *(river form, resilience and physical structure indicators)*

Most of the physical geomorphic metric scores in the Canyon zone are below recommended ranges, suggesting the potential for improvement, but this may be misleading since early estimates for these metrics in the original RHAF underestimated the degree of impairment to floodplain connectivity, river form, resilience, and physical structure. The original estimates of current condition presented in the RHAF for these metrics are in the A to B range, but measured results are from B- to C. Localized impacts at diversion dams and bridges account for some of the physical river channel impairment, but the primary cause is Highway 14, which runs up the narrow canyon parallel to the river. Portions of the road are built on fill that encroaches on the already-limited floodplain area. Areas where road fill impinges on the river are physically stabilized using bank armor, which itself is a source of impairment to physical structure. Armored reaches have proven resistant to damage from floods, but considerable damage would occur and there would be limited potential for unassisted recovery if or when these banks do fail.

Riparian corridor *(floodplain connectivity and riparian condition indicators)*

The Canyon zone was graded B for riparian condition and floodplain connectivity, reflecting the highly functioning nature of the streamside habitat. All of the riparian condition metrics were at or above recommended ranges. The recommended range for floodplain connectivity from A to B+ is greater than the observed grades (B to C+) indicating that the effects of Highway 14 encroachment and diversion dams are greater than previously estimated. Highway 14 is the sole source of impairment to riparian zone health on most of the canyon reaches, and scores generally correlate with the degree to which the highway encroaches on the floodplain and riparian zone. Outside of the influence of the road, such as on the opposite bank of the river, riparian zone habitat is essentially in natural condition. Most of the reach is managed for natural habitat and other than the highway, there are few artificial barriers to the movement of organisms through and between riparian habitats. As with habitat connectivity, the

contributing area surrounding the Canyon zone is in very good condition and managed primarily as wildland by federal, state, city, and county agencies.

Aquatic life

The aquatic insect indicator results provide strong evidence of healthy and functional aquatic fauna communities in the Canyon zone. While grades ranged from B to B+, individual metric values were well within the recommended ranges, and scores for all three sampling sites were among the highest within the study area. High scores for the EP taxa and clinger taxa sub-metrics show that the zone supports insect taxa that are considered sensitive to a variety of perturbations. The only evidence of minor stress in this zone was provided by the percent of non-biting midges (Chironomidae) and non-insect taxa that known to be more tolerant of poor water quality. The zone also supports a relatively healthy trout population and a viable trout fishery, at least on the sampled reach above the North Fork. However, aquatic habitat connectivity is severely limited in the zone due to the frequency of major structural barriers with metric grades from C- to F. The recommended range for this metric (B to C-) would be realistic only if instream barriers could be removed or reconfigured.

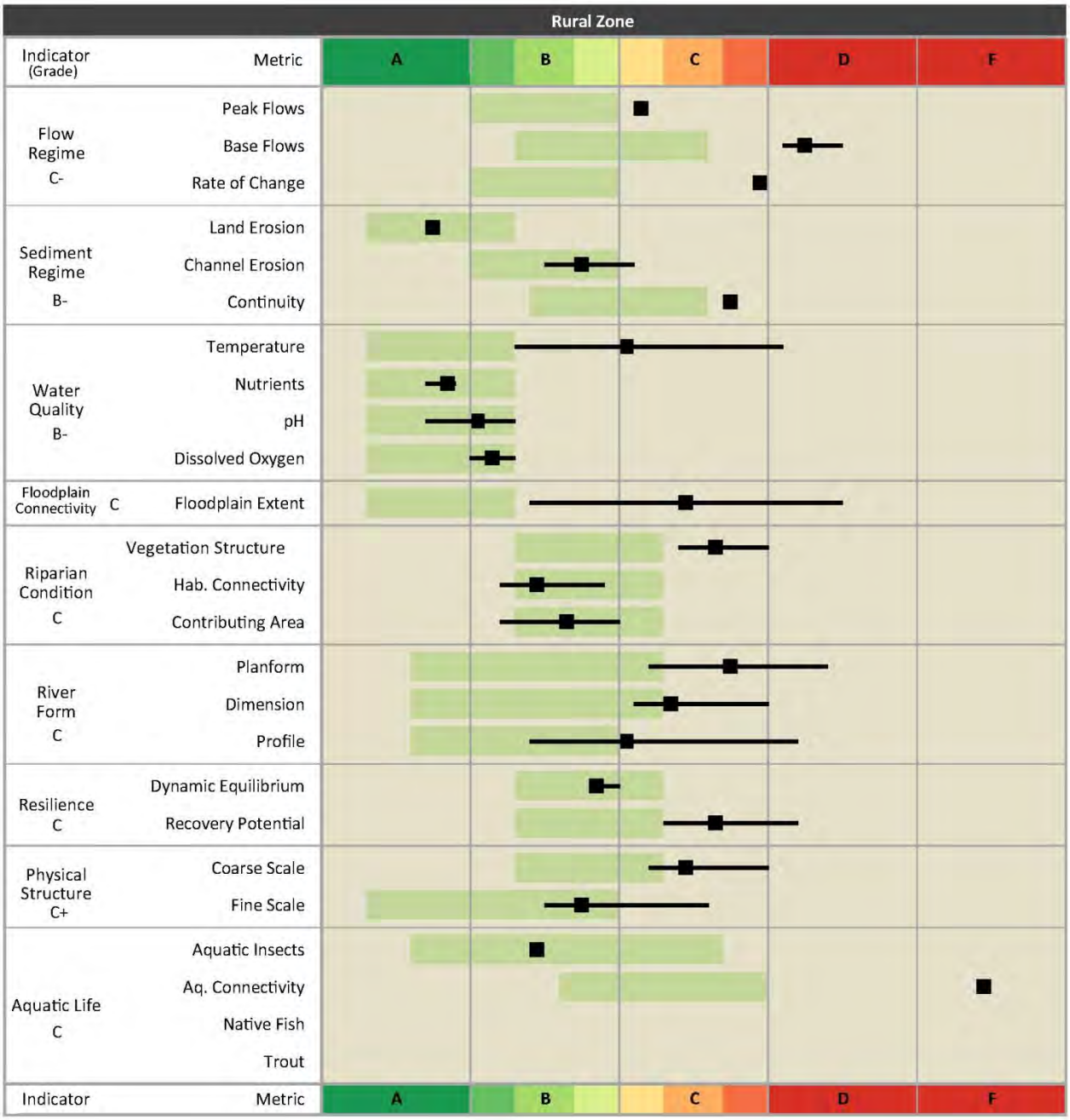
Figure 5.3: In the Canyon zone the confluence of the North Fork (the largest tributary in the canyon) into the main stem at Gateway Natural Area influences water quality parameters and therrefor habitat foraquatic wildlife.

5.3 Rural zone

Figure 5.4: As the river exits the canyon, the gradient begins to slacken, and the native river type shifts to a meandering channel that maintains form and structure through dynamic equilibrium between erosion and sediment supply.

The Poudre transitions from a confined to an unconfined river in the Rural zone, which is a fundamental shift in geomorphic river type (Figure 5.4). In the unconfined reaches downstream of the canyon, the floodplain and riparian zones become critical drivers of river health. Lacking resistant geology, a functional floodplain would be able to dissipate flood waters and their potentially destructive energies. Riparian vegetation provides roughness, which slows flows while lending structural integrity to river banks, serving as important wildlife habitat, and acting as the source of organic material that forms the base of the aquatic food chain. The gradient begins to slacken in this zone, and the native river type shifts to a meandering channel that maintains form and structure through dynamic equilibrium between erosion and sediment supply Figure 5.4). The Rural zone is still classified as cold-water river, with water temperature standards based on the requirements for supporting trout. The Rural zone is where land use shifts from wildland to rural development, and agriculture, eventually phasing into urban development (Table 5.3).

Table 5.3: Metric grades in relation to recommended ranges for the Rural zone. Recommended ranges (green bars) represent expert opinion for reasonable and practical potential metric grades given existing land and water-use constraints. Points (square black boxes) present the average grade for the given metric for this zone. The black lines show the range of results across the reaches within this zone.



Flow and sediment

All the flow regime metrics scored well below recommended ranges in the Rural zone, with diversions being the greatest cause of impairment. The effects of large reservoirs on reduced peak flows may still be a factor on these reaches, but the direct effects of water management have the greatest influence on flow regime scores. The base flow and rate of change metrics are much more impaired than peak flows. Recommended ranges for these metrics of B to C and B+ to B-, respectively, may not be obtainable unless there is willing collaboration and agreements can be made to manage water diversions differently. The cumulative effect of numerous diversions reduce, peak flows with in this zone. Similarly, base flows are also effected with the Greeley Filter Plant, Little Cache, and Watson Lake diversions all known to cause winter dry-ups. Some flow augmentation at the Hansen Supply Canal can partially offset the withdrawals but the acute impacts to base flow and rate of change are dependent on the timing of these diversions and releases.

The sediment regime indictor scored a B- in the Rural zone. Land erosion grades fell within the recommended range as impacts from the wildfires diminish moving downstream. The channel erosion metric dropped below the recommend range to a C+ below Rist Canyon Road. Bank armoring within this reach is limiting natural bank erosion processes which contribute to sediment supply imbalance. This altered sediment supply can also create accelerated bank erosion in areas without riprap due to the river's increased capacity to transport sediment. Sediment continuity grades fell below the recommended range in this zone reflecting the lingering impacts from the dams in the contributing watershed and, to a lesser degree, the smaller in-line dams within the zone.

Water quality

Water quality in the Rural zone is similar to that of the Canyon zone, with nutrient, pH, and dissolved oxygen grades within recommended ranges and temperature falling short. The reaches that score low for temperature are in the upper portion of the zone, and the degree and causes of impairment are similar to the reaches in the Canyon zone. Temperature grades increase rapidly through the zone. The sudden improvement is due to the fact that the lower reaches in this zone do not exceed temperature standards. This may be due, in part, to the introduction of cold water effluent from Horsetooth Reservoir via the Hansen Supply Canal. While these inflows may offset some of the warming observed in the Canyon zone downstream of the North Fork, the cooler stream temperatures may affect assemblages of fish and other aquatic organisms, both locally and downstream. However there are no fish data for the study period (2015/2016) in this zone and the relatively high aquatic insect scores reflect thresholds set for cooler waters.

River channel *(river form, resilience and physical structure indicators)*

Channelization, berms, armor, diversion dam structures, and bridges have a strong negative influence on floodplain connectivity, river form, resilience, and physical structure through the Rural zone. The effects of these stressors are very localized, but they are so widespread that most of the river channel indicators show impairment through the zone. A few segments, however, display a more natural form

and variation where the river has not been contained or confined. In these segments, natural floodplains still exist and the river is not as constrained or entrenched, though nowhere are they wide enough to meet the target range for the metric. Consequently, the river has been able to adjust its form to changing sediment and flow regimes and maintain a more natural form that is appropriate for the landscape position. As a result, net dynamic equilibrium scores are within the recommended range. The recovery potential metric scored well below the recommended range, however. Dams, bridges, berms, armored banks, and other confining structures on the reach increase the risk of damage and severely limit the river's ability to recover from large to moderate flood events.

Coarse-scale structure, such as overhanging banks and a mosaic of complex aquatic habitat, has suffered in the Rural zone with the installation of bank armoring and other active channel modifications. Even though some of the better pool-riffle sequencing was found in this zone, it is still lacking in pool habitat and structural diversity. The Rural zone scored best for fine-scale physical structure because of the recent occurrence of flushing flows on bed mobility, and most of the reaches are within the target range for this metric.

Riparian corridor *(floodplain connectivity and riparian condition indicators)*

Floodplain extent is well below the range recommended for river health in the Rural zone, and this is mostly the result of channelization, berms, and other direct physical impacts. Low-impact land uses dominate the historical floodplain area and SOPR riparian zone (defined as the corridor 100m from either bank). Today's riparian zone is largely functional owing to the lack of widespread or intensive development and relatively low presence of problematic woody species. Overall, riparian condition in the Rural zone rated a C. This grade accurately reflects the functional ability of the riparian habitats to support river health, and, in turn, the ability of the rural landscape to support somewhat healthy riparian habitat, while acknowledging that land use and land cover changes have substantially altered the form, structure, functioning and ecological integrity of the riparian habitats. The vegetation structure and complexity metric was the only riparian metric below the recommended range. The lower-than-desirable grade stems from the fact that much of the riparian zone vegetation has been cleared for agriculture or is no longer hydrologically connected to the river. Two large gravel ponds also severely impair riparian condition on one of the reaches. Sections of roadway affect small portions of the riparian zone, and in the town of Laporte, residential development and Cache la Poudre schools intrude into the riparian zone. The Watson Lake Fish Hatchery is another significant development limiting the riparian zone function.

The habitat connectivity scores are generally good throughout the Rural zone. Each reach had some disruption in the continuity of riparian habitat, such as intrusion of roads, or urban development. The most widespread impact on habitat connectivity is forest clearing for agriculture. Cleared areas still allow passage of most organisms, but cleared habitats are more difficult or dangerous for many organisms to cross, exposing them to an increased risk of predation or heat stress, for example. The contributing area metric indicates that the land use beyond the riparian zone is generally supportive of river health. Widespread light agriculture and small areas of intensive agriculture impair some of the

ability of these areas to support river health, but nevertheless most of the contributing area is vegetated and only sparsely developed.

Aquatic life

Aquatic insect grades indicate that the level of stress to aquatic life may have increased slightly in the Rural zone based on minor shifts in the aquatic insect community compared to the Canyon zone. The zone received a C grade which is slightly lower than the grade in the Canyon zone. The EP and clinger taxa sub-metrics reflect healthy aquatic conditions through the zone, however. The number of sensitive taxa remained high in the Rural zone, while the proportion of some aquatic organisms that are considered tolerant to anthropogenic stressors increased slightly. These findings are likely in part the result of increases in agriculture in the surrounding area.

The Rural zone was not directly sampled for fish populations in 2015 so no grades are presented for this zone; however, it has been frequently sampled in the past. Despite the presence of localized habitat features that can influence trout populations within short sections of river, the overall population can be estimated based on prior sampling, as well as upstream and downstream sample points. These extrapolations suggest that in general the Rural zone supports a thriving trout fishery.

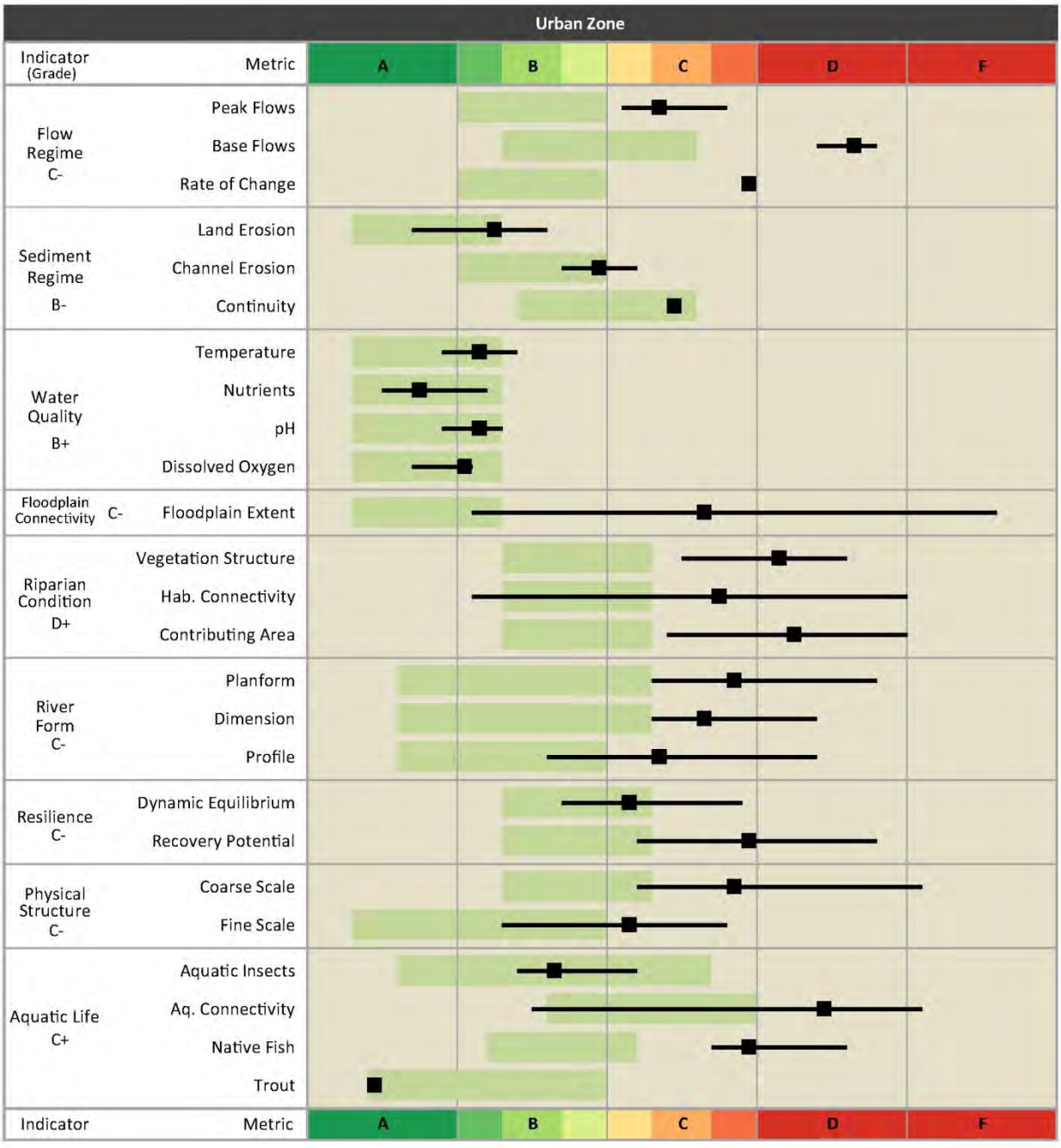
Figure 5.5: In contrast to the foot-long brown trout, the small-bodied longnose dace is one of the few native plains fish that can also survive in slightly cooler waters. It lives in the Poudre all the way up to Gateway.

5.4 Urban zone

As the river courses into and through town, its gradient slackens further and the Poudre begins its transition towards becoming a warm-water river (Figure 5.6). In this zone, the river's natural form would have been multiple channels interwoven into a braided pattern, running through an expansive and unconfined floodplain. Riparian vegetation would have formed a complex mosaic of habitats, providing critical support to river functions and health. Floods and disturbance were historically common and would have shaped most ecosystem processes (Table 5.4).

Figure 5.6: The river takes a narrow course through the heart of the Urban zone where the Linden Street crosses the River.

Table 5.4: Metric grades in relation to recommended ranges for the Urban zone. Recommended ranges (green bars) represent expert opinion for reasonable and practical potential metric grades given existing land and water-use constraints. Points (square black boxes) present the average grade for the given metric for this zone. The black lines show the range of results across the reaches within this zone.



Flow and sediment

The pattern of flow regime impairment in the Urban zone is similar to the Rural zone, but alterations are more pronounced because the diversions and flow reductions are cumulative. Peak flow, base flow, and rate of change metrics are all below the recommended ranges.

The sediment regime score dropped slightly in the Urban zone, but remained at a B- grade. Sediment grades generally decreased moving downstream through the Urban zone as land uses increasingly impact the sediment regime. Land erosion scored an A in the upper reaches of the Urban zone, but fell below the recommended range to a B+ at Shields Street due to increased urbanization and development surrounding the river. Channel erosion scored on the low end of the recommended range in the upper reaches as the river flows through several City owned Natural Areas, but fell below the recommended range to a C+ at College Avenue.

From College Avenue downstream the river becomes heavily impacted by bank armoring and channelization further disrupting natural erosion and deposition processes causing a sediment imbalance.

Figure 5.7: In addition to its construction site sediment and erosion control program, the City's LID Program requires on-site infiltration of stormwater to help prevent in-stream impacts associated with increased imperviousness.

Water quality

Water quality in the Urban zone is quite high, reflecting the quality of water that comes into town from upstream zones, and the City's commitment to protecting water quality in the Poudre River by managing stormwater runoff and meeting regulatory requirements for wastewater effluent. All water quality metrics scored within recommended ranges. Temperature regime grades are high (A- to B+) indicating no excessively warm periods, but the success of coldwater fish and the demise of native warmwater species on this historically warm-water segment may suggest an unnaturally-cold temperature regime—probably due to the release of cold water from Horsetooth Reservoir into the river just upstream at the Hansen Supply Canal.

River channel *(river form, resilience and physical structure indicators)*

The geomorphic (*i.e.,* physical) condition of the Poudre is most compromised in the Urban zone. The majority of the floodplain has been severely encroached upon or cut off by channelization and berms. More than two thirds of the river in this zone is armored and more than half of it is directly affected by eight dams and twelve bridges. These features have severely impacted river form. In most places, the channel is moderately to severely entrenched. Resilience of the system is low in the Urban zone, particularly with regards to natural recovery potential, due to the level of floodplain encroachment and

the number of structures. These alterations increase the risk of flood damage, as well. Channel stability depends almost entirely on artificial stabilization. A few areas remain where a wide buffer of undeveloped land has been maintained along the river corridor especially between Shields Street and College Avenue. Most of the undeveloped riparian zone is managed by Fort Collins Natural Areas or the Parks Department (in the case of Lee Martinez Park).

Bed mobilization and flushing functions appear to be intact in portions of the Urban zone that are not affected by dams or bridge constrictions, but these functional segments are short because there are so many such structures along the river in this zone. There is little physical habitat diversity here, and fewer pools except for notably higher scores in reaches 8 and 9 (from Larimer and Weld diversion to College Avenue) where some segments of river adjusted and became more complex during the 2013 flood (*e.g.*, adding large woody material that helped to create pool habitat). Elsewhere, the river is mostly channelized, and large woody material is limited and actively removed from the channel.

Large woody material has many roles in the riverine ecosystem; for example, it is a critical catalyst of habitat structure formation and an important driver of channel form. The systematic removal of large woody material in this zone limits the ability of the river to provide complex habitat and cover for fish, yet this action is deemed essential to public safety and protection of infrastructure. The need for removal of large woody material is an important challenge in the context of urban river management. Increased awareness of the importance of large woody material in river function and health could help instigate creative solutions to its use in future management plans.

Riparian corridor *(floodplain connectivity and riparian condition indicators)*

Overall, riparian condition in the Urban zone scored a D+. While lower than optimal, there is still some positive health support provided by the remaining habitat, such as flood flow abatement, bank stabilization and overall support of resiliency. Starting at Overland Trail the river undergoes a transformation as it meanders through town. In the uppermost reach—from Overland Trail Road to the Larimer-Weld Diversion—ponds from gravel mining, and associated berms, press almost to the banks of the river in spots. The riparian zone on averaged rated a D in the upper reach. The density of gravel ponds gradually decreases going downstream from the Larimer-Weld Diversion. Further downstream, an increasing amount of the riparian zone is City of Fort Collins property managed by the Natural Areas program. Several former gravel pond sites have been restored as wetland and reconnected to the river, allowing the wetland to directly support river health. Downstream of Shields Street, much of the riparian zone is managed by Natural Areas, and much of the zone remains forested, despite the otherwise urban surroundings. Therefore, in the Urban zone, patches of riparian forest in relatively good health and rated grades as high as B or B+, but too little remains across the zone for it to support the functionality recommended to maintain river health.

The reach below College Avenue is the heart of the river's urban course, and width of the riparian vegetation reduces down to a narrow stream-side band. Commercial and industrial areas encroach on the northern riparian zone, but fortunately, much of the riparian zone of this reach is managed by

Natural Areas. Because of that, despite its highly-urban setting, the riparian zone still remains functional. The newly completed Woodward-Governor site on the east bank of the river includes some habitat restoration. At the time of this survey, vegetation development at this site was rudimentary because of its newness, but as the site develops riparian health is expected to substantially increase.

Within the Urban zone, habitat connectivity varies widely according to the diversity of land uses through which the river flows. At the upper end of the zone, habitat connectivity was severely restricted by past and present gravel mining and the loss of vegetated habitat. Habitat connectivity improves downstream of Taft Hill Road, but in the central urban reaches (reaches 10 and 11), habitat connectivity becomes greatly impaired. Fortunately, there is almost always some vegetation or habitat, at least along the banks, providing limited cover for wildlife passage. From Mulberry Street to the end of the Urban zone, habitat connectivity once again improves as more and more of the riparian zone falls under City ownership and Natural Areas management (Figure 5.8). Much of the contributing area of this zone is urbanized or used for gravel mining and water storage. Only in the middle reaches from Taft Hill Road to College Avenue was the contributing area functional in supporting river health. Elsewhere, most land use in the area assess for the contributing area metric have negative effects on river health. Even so the influences are not as negative as might be expected in an area as developed as the City of Fort Collins.

Figure 5.8 At the lower end to the Urban zone the river is bordered on its northern side by industrial development along Mulberry Avenue, while on its south side the floodplain begins to open up as the land is owned by the City's Natural Areas Department.

Aquatic life

The overall health of aquatic insect communities in the Urban zone appeared to be similar to the Rural zone; although, some of the submetrics detected clear changes in community structure. The SOPR assessment assigned a C grade for aquatic life in the Urban zone. Sub-metrics varied in their ability to detect stress in this stream segment, but the richness of sensitive and specialized insect taxa (demonstrated by the EP Taxa and Clinger Taxa sub-metrics) remained high in the Urban zone even though there stressors were generally more severe as a result of increased anthropogenic activities.

Although the number of sensitive taxa remained elevated, the insects that have developed specialized feeding methods (Predators and Shredders) decreased in a downstream direction. Similarly,

proportions of aquatic organisms that are tolerant to stress *(i.e.,* Chironomidae and Non-Insect Taxa) were higher in the Urban zone compared to the Canyon and Rural zones. These changes in macroinvertebrate community structure were likely caused by increases in anthropogenic stress that come with urbanization.

The high grade (A) for the trout metric at Lee Martinez Park, is confirmation of quality habitat, at least locally (Figure 5.9). Multiple age classes, high recruitment level, and high numbers of adult fish indicate a well-supported and naturally-sustaining trout population. Population estimates suggesting 625 quality-size fish per mile and biomass that exceeds Gold Medal standards indicate a quality recreational fishery. These promising data, however, only represent 2015 and data from other years were not as high.

While good for trout, the river's condition in this zone is not good for native fish, most of which have recently been extirpated from the downstream portion of the zone. In the upstream portion of the zone, the available historic fish sampling data suggest that native warm water fish species richness was naturally limited, presumably because of the colder water. Native fish populations rebound some in the downstream reaches of the zone.

As found throughout the SOPR study area, aquatic habitat connectivity is highly fragmented and detrimental to fishery support. Several large diversion dams pose barriers that prevent native fish from migrating to the Urban zone from the plains, therefore, when populations do crash opportunities for recolonization from downstream are limited. Unlike fish, aquatic insects are less sensitive to in-channel barriers and grades fall within the recommended range. An equally concerning factor affecting native fish in the Urban zone is poor floodplain connectivity. Many of these small bodied native fish species require access to the floodplain as refuge from high flow events, and several species require access to the floodplain for reproduction.

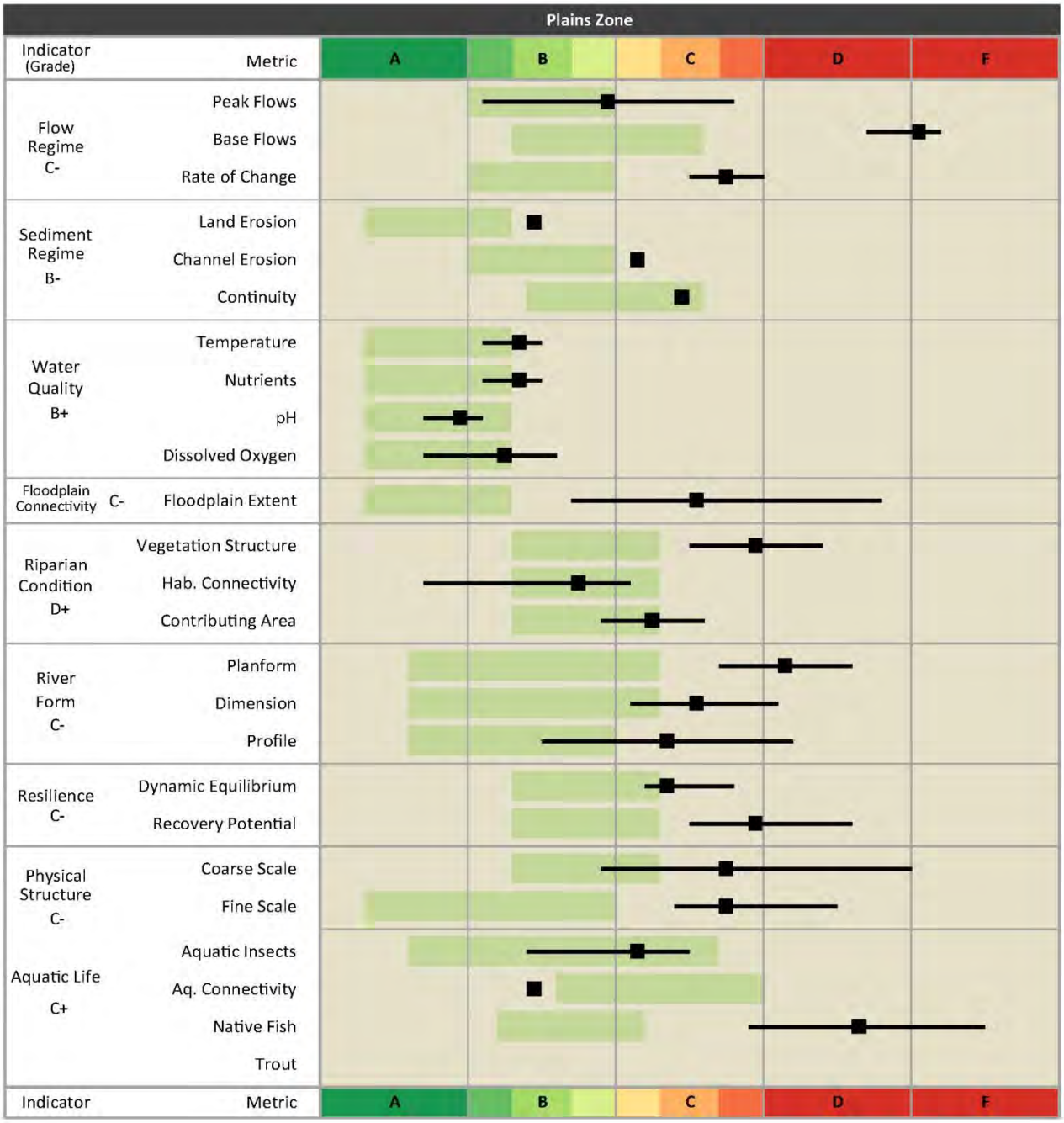
Figure 5.9: While the healthy brown trout populations in the Urban zone indicate suitable habitat conditions for cold water species, their influence as predators on the declining populations of native fish is not well understood (photograph courtesy of Colorado Parks and Wildlife).

5.5 Plains zone

Differentiation between the Plains zone and the Urban zone is largely based on land-use patterns and development rather than inherent differences in ecosystem properties. Historically the river would have continued to braid, with waters becoming warmer and bed material finer. A stretch of multi-thread channel exists in the broad floodplain preserved at Colorado State University's ELC south of Prospect Road, but most of the river has been simplified (Figure 5.10). Diversions continue to impair river health (except for fish movement due to recent installation of fish passage), as do berms, channelization, bank armoring, and impervious surface runoff upstream of this zone. Basically, all the land-use modifications that come primarily with mineral resource extraction in the floodplain influence this zone (Table 5.5).

Figure 5.10: In the Plains zone the river has some opportunity for good connectivity with the floodplain which results in higher function through the system and allows for periodic flooding of the riparian zone (left). However, through much of the Plains zone the channel is continues to be highly confined by ponds and berms on either side drastically altering its function (right).

Table 5.5: Metric grades in relation to recommended ranges for the Plains zone. Recommended ranges (green bars) represent expert opinion for reasonable and practical potential metric grades given existing land and water- use constraints. Points (square black boxes) present the average grade for the given metric for this zone. The black lines show the range of results across the reaches within this zone.



Flow and sediment

As in the Urban zone, most metrics in the Plains zone have grades below the recommended ranges. Flow regime scores on the Plains zone were similar to those in Urban zone, but the peak flow metric received a B- compared to C. The better grade in the Plains zone does not reflect an actual increase in peak flow hydrology, but rather a reduction in bed material size that potentially increases the ability of peak flows to mobilize stream bed material and flush it through the system. Therefore, even though observed magnitude and frequency of peak flows have been lessened, they are still considered sufficient for basic streambed maintenance functions in this zone. On the other hand, functions affected by diminished peak flow hydrology, such as floodplain activation, recharge, and riparian support are significantly reduced. Base flow conditions are at their worst on the Plains zone, where frequent dry-ups and critically low flows severely limit aquatic life. Grades for all these metrics are lower than the recommended ranges.

The sediment regime scored a C+ in the Plains zone. The grade is driven by the channel erosion metric, which fell below the recommended range at a C+. Despite the river flowing through large areas of land managed as conserved open lands, bank armoring and channelization continue to impact the sediment regime. Like the Rural zone, the altered sediment supply is also creating accelerated bank erosion in areas without riprap due to the river's increased capacity to transport sediment.

Because much of the area in this zone is conserved land, the opportunity may exist to better allow the river to adjust but cumulative impacts of multiple diversions upstream severely impact the river's flow regime directly influencing the sediment dynamics. Opportunities for improving sediment metrics in the Urban zone are limited due to encroachment of development and the need to protect infrastructure near the river. The City of Fort Collins Utilities' Stormwater Management Program enforces and implements several management practices aimed at reducing stormwater runoff impacts to the river. Erosion control practices during construction help to reduce undesired sediment from entering the river.

Water quality

Water quality is diminished compared with upstream zones but remains relatively high through the Plains zone. In this zone, grades for nutrients and temperature are lower than the recommended ranges, while dissolved oxygen scores hover at the lower limit of the recommended range. The relatively lower grades reflect the combined influences of urban stormwater runoff, treated wastewater effluent, and lower river flows.

River channel *(river form, resilience and physical structure indicators)*

River form is highly altered from the historic condition in the Plains zone. Approximately 70-80% of the river length is channelized or bound by berms, and more than half of it is armored. Floodplain extent is severely limited as a result. Like the zones upstream, the dependence on artificial measures to maintain river form indicates poor resilience and limited recovery potential. The channelized river form and lack of woody material are responsible for impaired physical structure and lack of habitat diversity on most of the zone, where most reaches exhibit homogenous run habitat and few riffles, pools, side channels,

or backwater features. Channel structures such as bridges, dams, and weirs are fewer and spread farther apart compared to the Rural and Urban zones, but they are still the most important stressors to river form, structure and resilience on the sub-reaches where they do occur.

Riparian corridor *(floodplain connectivity and riparian condition indicators)*

The Plains zone holds some excellent patches of dynamic, resilient riparian habitat, such as that in the Riverbend Ponds Natural Area and at the ELC. Yet these are few and far between because ponds and berms (along with the Boxelder Treatment Plant), narrowly encroaching on the channel seriously impair riparian vegetation condition throughout much of this zone. Vegetation structure and complexity is well below the recommended range, at the low end of the C range. This indicates that vegetation has only a tenuous hold on healthy functioning.

The ELC has some of the highest-quality—or at least most extensive— riparian habitat in the SOPR study area (Figure 5.11). In this reach, the split channel creates a wide riparian zone. Although variously wooded and an outstanding resource, much of the habitat in the interior is essentially "high and dry" and disconnected from the river; therefore, its ability to support river health is diminished.

Figure 5.11: In the Plains zone, a stretch of multi-thread channel exists in the broad floodplain preserved at Colorado State University's ELC south of Prospect Road (above). The river in the ELC is a contrast to the simplified river form that exists in much of this zone.

Habitat connectivity was generally good and within the recommended range in the Plains zone. Reductions in connectivity were usually caused by the narrowing of native riparian vegetation – most commonly as the result of gravel mining. Prospect Road also crosses the river and riparian habitat and

creates a break, but fortunately the bridge underpass provides a protected corridor for organism movement and passage for water and materials.

The contributing area of reaches in the Plains zone were on the average just within the recommended range for maintaining river health. Open, vegetated habitats cover most of the areas that have not been mined and converted to water storage. Because most of the ponds are isolated from the river, they do not contribute positively to river health, but they also do not cause major ongoing negative effects on the river and the remaining riparian habitats.

Aquatic life

Aquatic insect grades range from B to C, and all reaches scored within the recommended ranges. Native fish grades range from C- to F in the Plains zone. Most native fish species are either extirpated from the zone or at risk. Trout were not graded in the Plains zone because this warmer segment of river is not natural habitat for these cold water-fishes. Aquatic habitat connectivity is greatly improved in this zone, compared to the Rural and Urban zones,largely due to the installation of fish passage at one of the major diversion dams. Because aquatic habitat connectivity is greatly improved on the Plains zone compared to reaches upstream, the average grade exceeds the recommended range. Nevertheless, barriers downstream of the study area limit upstream migration of native fish, so when populations do crash locally, it is difficult or impossible for them to recover naturally (through immigration from downstream waters).

Many factors are negatively affecting native fish species richness in the Plains zone and contributing to their decline, particularly poor base flow conditions and seasonal dry-up of certain reaches. As in the Urban zone, poor floodplain connectivity diminishes habitat quality for native fish that require access to the floodplain to carry out basic life history functions. Numbers of brown trout have also recently increased above historic levels in upstream portions of this zone suggesting marginally cold thermal conditions for warm water native species. Finally, the proportion of other warm water non-native species has increased in this zone. Many of these species may indirectly compete with native species for resources, while others such as largemouth bass suppress native populations directly through predation.

While the results from the aquatic insect evaluation for the Plains zone produced an overall B- grade, many of the sub-metrics detected a general increase in stress in a downstream direction. An evaluation of taxa that are sensitive to stressors indicated that there was some decline in the richness of these species; however, the Clinger Taxa sub-metric produced scores that were identical with the rest of the study area. Despite the variable responses among some metrics, a distinct reduction in specialized feeding groups (demonstrated by the Predator and Shredder Taxa sub-metric) was observed, while the abundance of taxa that are usually tolerant to disturbances increased in the most downstream portion of the study area. In general, negative impacts affecting aquatic insect communities appeared to increase in the downstream portions of the Plains zone, yet evidence suggests that aquatic conditions were adequate for maintaining moderately healthy communities of these organisms.

5.6 Potential opportunities for improving river health

The goal of this section is to identify the types of opportunities where the City may be able to most effectively improve river health and resilience by strategically applying its resources. The following section is provided as a high-level description of management possibilities rather than a site-specific set of priority actions.

Flow

Achieving improvements on the river will be challenging since the amount and timing of the multiple diversions on the Poudre River are governed by water rights that are administered by the State according to strict legal procedure. Water rights administration is largely outside the sphere of influence of the City. The existing (and future) diversions on the Poudre River support local food production and the water needs of our homes, businesses and institutions. Concepts for improvements to the river will need to consider these historic rights and may require some type of compensation if historic diversions are not maintained, operations become more costly, or physical structures need to be altered. There may be opportunities for improvements that minimize impacts to these water users (as described below), but doing so will take collaborative efforts with many stakeholders.

From the Canyon zone to the Plains zone refining water management operations to better mimic the natural flow regime would improve river health and grades. In the Canyon zone, a more natural flow regime would especially benefit the rate of change metric. Out of the canyon, water management becomes increasingly complicated due to the multiple diversions for irrigation and municipal water needs, including those by the City of Fort Collins. Known dry up locations could be good focal points for collaborative flow related initiatives aimed at reducing the frequency and severity of complete dry-up events during critical low flow periods. Water exchanges and creative uses of local storage could be effective tools for improving base flow conditions.

Improving base flow in the Urban and Plains zones would require major changes to water management and diversion operations in order to elevate the current grade ranges of D to F+ to the recommended C (or greater). Achieving this level of improvement is highly aspirational, but even small improvements could make a big difference in the health of the aquatic habitat. Improving the rate of change metric from C- to the recommended minimum B- may be more attainable goal since this could be accomplished by ramping diversions so that river flows change less drastically over short periods of time. For example, local storage releases to diversion points lower on the river could be made in a manner that avoids sudden flow changes and yet maintains the same volume of delivery. Improving peak flows (mention zones if you want) may also prove to be challenging, since these flows are typically diverted throughout the watershed to fill local storage reservoirs and provide local irrigation and municipal water needs.

However, there could potentially be better coordination among local water users and the river administrators to consider short periods during which administration of the river could potentially be implemented in a way that would allow higher peak flows to provide ecological benefits to the river. For example, in particularly high snowpack years when there is consensus that there will be more than

enough runoff to meet all the basins water needs, much of the diversions could be curtailed for 1-3 days during the projected highest runoff period to allow for better flushing flows. Again, this type of operation would require close and willing collaboration with the various stakeholders in the basin.

Water Quality

Water quality is quite high in the Canyon zone. The metrics that are most impaired— temperature and dissolved oxygen—could possibly be improved by changing dam and reservoir operations, but it is unclear which changes should be implemented to bring about the desired effects. Detailed study and modelling would be necessary to make prescriptions for actions to improve water quality in the Canyon zone, because unguided action could exacerbate problems.

Downstream of the canyon, opportunities for improving water temperature seem technically feasible but again it would probably involve changing water operations. Water operation changes are notoriously challenging and usually expensive, therefore, improvements in temperature are unlikely in the near term.

There are irrigated agricultural lands influencing the SOPR study area, specifically in the North Fork watershed, within the Rural zone, and near the Dry Creek and Box Elder tributaries that feed the Poudre River. Nutrient metric grades indicate impacts from irrigated agriculture are currently a low stressor to the Poudre River. If water quality monitoring efforts indicate pollution inputs from irrigated lands, then best management practices could be recommended to improve agricultural runoff and decrease nutrient loading. The City has no control over privately owned agricultural land so stakeholder partnerships and participation would be necessary to mitigate impacts from agriculture.

River channel *(river form, resilience and physical structure indicators)*

The physical setting is described through the four indicators: river form, structure, and resilience. In the Canyon zone, physical constraints limit the range of improvements that could occur and because a large proportion of the physical impairment in the zone is tied to the highway and dams, there is little opportunity for improving these aspects of river health.

Below the canyon, there are a number of technically feasible ways that the physical characteristics of the river could be improved. Creating bridge designs that incorporate appropriate bridge spans and adding floodplain culverts could reduce river health and resilience impairments. Increasing floodplain connectivity near bridges in conjunction with floodplain culverts could help ease flow constriction through bridges, improve sediment transport, and provide drainage if the bridge were to become clogged during a large flood event. These actions would greatly increase resiliency in the face of large flood events. Reclaiming abandoned roads and removing non-essential bridges, constrictions, and relict in-channel structures may be feasible in the areas where they exist and these improvements would be a benefit in any of the zones.

Even in the most urban areas, potential opportunities exist for improving the river's physical form and function. In general, offsetting berms (when possible to beyond the 100m riparian zone), setting multi-use paths further back (when due for replacement), removing or offsetting bank armor (unless it is necessary to protect infrastructure), restoring natural stream form in undeveloped open areas could greatly improve river health and resilience. These actions would improve floodplain connectivity, river form, resilience, and structure by decreasing entrenchment and allowing the river to adjust planform. This would allow the river's energy to decrease during floods by spreading water over the floodplain, slowing velocities, and increasing sinuosity. These mechanisms of dealing with floods are less expensive and more resilient, over the long-term than trying to make channels strong enough to resist the high energies generated by flood flows. It also allows the river to be dynamic, which is important for maintaining structural complexity, habitat diversity, and healthy riparian vegetation.

Some berms may be able to be removed outright. For instance, many of the naturalized open spaces and Fort Collins Natural Areas are channelized or have berms close to the channel where their close proximity may not be critical to health or safety. Rehabilitation or removal of these features would open floodplain access, restore river form, and improve riparian condition. Furthermore, these undeveloped areas could be utilized as areas where floodwaters could spread, drop sediment, and slow down to help protect entities downstream. The City of Fort Collins Natural Areas Department recently completed the successful removal of the Josh Ames diversion and associated riparian restoration projects at Sterling and McMurry Natural Areas (just upstream and downstream of Shields Street respectively). Similar beneficial opportunities may exist elsewhere, but the main challenge is that these types of projects are expensive and difficult to implement given the various engineering and regulatory issues they present.

When riprap is necessary, the way it is installed can lessen its negative effects. For instance, offsetting and burying riprap right at the protected structure may provide increased resiliency during large flood events by allowing the river to erode banks and dissipate energy. Furthermore, during large flood events rivers will move and possibly even avulse into a new channel. By allowing the river as much room as possible to move during large flood events, management works with natural processes instead of trying to halt them. Ignoring natural processes may increase risk of harm and costly impacts during high floods in the very areas we are trying to protect.

Riparian corridor *(floodplain connectivity and riparian condition indicators)*

In the Canyon zone, riparian condition is generally good, and since the small-degree of impairment here is directly related to encroachment by the highway, there is little opportunity for improvement other than maintaining best management practices, addressing noxious weed issues, collecting litter, etc. Most of the practices must be carried out by individuals and entities other than the City.

Downstream of the canyon, areas with rural-land use or light agriculture have some capacity for maintaining at least patches or strips of native riparian vegetation alongside existing uses. In fact, some of the forested patches in light agricultural areas scored among the highest in the entire study area, especially near the canyon mouth. These forests have fewer problematic woody species and better

canopy structure than most of the habitats downstream. Stewardship and riparian restoration may, therefore, be potential options for improving riparian condition if landowners are interested. The average riparian condition grade on areas mapped as rural, pasture, or light agricultural land use is D+, but the range extends to C+. This range suggests that there could be potential for improvement at some lower condition sites. The City does not own or manage lands in the Rural zone, so improvements to riparian habitats in that zone would be voluntary, landowner-led efforts; although the City could potentially help support improvements through a variety of means.

In the Urban and Rural zones, improving the character of foundational processes such as opportunities for flooding, scour, and deposition would drive a cascade of positive influences throughout affected riparian areas.

Other potential riparian improvements include improving the recruitment of large woody material and leaving woody material in the river to the greatest extent possible. In areas where the surrounding and downstream land is relatively undeveloped, increasing floodplain extent and tolerance for some degree of channel migration in naturally forested areas is also a mechanism for improving recruitment of woody material recruitment. These refinements in management would increase structural diversity and aquatic habitat heterogeneity. But woody material can also cause damage to bridges, dams, berms, and other structures, so there will always be some need to manage how and where wood is allowed to contribute to river dynamics. Maintenance strategies that employ selective, rather than complete, removal of wood could provide river health benefits, while still protecting infrastructure.

Aquatic life

One of the biggest impacts to aquatic life in the study area is habitat fragmentation and migration barriers caused by the diversion dams. Construction of fish passageways or other passage mechanisms would lessen the impact of dams on fish migration, and such measures would elevate the aquatic habitat connectivity scores (Figure 5.12). Facilitating fish passage at diversion dams would also allow fish to access the mosaic of habitats vital to different life history attributes, and would allow recolonization following localize population crashes. Such measures would seemingly lead to increases in fish populations and certainly fishery health.

Figure 5.12: Recently installed fish passageway at the Fossil Creek Inlet Ditch just downstream of Prospect Avenue.

Across aquatic life metrics and river reaches aquatic habitat could be enhanced by improving flow metrics as discussed above. Low flows and dry ups during summer and winter months are known limiting factors to aquatic life health. Improvement to flow characteristics would mitigate thermal

stresses, support desired dissolved oxygen levels, increase the amount of aquatic habitat, flush interstitial spaces for aquatic insects, and reduce the habitat fragmentation caused by dry ups.

Projects increasing habitat complexity, especially those which result in increased pool habitat, would definitely bring benefits to aquatic life. Use of large wood material and other scour providing materials could lead to increases in habitat scores and greater fish numbers and health. Promoting habitat at the tributary nodes of storm water return, irrigation return, and other small tributaries for production of some native fish species paired with active translocation of species would further improve the aquatic species populations. Continued stocking and evaluation of rainbow trout recruitment and survival in the face of whirling disease and high brown trout densities is an objective of Colorado Parks and Wildlife for the Poudre and similar Front Range rivers.

Aquatic insects have evolved and adapted to the healthy aquatic conditions that historically persisted in Colorado streams for eons. Many of the human activities in the Poudre River watershed alter water quality or habitat resulting in a shift in aquatic insect community structure or function. Accurate and consistent sampling and monitoring of aquatic insects is important for the documentation and evaluation of stress-related shifts in aquatic life over time. Long-term biomonitoring studies also provide valuable information that can be used to identify trends and help distinguish between natural variation and impacts from anthropogenic stressors which could then potentially be addressed through management actions.

6 Looking forward

A primary goal of the SOPR is to foster management approaches that consider river health and function in a more comprehensive fashion. The SOPR takes a holistic and science-based approach, and provides a platform for evaluating operational, management, and policy options for preserving or enhancing river health. It is a tool for weighing outcomes and evaluating tradeoffs in the currency of river health. This first SOPR assessment also serves as a benchmark for monitoring river health changes into the future.

The SOPR is intended to serve to enhance the collective understanding on the potential impact of projects or decisions and to provide a means to effectively evaluate and prioritize opportunities, measure progress, and communicate results (Figure 6.1).

Figure 6.1: Colorado Water Institute staff Reagan Waskom and MaryLou Smith lead a community dialog at the annual Poudre River forum.

6.1 The future of the State of the Poudre project

Continuing this project through repeat assessments on a periodic basis (3-5 years) allows it to serve as a tool for following a "plan, do, check" management approach. Using this strategy, the results of SOPR assessments can first be considered by City staff and collaborators. Next, reach and metric specific goals, scores and stressors can be linked to create management priorities (Figure 6.2). Then the subsequent version of the State of the Poudre can help us reflect, or "check" on the progress we are making towards our goals.

Figure 6.2: Diagram illustrating the process whereby the SOPR may be applied to inform management priorities and track river health trends over time.

The metrics included in this study are each distinct and therefore need to be measured on specific time scales. To support subsequent iterations of this project data for some metrics should be collected annually, or perhaps data gaps filled. Other metrics change more slowly and need to be measured on less frequent intervals. These metrics may not be revisited until the next full assessment. The following section presents a list of recommendations developed by this project team of potential methodological improvements and enhancements that could be made in the future.

6.2 Potential improvements to the SOPR methodology and data

- While maintaining this existing approach for evaluating peak flows, a potential addition for understanding this metric would be to evaluate new locations for scour analysis thresholds, collect evidence of "flushing" using tracer rocks, and/or use point flow model to understand local conditions at discrete (diversion) points. Also a quantitative approach could be developed for evaluating flows in the Canyon zone.
- Work with collaborating organizations to catalyze a landscape-scale fish movement study to improve understandings of the relationship between fishery health, movement and the suite of stressors. This study would not become a regular part of the SOPR, rather it would provide

important insight and additional evidence to supporting various scores associated with fish and fish habitat.

- Continue annual insect data collection, generally during both spring and fall (including new data points initiated in 2016 to inform this project). Review 2016 fish data including the sampling location in from the Rural zone. Conduct field assessment of valued riparian sites not assessed through a 2016 on-site evaluation for this baseline assessment.

Wrap Up

For the first time, the City of Fort Collins has a comprehensive baseline of river condition. From here forward, this tool will help the City and the region measure efforts to sustain, maintain, and improve river health. Ultimately, the SOPR is an act of faith in the future and an example of the City's commitment to the plan-do-check-act cycle (Figure 6.3).

Ultimately, a well-stewarded river contributes to the long-term success of our community, which has for over a century depended on the Poudre. As challenges to water security and ecological health mount over the next century – it will become ever more important for decision makers to have powerful tools like the SOPR at their disposal, to inform critical decisions. With good tools, and some hard work, our community will be in a better position to sustain the cherished values of the beloved Cache la Poudre.

Figure 6.3: City of Fort Collins Watershed Education Coordinator Alicia Sprague teaches school children about the relationship between water quality and sensitive aquatic insects.

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Fort Collins Utilities Water Supply Vulnerability Study Draft Report

Prepared for: Fort Collins Utilities **in coordination with** Northern Water
Prepared by: Stantec in Association with RTI International

June 2019

Fort Collins Water Supply Vulnerability Study

Final Report

June 27, 2019

Prepared for:

Fort Collins Utilities
In coordination with Northern Water

Prepared by:

Stantec Consulting Services, Inc.

In association with RTI International

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Prepared by

Lisa Fardal, PE, Samantha Dyche, EIT, Neil Stewart, PE, Enrique Triana, PE

Reviewed by

Chip Paulson, PE, Terry McEnany, PE

Approved by

Chip Paulson, PE

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Executive Summary

Introduction

The City of Fort Collins is located 65 miles north of Denver in Larimer County, between the Rocky Mountains foothills and the Eastern Plains of Colorado. Fort Collins Utilities (FCU) currently serves about 75% of Fort Collins' residents and businesses. The FCU service area boundary for water, which does not coincide with Fort Collins city limits, is landlocked by neighboring water districts. Current estimates for the FCU service area show an increase in population to about 178,000 by 2065. Fort Collins is home to Colorado State University and a few large commercial enterprises.

The Fort Collins Water Supply Vulnerability Study (WSVS) was performed to investigate the ability of the FCU water supply system to meet future demands under current policy criteria and level of service goals when subjected to alternative hydrologies and various risks and uncertainties. The WSVS compiled alternative hydrologies, demands, and infrastructure risks and uncertainties into risk scenarios, resulting in a broad range of potential future conditions. The performance of the Fort Collins system under these risk scenarios was evaluated to inform under what future conditions the FCU water rights portfolio, raw water infrastructure and water supply policy and planning efforts are most vulnerable.

This project was performed by Stantec Consulting Services, Inc. under a contract with the City of Fort Collins. RTI International was a subconsultant to Stantec for hydrologic analyses and demand tool development.

Water Resources System Model

The WSVS involved risk-based water resources planning analyses that required a robust modeling platform to simulate the performance of FCU's raw water system under a wide range of possible future conditions. The modeling system used for the WSVS consists of three separate models: the Colorado-Big Thompson Quota Model (CBTQ), the Poudre Basin Network Model (PBN) and the Fort Collins System Model (FCSys).

- The CBTQ Model was developed by Northern Water to estimate annual quotas of C-BT and Windy Gap water for its allottees based on hydrology and current operations.
- The PBN Model is a MODSIM model that simulates water supply infrastructure and operations by municipal, industrial, and agricultural entities in the Poudre River basin and the lower South Platte River basin below the Poudre River confluence near Greeley. It was originally developed by Resource Consultants in 1985 for the Fort Collins Drought Study, but has been enhanced by Fort Collins, Northern Water and Greeley over the years to serve a number of purposes.
- The FCSys is a MODSIM model developed by FCU that simulates the FCU water supply system under various water demand, water rights, infrastructure and operational scenarios. The FCSys simulates city water deliveries, deliveries to large contractual users (LCU), return flow obligations

from the use of converted agricultural water rights and various other operations of the FCU water supply system.

These models were run in sequence through a Data Management System as shown in **Figure ES-1.** The system is semi-automated and includes the ability to export FCSys output as PBN inputs and vice versa.

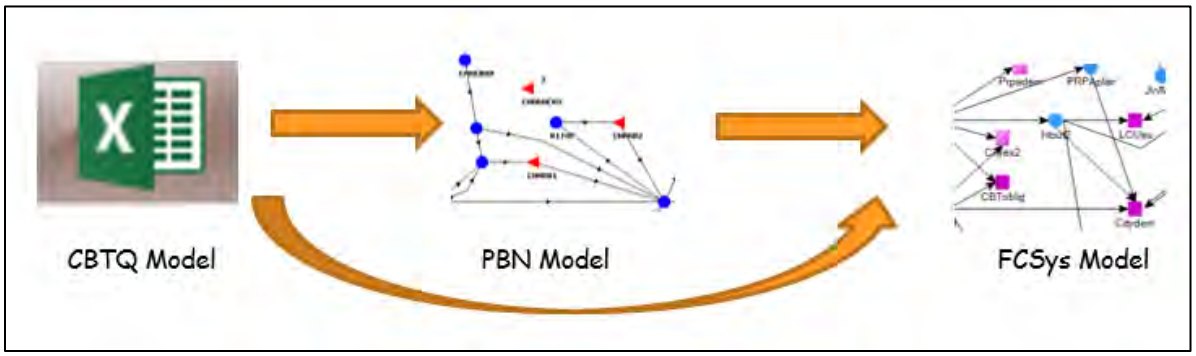

Figure ES-1 FCU Modeling System Overview

Fort Collins and other agencies have used previous versions of the PBN and FCSys models for past water resources planning and decision-making. The WSVS modeling system was not developed to re-evaluate any previous planning studies and it does not simulate flows in streams that could be affected by water development projects in the Poudre River basin. This modeling system was developed to identify and prioritize future risks for which FCU should be planning.

The WSVS used the FCU modeling system to evaluate FCU water supply system performance. “System performance” is defined as the ability to meet customer demands and satisfy adopted water supply planning policy criteria. For FCU, the Water Supply and Demand Management Policy (WSDMP) establishes an objective of:

- meeting demands calculated using a per capita use factor of 150 gallons per capita per day,
- through the 1-in-50-year drought,
- with no shortages or water restrictions,
- while maintaining a minimum of 20 percent of annual demand in reservoir storage at all times (storage reserve factor).

As part of the WSVS, the performance of the FCU water supply system was quantified using measurable parameters (metrics) with target values based on the criteria defined in the WSDMP (level of service goals). The performance metrics and level of service goals were identified and calculated as part of the modeling system outputs. Risk-based water supply planning commonly considers three categories of performance metrics: reliability metrics (i.e., measures of how often certain conditions occur), resilience metrics (i.e., how long certain conditions occur) and vulnerability metrics (i.e., how severe certain conditions area). Many specific reliability, resilience and vulnerability performance metrics were identified

to help quantify the impacts of risks and uncertainties to the FCU water supply system. As the WSVS progressed, FCU staff found that the following four performance metrics were most useful for identifying the impactful risks.

- Average annual total demand shortage in years when shortages occur
- Reliability (i.e., frequency) of maintaining 20% of annual demand in storage (storage reserve factor)
- Percentage of time in any level of water use restrictions based on the current planning policy criteria
- Reliability of meeting indoor demand

Hydrology

Synthetic sets of potential future hydrologic model inputs that include natural variability and large-scale shifts in precipitation and temperature trends due to potential climate change were generated for use in the Fort Collins Modeling System.

Figure ES-2 provides an overview of the process used to generate hydrologic datasets for the WSVS. Application of this process resulted in 20 sets of 100 sequences of natural hydrologic variability (referred to as a "trace"), with each set representing a particular future climate condition. Future climates were described by the offset of temperature and precipitation from historical conditions. Based on review of previous climate change studies for the Front Range region, the temperature offset ranged from 0 to plus 8 degrees F compared to average annual 1981 to 2010 observed temperature, and the precipitation offset ranged from -10% to +15% of average annual 1981 to 2010 observed precipitation.

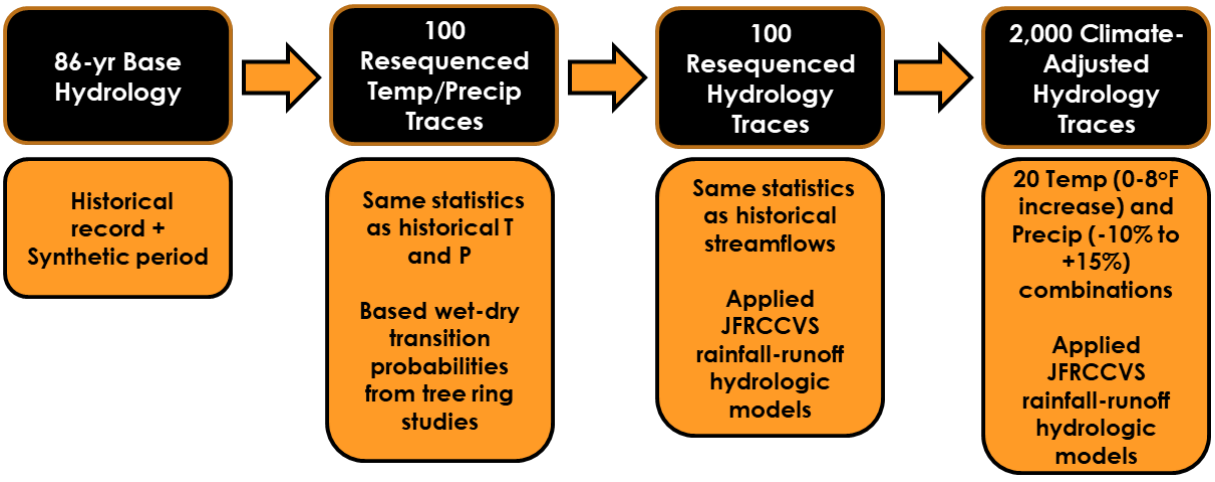

Figure ES-2 Overview of Hydrologic Analysis Process

Note: JVRCCVS = Joint Front Range Climate Change Vulnerability Study

Temperature and precipitation changes in the range adopted for the WSVS were found to have significant effects on streamflow contributing to FCU water supply. The hottest/driest climate condition (T=+8, P=-10%) reduced the Poudre River at the Canyon Mouth mean annual streamflow by an average of 30% for the 100 hydrologic traces, compared to the non-climate adjusted traces. The coolest/wettest climate condition (T=0, P=+15%) increased the Poudre River mean annual streamflow by an average of 39% for the 100 hydrologic traces, compared to the non-climate adjusted traces. This is shown in **Figure ES-3**.

In the past, FCU has used a 6-year critical period within the 86-year model simulation period to determine the 1-in-50-year drought for water supply planning. Hydrologic inflows were based on synthetic runoff data. This 6-year critical period for the Poudre River at the Canyon Mouth has an average annual runoff of 196,090 acre-feet per year (AFY). The 100 hydrologic traces in the WSVS hydrologic dataset for the unaltered historical climate conditions (T=0, P=0%) have an average 6-year critical period flow at this location of 191,343 AFY, which is a 2% reduction. The hottest/driest climate condition (T=+8, P=-10%) produces an average 6-year critical period annual streamflow that is 31% less than the critical period streamflow currently used for planning. The coolest/wettest climate condition (T=0, P=+15%) produces an average 6-year critical period annual streamflow that is 38% more than the critical period streamflow currently used for planning. This is important when interpreting the vulnerability study results relative to current water supply policy criteria that are based on the 6 year long, 1-in-50-year drought in the synthetic runoff data. When considering the full set of 100 hydrologies times 20 climate scenarios generated for the WSVS, there are traces which capture more severe and more frequent critical periods than the historical 6-year critical period used in previous water supply planning to represent the 1-in-50 year drought. Additionally, there are traces in the WSVS that do not see critical periods as severe as the historical.

		Delta P				
Basin	Delta T	-10%	-5%	0%	7%	15%
Cache La Poudre at Canyon Mouth	8 F	70% 189,516	79% 214,864	88% 241,156	103% 279,926	120% 326,717
	5 F	72% 197,600	82% 224,065	92% 251,456	107% 291,295	125% 339,726
	2 F	75% 204,550	86% 233,415	97% 263,366	113% 307,497	132% 361,271
	0 F	77% 209,967	88% 240,600	100% 272,680	118% 320,455	139% 378,560
Lake Granby	8 F	70% 190,797	80% 215,992	89% 241,377	102% 276,540	117% 316,072
	5 F	74% 200,493	84% 226,635	93% 252,835	107% 288,931	121% 328,746
	2 F	78% 210,964	88% 237,245	97% 263,351	111% 299,719	126% 340,232
	0 F	81% 218,725	90% 244,938	100% 270,981	113% 306,969	128% 347,893

Figure ES-3 Average Annual Flow Volume for Hydrologic Traces for All Climate Conditions

Note: Each cell shows the mean of the average annual flows for the 100 traces with the corresponding T/P combination expressed in AFY and as a percentage of the average annual flow for the T=0, P=0 combination.

Water Demands

Future water demands for general residential and commercial customers in the FCU service area were estimated using a new Demand Estimation Tool developed for this project. The Demand Estimation Tool consists of individual linear regression models, each developed for the following groups of water customers: single family and duplex, multifamily, commercial small, commercial medium, and commercial large customers. It was developed using processed historical customer-level water use data from 2001-2016.

Three demand scenarios were developed by FCU for use in the WSVS: City Plan 2, City Plan 3 and City Plan 3 plus 20%. The first two demand scenarios are based on the most likely proposed future development scenarios for 2070 developed as part of the Fort Collins City Plan update. The median average annual water demand in 2070 under City Plan 2 assumptions, including the effects of climate change, is 37,700 AFY. The more aggressive growth assumptions in the City Plan 3 scenario result in a median total water demand of 39,200 AFY, for an increase of 4% compared to City Plan 2. The City Plan 3 Plus 20% scenario increased both the general residential and commercial portion of the total demand and a portion of the Large Contractual User demand by 20%. This resulted in a median total water demand of about 45,200 AFY. **Figure ES-4** compares the total annual demands for these three scenarios. The average annual demand for 2065 developed from previous FCU planning studies is 40,629 AFY; this is referred to as the “baseline demand” in this study.

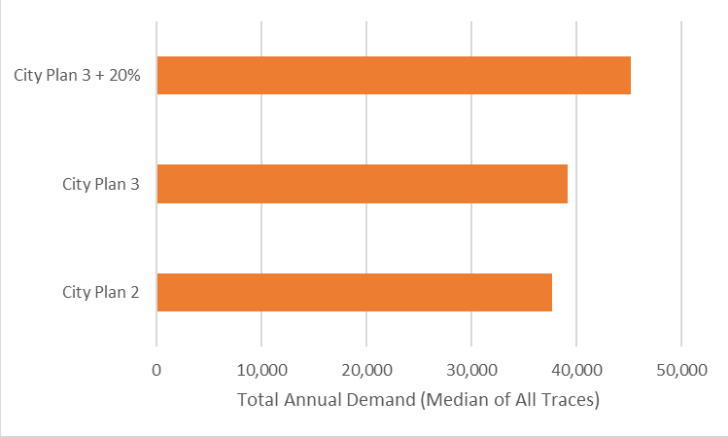

Figure ES- 4 Total Annual Demand in 2070 Including Climate Change (Median of All 2,000 Traces for Each Development Scenario)

Note: Average Baseline demand = 40,629 AFY

Risks and Uncertainties

The purpose of the WSVS is to identify the vulnerability of the FCU water supply system to a range of risks or threats that could occur in the future and factors that cannot be accurately forecasted. Risks and uncertainties that could affect the future performance of the FCU water supply system were brainstormed in workshops held at Fort Collins Utilities and Northern Water. Identified risks and uncertainties were organized in the following categories that span the various aspects of the FCU water supply system.

- ***Climate and Hydrology*** risks relate to weather variability and other hydrologic factors, both short- and long-term, that can impact the potential yields from a watershed.
- ***Watershed*** risks relate to physical watershed conditions that can impact the yields available to FCU.

- ***Operational and Infrastructure*** risks relate to how FCU delivers physically and legally available water to its treatment facilities.
- ***Administrative and Legal*** risks relate to conditions, regulations, or policies that could impact the legal allocation or availability of water supplies.
- ***Demand*** risks relate to changes in required volume, timing, and quality of water that will need to be delivered to water treatment facilities to meet customer needs.

Some risks are long-term, or chronic, and would persist indefinitely and affect all future years. Other risks are short-term, or acute, and would only occur for a short period of time (e.g., several months or a few years). Although long-term and short-term risks could have very different impacts on the FCU raw water system performance, both types of risks were assessed together in the WSVS.

The identified risks were rated as part of the prioritization process. Individual risks were rated by assigning a 1 to 5 score for both likelihood (possibility of the risk or uncertainty occurring) and impact (consequences to the FCU/C-BT water supply system if the risk or uncertainty were to occur). The composite score was calculated by multiplying the likelihood score by the impact score and was then used to prioritize risks. The prioritized risks and uncertainties were organized into five major threat groups that span the various risk categories. These threat groups are: climate change, demands, critical outages, enhanced environmental stressors and shared infrastructure (i.e. risks or uncertainties due to lack of infrastructure ownership by FCU). The risks and uncertainties selected for analysis in the WSVS are shown in **Table ES-1.**

Table ES-1. List of Key Risks and Uncertainties Prioritized for Simulation

ID	Risk or Uncertainty Name	Threat Group	Description
O1	Outage - 24 Pipeline	CO	Short term outage due to flooding, landslides, wildfire, etc.
O2	Outage - 27 Pipeline	CO	Short term outage due to flooding, landslides, wildfire, etc.
O3	Algal Blooms	EES	Algal blooms in storage reservoirs and rivers increases water quality issues and potential treatment problems.
C1	Longer duration droughts	CC	Multi-year and/or more severe droughts occur in the future that are not captured in the observed record.
A1	New Regulations	EES	New regulations (either federal or state) impact availability of yields from existing water rights.
W1	Wildfires	EES	Wildfires occur, causing a variety of impacts on water quality, runoff and threats to infrastructure.
C3	Change in precipitation type - Hydrology	CC	More precipitation falls as rain instead of snow during the Fall and Spring.
C4	Changes in frequency/ magnitude of precip events - Hydrology	CC	Precipitation events, particularly summer rainstorms, become less frequent and more intense.
C2	Changes in runoff timing	CC	Early higher runoff and lower late-season baseflow reduces yield from volumetric decrees that list specific diversion dates.
W2	Forest Health Degradation	EES	Forested area health decreases due to beetle kill, pollution, warming climate, etc.

ID	Risk or Uncertainty Name	Threat Group	Description
A4	Changing state administration	CC	Policies around state water administration change, impacting yields from water rights
D3	Development Uncertainty	D	The composition of development in service area (e.g. density, type, outdoor area) is different that past.
A2	Increased Basin Demands	D	Higher demands across the entire Poudre River basin (due to climate change/population growth) impact use of water rights.
O5	Outage - Horsetooth Reservoir Intake	CO	Short term outage of reservoir outlet and intake to WTP; higher risk due to lack of redundancy.
O4	Outage - Michigan Ditch	CO	Short term outage due to flooding, landslides, wildfire, etc.
D2	Water Use Changes	D	Decrease in per capita use continues and how water is used (e.g. indoor vs. outdoor) changes.
D1	Service area growth and Regionalization	D	Ft. Collins expands its service area or enters into agreements to provide water to regional entities.
A9	Elimination or Interruption of Reuse Plan	SI	Platte River Power Authority decommissions Rawhide Energy Station, effectively eliminating the need for the Reuse Plan. In multi-year droughts, water from the Reuse Plan is reduced or unavailable.
D8	Change in precipitation type - Demands	CC	More precipitation falls as rain instead of snow during the Fall and Spring.
D9	Changes in frequency/ magnitude of precip events - Demands	CC	Precipitation events become less frequent and more intense.
A3	Changes to Northern Water C-BT Operations	SI	Allocation of C-BT water through setting of the quota and ways in which C-BT water can be managed, changes in the future.
W3	Development in Watersheds	EES	Land development in watersheds (recreation, residential, O&G, mining) increases risk of water quality contamination.
D6	Hotter summer changes irrigation	D	A warmer climate increases the length of the irrigation season and hotter days increase demand during the summer.
O6	Outage - Chambers Reservoir	CO	Short term outage due to flooding, landslides, wildfire, etc.
O8	Outage - Joe Wright Reservoir	CO	Short term outage due to flooding, landslides, wildfire, etc
O11	Outage - Pleasant Valley Pipeline	CO	Short term outage due to flooding, landslides, wildfire, etc.
Note:	Threat Group ID definitions: CC = Climate Change, D = Demands, CO = Critical Outages, EES = Enhanced Environmental Stressors, SI = Shared Infrastructure		

Risk Scenarios

Risk scenarios were developed by FCU to represent combinations of future conditions for which a vulnerability analysis was desired. Scenarios are comprised of single or multiple risks and are designed to allow FCU to understand how its water resources system would behave under a range of future stressful conditions.

In general, a WSVS scenario consists of three parts:

- A climate condition, defined as one of the 20 temperature and precipitation combinations, which determines 100 hydrologic traces representing climate variability around that climate condition.
- A demand condition, defined as one of the two City Plan demand scenarios or the baseline planning demand.
- A system risk condition, defined as a combination of one or more of the risks and uncertainties.

The process for creating WSVS scenarios is shown in **Figure ES-5**.

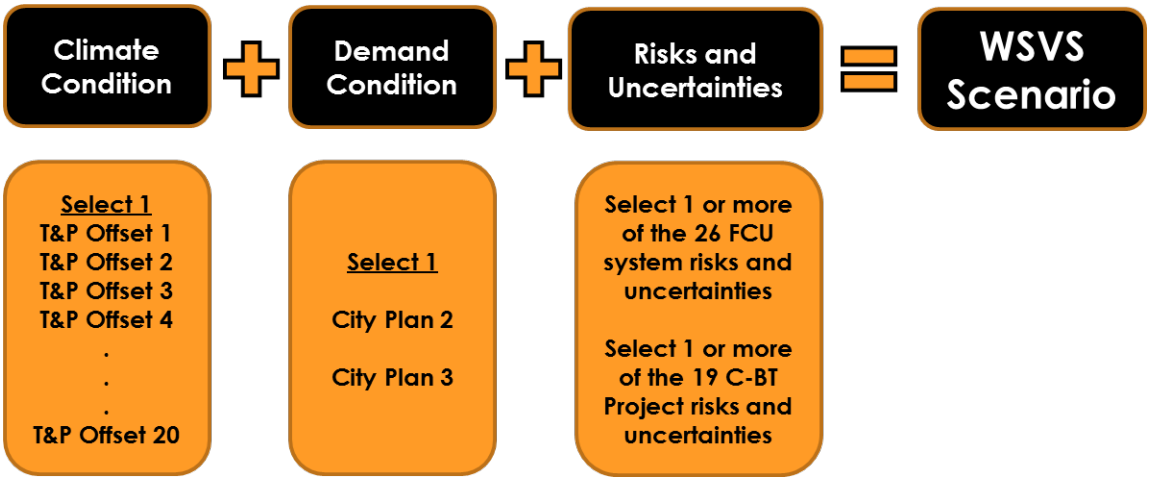

Figure ES-5. Process of Creating WSVS Scenarios

FCU Staff, in coordination with Northern Water, identified 13 scenarios for simulation, including baseline conditions. The 12 non-baseline scenarios were selected to represent a range of future conditions believed to be possible and potentially impactful to the FCU water resources system. They represent both long-term or chronic conditions (i.e., those that occur over the entire simulation period) and short-term or acute conditions (i.e., those that occur for only a short period of time). These risk scenarios are described briefly below.

- Baseline – Future conditions, including current water rights and anticipated acquisitions, current water supply infrastructure, Halligan Reservoir enlargement and a demand of 40,629 AFY.
- Climate Change Impacts – 20 future climate conditions with constant demand and no other risks.
- Loss of Storage – No Halligan Reservoir enlargement and no C-BT carryover storage in Horsetooth Reservoir.
- Increased Demands – Two City Plan based demand scenarios and one increased demand scenario beyond the City Plan development assumptions.

- No Halligan Enlargement – No enlargement of Halligan Reservoir as currently proposed.
- Poudre River System Acute Outage – Short-term outage of 24-inch and 27-inch delivery pipelines and Pleasant Valley Pipeline.
- C-BT System Environmental Impacts – Impacts on C-BT quota allocations due to environmental issues resulting from wildfires in the receiving East Slope watershed or restricted use of Horsetooth as a water source because of algal blooms.
- Poudre River System Environmental Impacts – Impacts due to algal blooms or environmental issues resulting from wildfires in source watersheds (e.g. increased sediment deposition) that would limit FCU's diversions from the Poudre River.
- C-BT System Acute Outage – Short-term loss of C-BT deliveries due to delivery infrastructure failures.
- C-BT System Long-Term Reduction - Captures possible effects of a wide range of conditions that could reduce C-BT deliveries and quotas over a period of 10 years.
- Horsetooth Reservoir Outage – Short-term outage of deliveries from Horsetooth Reservoir due to infrastructure failures.
- Reuse Plan Changes – Two options: Reuse Plan Change 1 represents 100% elimination of the Reuse Plan; Reuse Plan Change 2 represents 50% reduction in the Reuse Plan.

Vulnerability Assessment

The impacts of these various risk scenarios on the FCU water supply system were quantified using the system performance metrics tied to the current water supply planning policy criteria. Vulnerabilities were investigated in a systematic methodology based on the following steps.

1. Determine the current system's performance for the baseline demand with no climate or infrastructure risks.
2. Investigate how potential short-term climate variability and broader climate change could affect the performance of the baseline system.
3. Assess the impacts of increased demands, generated by the new Demand Estimation Tool in combination with the climate-adjusted hydrologies.
4. Evaluate the superposition of the risk scenarios with the climate-adjusted hydrologies and each City Plan based demand scenario.
5. Identify the risk scenarios with the greatest potential to adversely affect the FCU system performance.

The process for evaluating risks in the WSVS is shown in **Figure ES- 6** below.

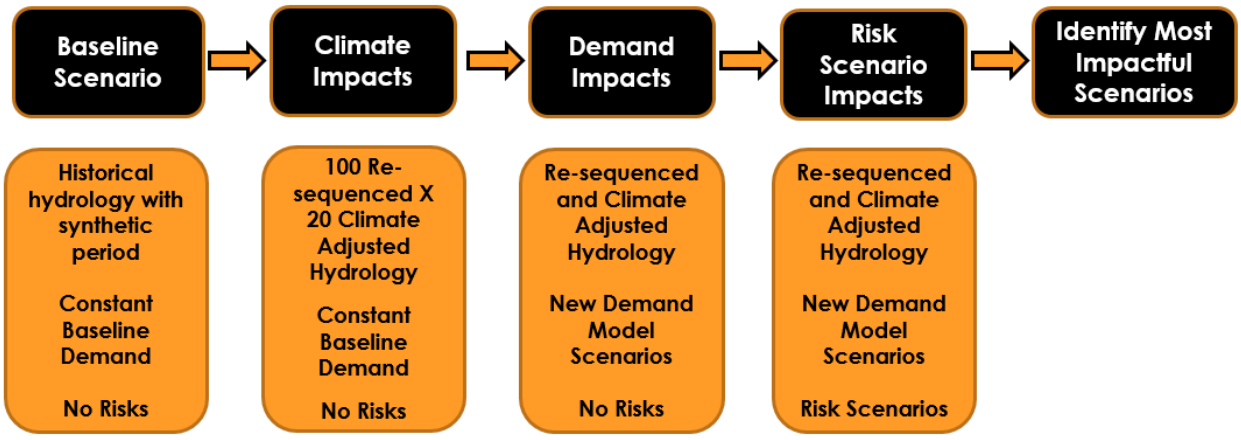

Figure ES- 6 Method for Risk Evaluation

Results showed that FCU's water system and water rights portfolio is well adapted to current climate conditions. The existing system, which includes the Halligan Reservoir enlargement, meets all demands, including Reuse Plan demands, with 99.1% reliability. Indoor demands are met 99.8% of the time. The results also showed that the system maintained the policy guideline of a 20% storage reserve factor in 97.1% of the total simulated months. Note that none of the WSVS simulations include the effects of water use restrictions.

However, system performance declines as the climate gets hotter and drier. The effect of climate on the reliability of meeting an annual demand of 40,629 AFY is shown in **Figure ES-7**. This figure shows the average percent of months in which the target baseline demand was met across the 100, 86-year traces for each of the 20 climate conditions. Comparing these reliability results to the current water supply policy of 100% reliability, under almost all climate futures, including no change in climate, the FCU system is unable to meet this level of service goal. Uncertain future hydrology is the biggest threat to FCU's future water supply, as it is heavily influenced by changing climate. Even the risk scenarios with the worst performance under current climate conditions were shown to perform better than a scenario with no system risks and an increase in temperature and decrease in precipitation.

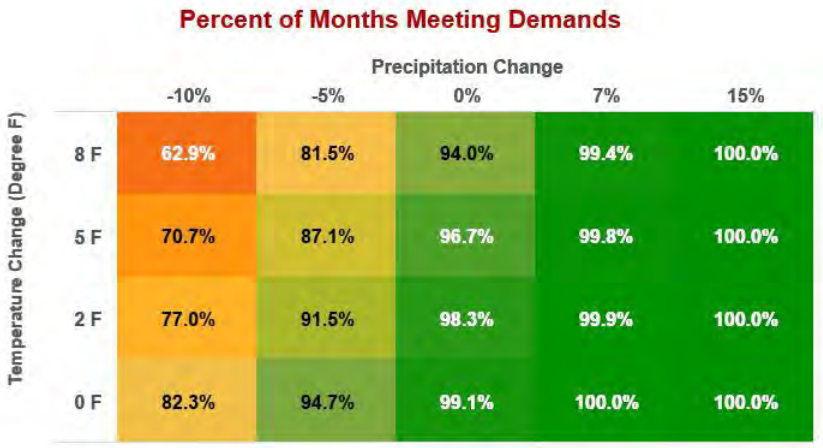

Figure ES-7. Average Monthly Reliability of Meeting Total Demands for All Climate Conditions

Simulations of increased demands showed the FCU baseline system is only moderately vulnerable to the City Plan 2 and City Plan 3 scenarios and only for hotter/drier climates. However, the City Plan 3 + 20% condition has more significant effects and represents a greater threat to FCU system performance. **Figure ES-8** shows the effects of the demand scenarios on the average annual shortage metric. This metric calculates the average annual shortage across the years when shortages occur. The figure also shows the number of years when shortages occur for each scenario. The current water supply policy establishes a level of service goal of no shortages during the 1-in-50-year drought. With the exception of significantly wetter climates, all demand scenarios have a shortage, showing the FCU system is unable satisfy this level of service goal, even for traces where the critical drought period is less than the historic 1-in-50-year drought used in previous water supply planning.

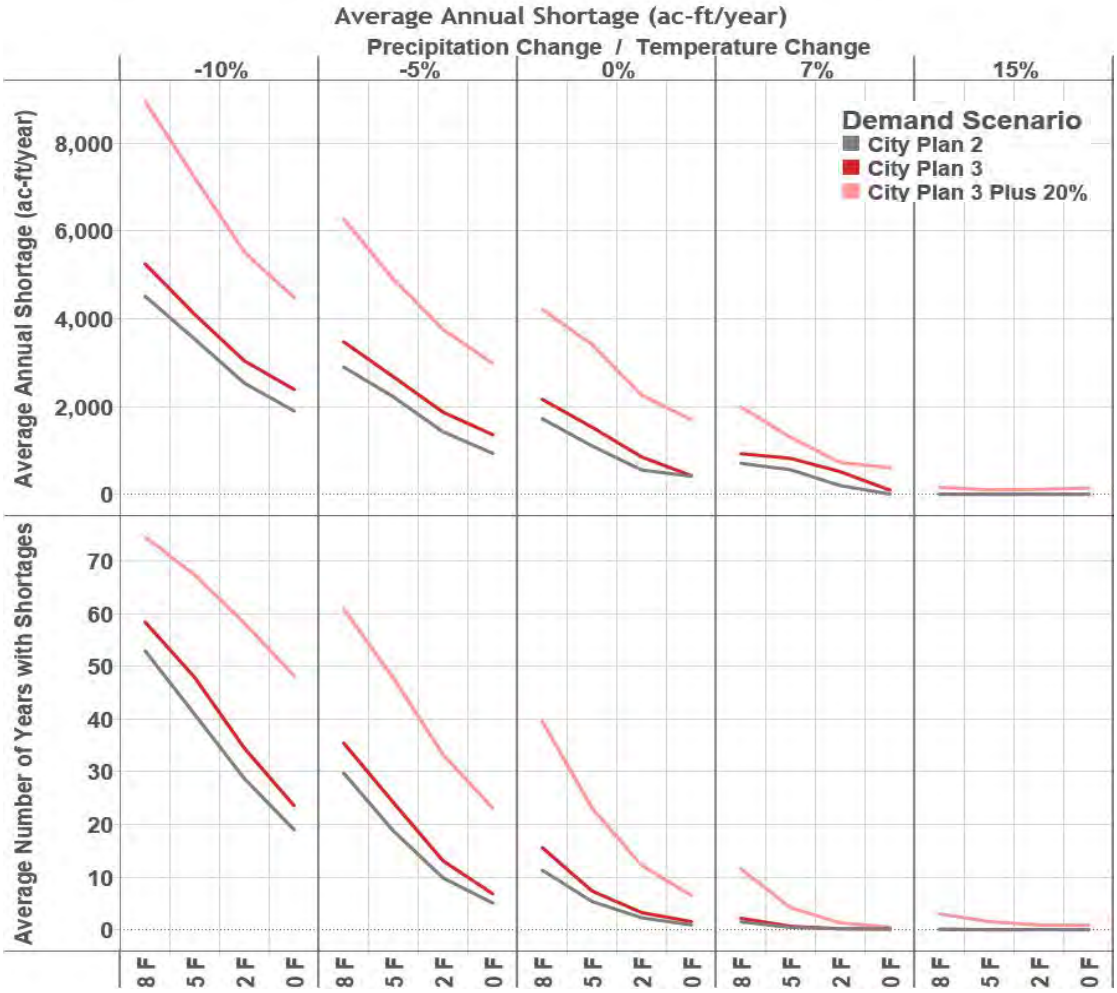

Figure ES-8 Average Annual Total Demand Shortage for Increasing Demand Scenarios and All Climate Conditions

Notes:

a) Poorer performance is indicated by greater shortage volume towards the top of the graph.
b) Current water supply planning policy goal is no shortages for the 1-in-50-year drought.

Besides climate change and increased demands, the risks found to have the largest impact on the Fort Collins system performance relative to the current water supply planning policy criteria are:

- loss of storage, including no Halligan Reservoir enlargement;
- Reuse Plan changes, including elimination or 50% reduction;
- increase in demands above the expected City Plan 3 levels;
- and a long-term reduction in C-BT quota due to constrained C-BT supply or other factors.

Over the four metrics analyzed in this report, those risks and risk scenarios show the poorest performance for current climate conditions and their performance is significantly reduced for the warmer and drier climates.

Figure ES-9 shows the storage reserve metric for all risk scenarios as a function of climate. The storage reserve metric measures the ability to maintain a minimum of 20% of total annual demand in reservoir storage. The water supply policy establishes a level of service of 100% for the storage reserve factor. Under any risk, the FCU system cannot satisfy this LOS goal at most climate futures however the Loss of Storage and No Halligan Enlargement risks have the most significant cumulative impact on maintaining 20% of total annual demand in storage.

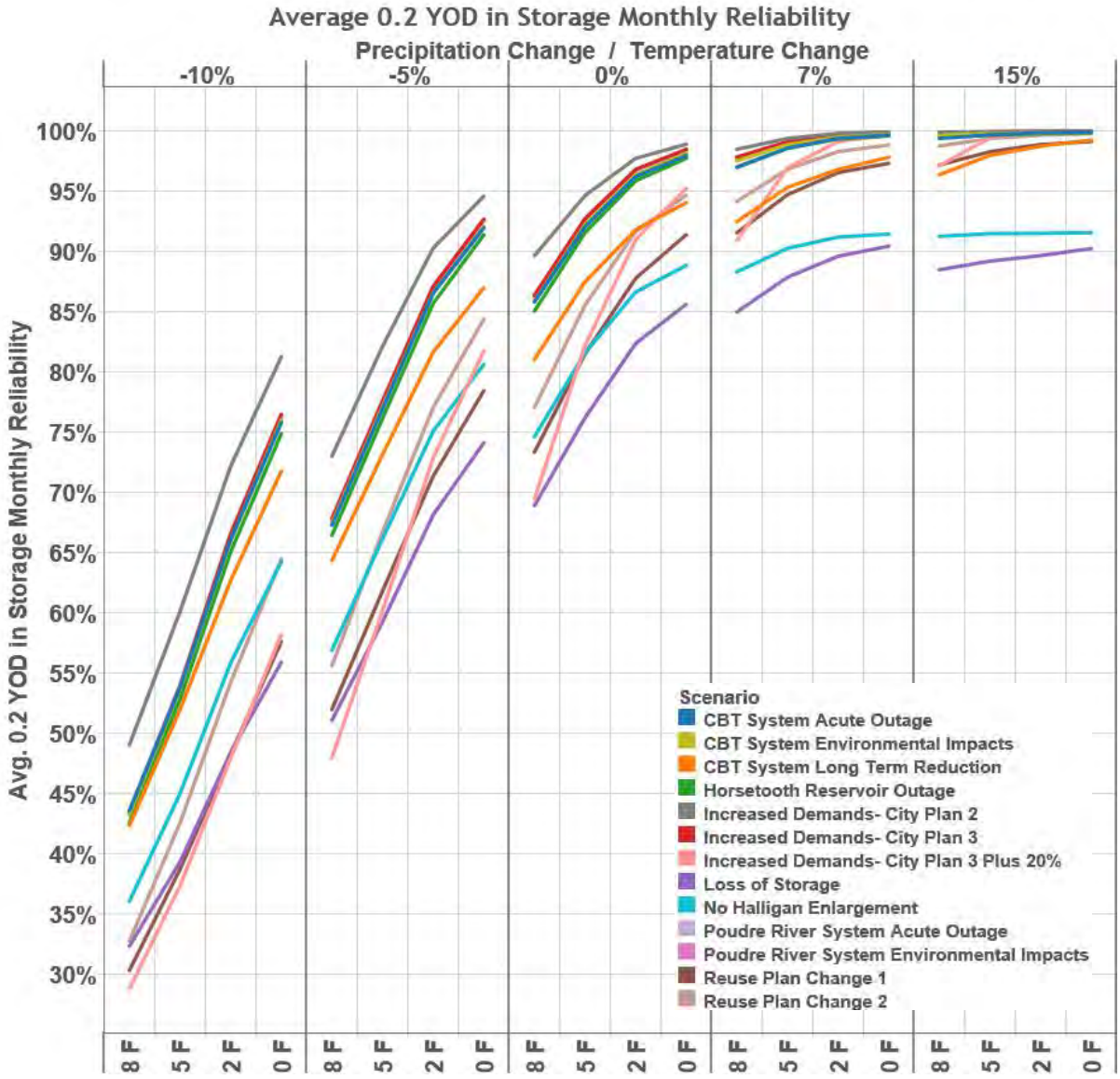

Figure ES-9 Storage Reserve Metric for All Risk Scenarios and All Climate Conditions

Notes:

a) Poorer performance is indicated by lower reliability towards the bottom of the graph.
b) Current FCU policy establishes a goal of 100% for the storage reserve factor during the 1-in-50-year drought.

The risk scenario simulations demonstrated the fundamental difference between long-term or chronic risks and short-term or acute risks. All the most impactful risks based on the metrics used in the WSVS are long-term risks. This is biased by the metrics themselves which, with the exception of the annual demand storage metric, are always calculated over the entire 86-year simulation period. Thus, long-term risks that adversely affect system performance over the entire simulation period or for many years within the simulation period affect metric values more than short-term risks that occur for only a few months or years. Short-term risks such as an outage of the Poudre River pipelines or C-BT facilities can have extreme impacts on system performance for a short period but are masked by climate shifts that cause significant long-term impacts to performance. The effects of long-term risks are not as easily masked by the shifts in climate, as their impacts are also significant over several years or the entire simulation.

Figure ES- 10 highlights the storage reserve metric for the five short-term risks simulated for the WSVS. This figure shows that most of the short-term risk scenarios have very similar performance when measured by the WSVS metrics. Additional investigation may be warranted to develop different metrics that are useful in comparing performance of short-term risks to each other. Many of these short-term risks received relatively high composite scores (likelihood multiplied by impact) at the risk identification workshops, meaning they are of high concern to FCU staff and should be further assessed.

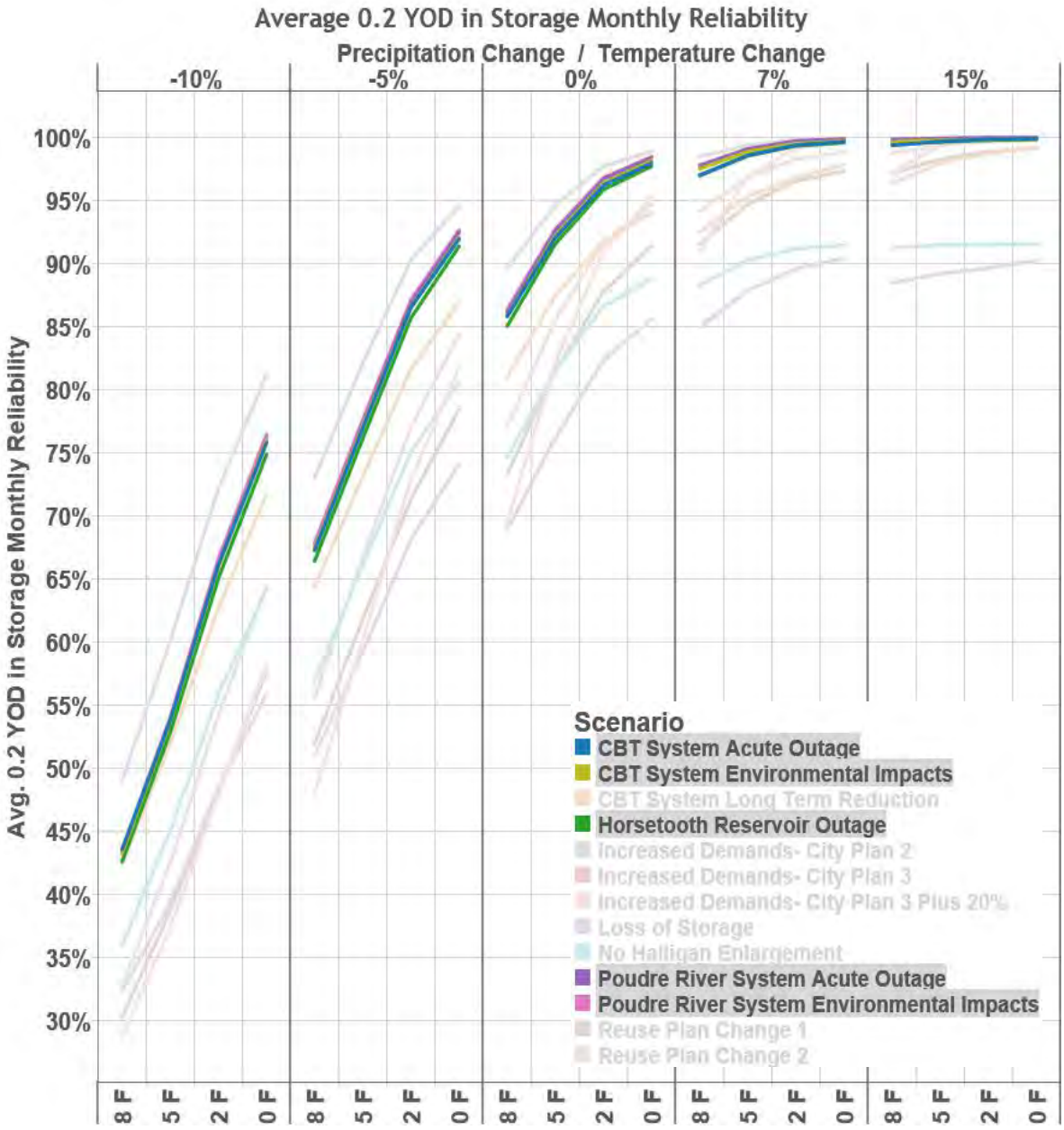

Figure ES- 10 Reliability of Retaining 20% Storage Reserve for Short Term Risks Compared to Long Term Risks

Conclusions

FCU plans to use the results and conclusions of the WSVS as the foundation for updating its Water Supply and Demand Management Policy and its long-range water resources strategy. The following findings from the WSVS may be important as FCU contemplates the coming planning process.

- Climate change is the most important vulnerability faced by the FCU system. Future climate conditions may be more impactful to FCU's ability to meet its water supply planning policy criteria than the occurrence of any particular infrastructure outage or environmental condition simulated by the WSVS risk scenarios. However, climate change is the most difficult risk to track. Long-term trends are difficult to measure and are obscured by the natural variability in wet and dry years. Participating in or keeping informed of state and federal climate change studies will help FCU understand the trajectory of climate change in the region.

- Water demands higher than those forecast in the City Plan 3 scenario represent a significant vulnerability to the current FCU system. This points out the importance of FCU maintaining its water conservation program, and working with City Planning Department to closely monitor population and development density trends to see how they are tracking with City Plan assumptions. An increase in 2070 demands by 20% significantly increases shortages and incidence of failures to meet current water supply policy requiring 20% of average annual demand in storage through a 1-in-50-year drought.

- The risk scenarios found to have the largest impact on the FCU system performance across the range of performance metrics are listed below.

    - Loss of storage, including no Halligan Reservoir enlargement; the FCU system is storage-limited, therefore loss of any existing or proposed storage capacity has significant adverse effects.

    - Reuse Plan changes, including elimination or 50% reduction in the amount of water incorporated in the Plan; the Reuse Plan is a water supply agreement with other Northern Colorado entities that results in additional water supplies for FCU in most years. Losing all or part of the supplies generated from this agreement has compounding effects on FCU water supply.

    - A long-term reduction in C-BT quotas due to C-BT supply or delivery infrastructure issues; C-BT supply is a critical part of FCU's water supply portfolio and reduction in that source over several years significantly impacts FCU's ability to meet its water supply planning policies.

- For most risk scenarios, shortages for climate conditions that are wetter than the current climate would occur most often in late summer and early fall. For warmer and drier climate conditions, shortages would occur throughout the year except in the peak runoff months of May and June. This shows the challenge of maintaining a resilient water resources system in the face of a warmer and drier climate with the limited amount of storage in the FCU raw water system.

- Without the proposed Halligan Reservoir enlargement of 8,125 AF, FCU system performance would be significantly impacted and current water supply planning policy criteria could not be met under most future climate and demand conditions.
- The WSVS highlights the importance of storage in the FCU system and the significant vulnerability posed by the inability to implement the proposed Halligan Reservoir enlargement or a similar storage project as a strategy to mitigate effects of climate change and other risks.
- The WSVS validates that FCU is highly reliant on the C-BT system and is particularly susceptible to extended periods of low quotas and loss of the carryover storage program. FCU should monitor conditions that could trigger either of those risks.
- Results of the WSVS are biased toward long-term risks, but a number of short-term risks were identified that could severely impact FCU operations for a few weeks or months. These conditions will require further study and may involve a different management strategy in the future water supply plan.
- The WSVS analysis was performed without simulating the effects of demand management measures that FCU could adopt under the City's current Water Supply Shortage Response Plan. Investigating benefits of the current shortage response policy should be a key aspect of the water supply plan update.
- FCU now has a water supply modeling tool that can be used to conduct more detailed analyses of the WSVS risk scenarios or explore a broader range of uncertainties or operating conditions if desired. It can also be used to measure and compare the effectiveness of alternative water supply system improvements.

Abbreviations

AFY	acre-feet per year
Ag	Agricultural
C-BT	Colorado-Big Thompson Project
CBTQ	Colorado-Big Thompson Quota Model
CTP	Common Technical Platform
DMS	Data Management System
DWRF	Drake Water Reclamation Facility
EIS	Environmental Impact Study
ELCO	East Larimer County Water District
FCLWD	Fort Collins-Loveland Water District
FCSys	Fort Collins System Model
FCU	Fort Collins Utilities
GCM	Global Climate Model
GMA	Growth Management Area
JFRCCVS	Joint Front Range Climate Change Vulnerability Study
JOP	Joint Operations Plan
LCU	Large contractual users
LOS	Level of Service
NEPA	National Environmental Policy Act
Northern Water	Northern Colorado Water Conservancy District
PBN	Poudre Basin Network Model
PRPA	Platte River Power Authority
SQL	Structured Query Language
SSD	South Side Ditches
TAC	Technical Advisory Committee
WSSC	Water Supply and Storage Company
WSDMP	Water Supply and Demand Management Policy
WSVS	Water Supply Vulnerability Study

1.0 INTRODUCTION

1.1 PROJECT OBJECTIVES

The objective of the Fort Collins Water Supply Vulnerability Study (WSVS) is to investigate the ability of the Fort Collins water supply system to meet future demands under current policy criteria and level of service goals when subjected to various risks and uncertainties. The WSVS explores and prioritizes the impacts of a wide variety of risks and uncertainties, including:

- hydrologic changes resulting from a warming climate;
- risks of water supply disruptions, such as infrastructure failures;
- wildfires, water quality and other environmental factors; and
- changes in water demands resulting from shifts in population, development density and water use patterns.

The WSVS combines alternative hydrologies, demands, and infrastructure vulnerabilities into plausible scenarios, resulting in a broad range of potential future conditions. Knowledge of these potential futures and the impacts of possible risks and uncertainties on the ability to meet the criteria specified in Fort Collins' current water supply planning policy will allow Fort Collins to determine if its water rights portfolio, raw water infrastructure, and water supply policy and planning efforts are adequate to meet changing water demands into the future.

Results of the WSVS will be used by Fort Collins in the future to investigate potential water resources system improvements and operating policies as part of a planned update to its Water Supply and Demand Management Policy (City of Fort Collins, 2012).

1.2 PROJECT BACKGROUND

1.2.1 Fort Collins Utilities

The City of Fort Collins is located 65 miles north of Denver in Larimer County, between the Rocky Mountains foothills and the Eastern Plains of Colorado. Horsetooth Reservoir borders Fort Collins to the west, the Cache la Poudre River winds its way through north Fort Collins before reaching the South Platte River, east of Greeley and several small gravel pit reservoirs and agricultural reservoirs are located in and around the city.

Fort Collins Utilities (FCU) currently serves about 75% of Fort Collins' residents and businesses. The FCU service area boundary for water, which does not coincide with Fort Collins city limits, is landlocked by neighboring water districts. FCU anticipates little new development and mostly re-development of existing properties within the service area boundary. Fort Collins-Loveland Water District (FCLWD) and East Larimer County Water District (ELCO) provide water to some areas within the city limits and will serve much of the new development in the Fort Collins Growth Management Area ("GMA", or future City limits).

Figure 1-1 shows the spatial extent of the City Limits with respect to the FCU service area, GMA and surrounding water districts.

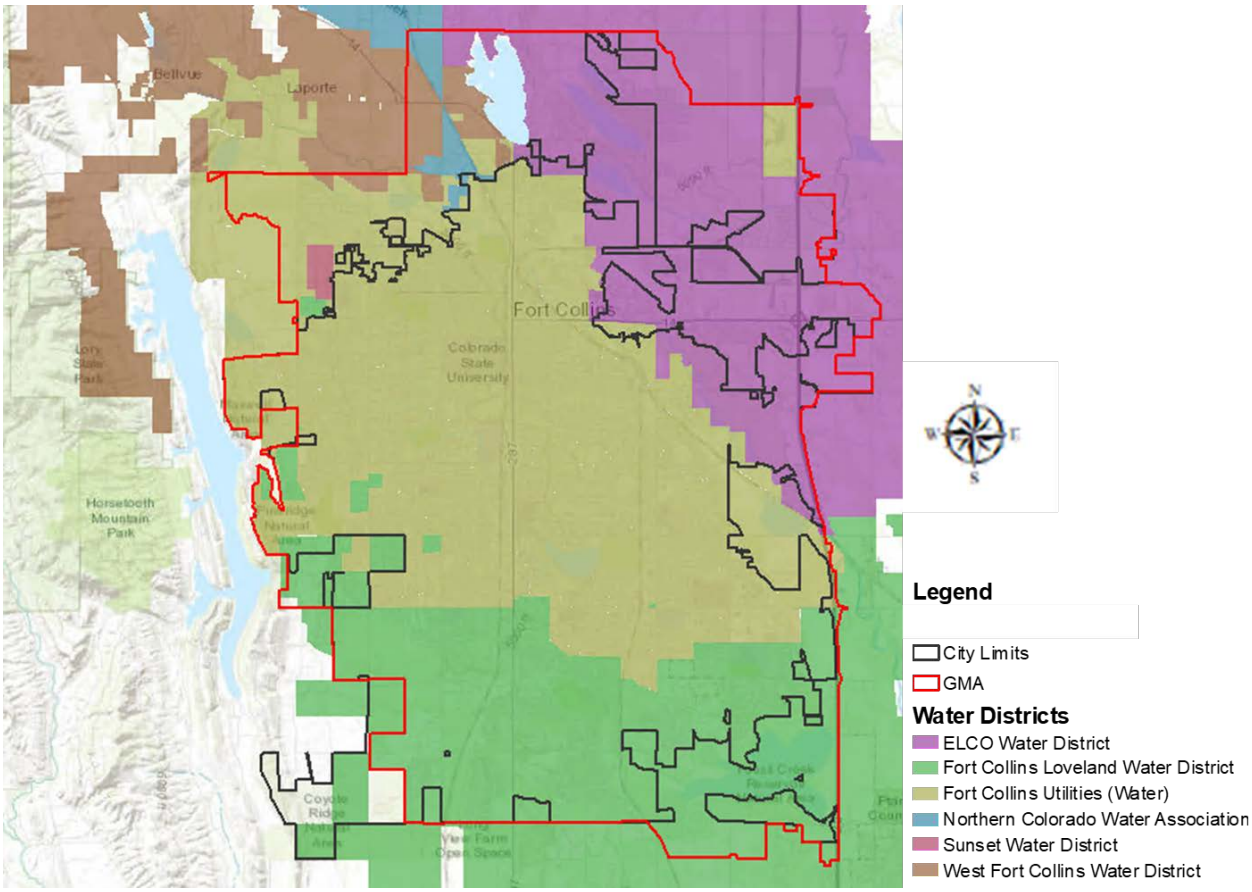

Figure 1-1 Spatial Extent of Fort Collins Utilities Service Area, City Limits and Surrounding Water Districts

FCU supplies an average of about 24,000 acre-feet per year (AFY) of treated water and about 1,100 AFY of raw water to both residential and commercial users with a service area population of approximately 134,300. Additionally, FCU currently has about 3,400 AFY of Colorado-Big Thompson Project obligations, including to City facilities and various Homeowners Associations, as well as agreements with surrounding water districts, municipalities and other entities. Current estimates for the FCU service area show an increase in population to about 178,000 by 2065. Fort Collins is home to Colorado State University and a few large commercial enterprises.

1.2.2 Fort Collins Utilities' Water Supply Sources

FCU's water supply sources come from the Poudre River Basin, the North Platte River Basin (with a transmountain diversion into the Poudre River Basin) and the Colorado-Big Thompson (C-BT) Project, including Horsetooth Reservoir and the Windy Gap Project. FCU's supplies include direct flow rights, converted agricultural rights, C-BT units, supplies from the Michigan Ditch, and storage in Joe Wright

Reservoir and Rigden Reservoir. Key facilities related to delivering water from these sources include two diversion points on the Poudre River, pipelines delivering Poudre River water, Joe Wright Reservoir, the Michigan Ditch, as well as facilities utilized to deliver C-BT and Windy Gap Project water. **Figure 1-2** shows the water supply system for FCU. FCU currently owns limited water supply storage outside of Joe Wright Reservoir. The reservoir, located near Cameron Pass along Colorado State Highway 14, has an active capacity of approximately 7,100 acre-feet. Joe Wright Reservoir is mainly utilized to satisfy current operational and exchange agreements, leaving limited availability for year over year or long-term drought storage. FCU has access to limited carryover storage as part of its ownership in the C-BT system. This storage is not managed by FCU and carries additional costs to utilize. FCU finalized construction and began operation of Rigden Reservoir in 2015. Rigden Reservoir, with an active capacity of 1,900 acre-feet, is located below the FCU wastewater treatment facilities and is not directly tied to treated water operations. Rigden Reservoir is mainly utilized as an operational reservoir to help meet return-flow obligations.

FCU's water supply portfolio contains enough sources to meet demands in most years. However, yields of many of its sources are greatly diminished in dry years, and yields are typically much greater in wet years (some in excess of FCU demands, particularly during the months of high Poudre River flows in May and June). Previous modeling efforts have shown the effect of reliably meeting demands by increasing ownership of water rights is relatively small compared to the effect of increasing system storage capacity due to the uncertainty of the timing of Poudre River flows with respect to the timing of demands.

FCU is currently in the midst of the National Environmental Policy Act (NEPA) permitting process for the enlargement of Halligan Reservoir, an existing reservoir on the North Fork of the Poudre River. The current capacity of Halligan Reservoir is owned and operated by the North Poudre Irrigation Company and cannot be utilized by FCU for water supply storage. Raising the dam will increase Halligan Reservoir's capacity from approximately 6,400 acre-feet to about 14,500 acre-feet and at the same time provide an opportunity to rehabilitate the over 100-year old dam. FCU has various existing water rights to fill the enlarged portion of the reservoir and enlargement would provide an additional 8,100 acre-feet of storage for FCU's use. Previous planning and analyses by FCU staff have determined that enlarging Halligan is a very cost-effective solution to increasing the use of their water rights.

On an annual average basis, FCU receives approximately half of its water supply from the Poudre River and half from the C-BT and/or Windy Gap Projects, which deliver water to Horsetooth Reservoir. FCU works closely with the Northern Colorado Water Conservancy District (Northern Water), which administers the C-BT and Windy Gap Projects, to utilize water supplies out of Horsetooth Reservoir.

FORT COLLINS WATER SUPPLY VULNERABILITY STUDY

INTRODUCTION

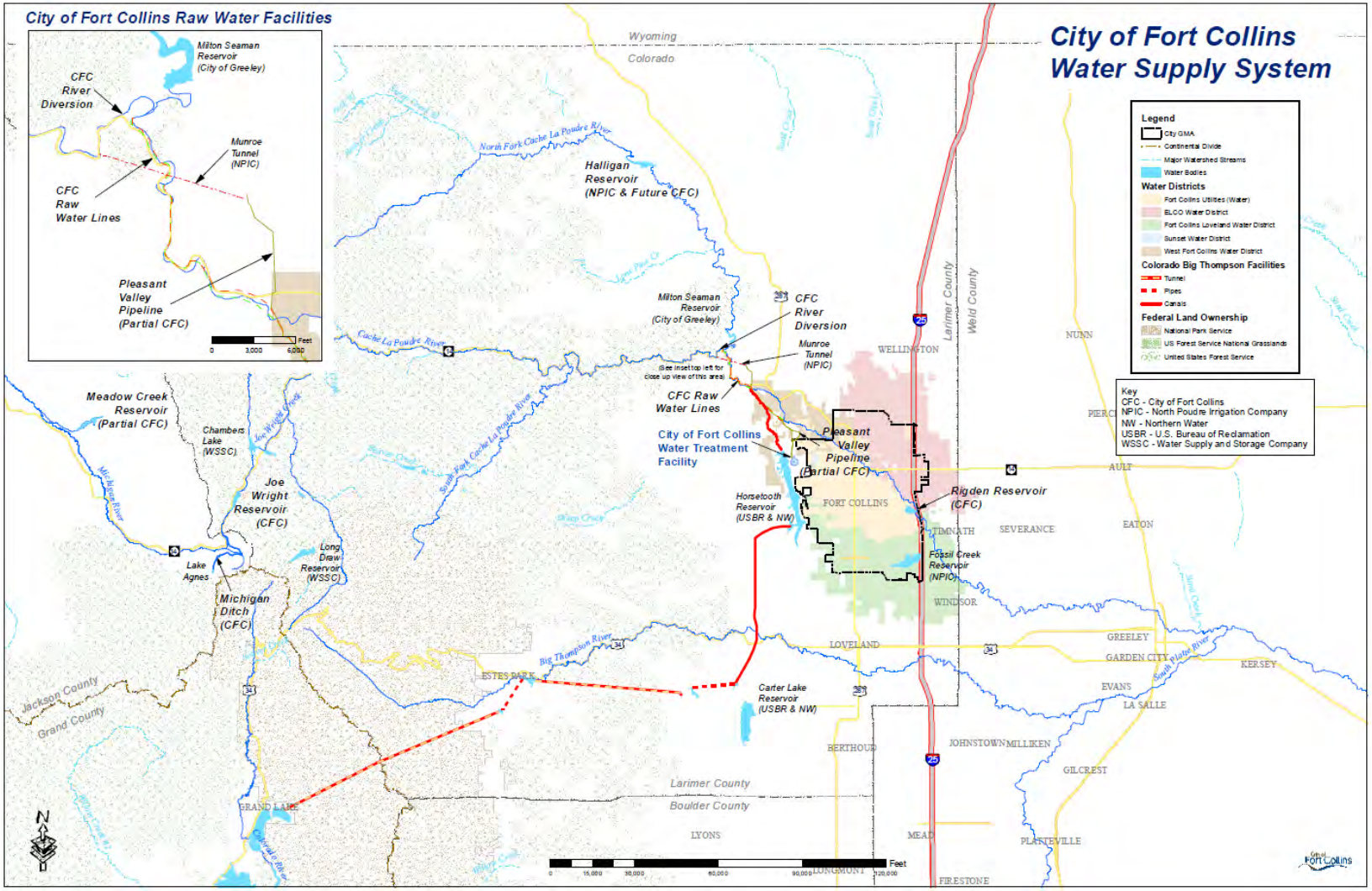

Figure 1-2 City of Fort Collins Water Supply System

1.3 SCOPE OF WORK

The WSVS Scope of Work consisted of the following main tasks.

1. Project Management – Manage scope, schedule and budget and coordinate the project with FCU staff and Northern Water
2. Background and Literature Review – Obtain background information on FCU water supply system and water resources and review applicable literature on climate change and other factors affecting FCU's' water supply reliability
3. Future Water Demand Considerations – Create and apply a Demand Estimation Tool to forecast future water demand, incorporating climate change, population growth and changing land use patterns.
4. Identify Water Supply and Demand Vulnerabilities – Brainstorm and prioritize risks and vulnerabilities that could affect water resources system performance.
5. Develop Potential Yield Changes – Estimate the effect of climate change on hydrology and water rights yield.
6. Scenario Analysis and Framework Development – Create future scenarios comprised of one or more types of risk or uncertainty and assess the performance of the existing water resources system under those scenarios.

1.4 PROJECT AUTHORIZATION

This project was performed by Stantec Consulting Services, Inc. under a contract with the City of Fort Collins. RTI International was a subconsultant to Stantec for hydrologic analyses and demand tool development.

1.5 PROJECT COORDINATION

This project was coordinated closely with FCU staff throughout the project through a series of seven formal workshops, weekly project updates and numerous informal meetings and conference calls.

Northern Water was a partner in the WSVS, providing supplemental funding as well as information and expertise related to its systems. Northern Water staff were included in workshops and project meetings as appropriate.

FCU assembled a Technical Advisory Committee (TAC) consisting of citizens and experts from its Water Resources Board, Colorado State University, and a member representing the surrounding water districts. TAC members were invited to project workshops and received project updates at selected milestones. TAC members included:

- Chris Goemans, Ph.D

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- Neil Grigg, Ph.D
- Phyliss Hortman
- Steve Malers
- Richard Raines

2.0 WATER RESOURCES SYSTEM MODEL

The WSVS involved risk-based water resources planning analyses that required a robust modeling platform to simulate the performance of FCU's raw water system under a wide range of possible future conditions. This section provides a high-level description of the modeling system used to support the WSVS analysis.

The basis of the WSVS modeling system is the water resource modeling platform developed by FCU and other regional water providers in the Poudre River Basin including Northern Water. New modeling tools and improvements to certain model constructs were developed as part of the WSVS project. Most new model development for FCU was performed under Stantec and RTI contracts separate from, but coordinated with, the WSVS study.

2.1 MODELING SYSTEM OVERVIEW

The modeling system used for the WSVS consists of three separate models: the Colorado-Big Thompson Quota Model (CBTQ), the Poudre Basin Network Model (PBN) and the Fort Collins System Model (FCSys). These are run in sequence through a Data Management System (DMS), as shown in **Figure 2-1**. The system is semi-automated and includes the ability to export FCSys output as PBN inputs and vice versa. The models operate on a monthly time-step and each model run simulates a single set of future conditions (water resources system operations and annual demand) for 86 years of variable hydrology.

The three models are described below.

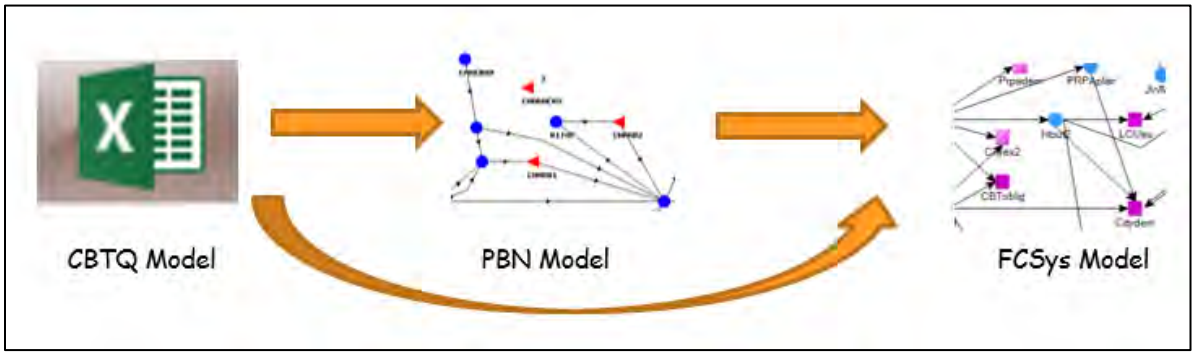

Figure 2-1 FCU Modeling System Overview

2.1.1 CBTQ Model

Northern Water issues allotment contracts for the allocation of Colorado-Big Thompson Project water supplies to water users such as FCU. The allotment contracts call for annual water allocations, known as quotas, to be set by the Northern Water Board based on hydrologic conditions and the needs of its

allottees for supplemental water. Because a significant portion of FCU water supply comes from the C-BT Project, WSVS analyses required an estimate of future C-BT quotas for the conditions being simulated.

The CBTQ Model was developed by Northern Water to estimate annual quotas of C-BT water for its constituents based on hydrology and current operations. The primary function of this model is to determine the C-BT agricultural (Ag) deliveries to the Poudre River for use in the Poudre Basin Network Model (PBN) described below. The CBTQ model is a spreadsheet model and includes native flows of pertinent rivers and creeks on the East Slope and the West Slope that contribute to the C-BT project. Other model inputs include precipitation at the Fort Collins station, starting reservoir storage volumes, initial C-BT M&I ownership and demand, C-BT Ag demand, carryover, influence of the Windy Gap Project and influence of East Slope wildfires. Outputs include annual C-BT quotas, Windy Gap Firming Deliveries and other agricultural ditch deliveries to be imported into the PBN Model. From the C-BT quota, the Fort Collins C-BT allocation can be generated as an input to the FCSys model.

2.1.2 PBN Model

The Poudre Basin Network (PBN) Model is a MODSIM model that simulates water supply infrastructure and operations by municipal, industrial and agricultural entities in the Poudre River basin and the lower South Platte River basin below the Poudre River confluence near Greeley. It was originally developed by Resource Consultants in 1985 for the Fort Collins Drought Study (Resource Consultants, 1985) but has been enhanced by Fort Collins, Northern Water and Greeley over the years to serve a number of purposes. The PBN includes all major water rights within the basin and exchanges operated under their given priority. It also has several special constructs to model system operations such as the routing of transbasin water, return flows and ground water.

The main purpose of the PBN is to quantify yields of agricultural and municipal water rights in the Poudre and South Platte basins. For municipal water providers, the PBN quantifies the potential yield from their water rights for use in their individual system models (such as the Fort Collins System Model described below) for a more refined estimation of current and future water system operations and water use.

Extensive documentation of the PBN model can be found in the Common Technical Platform (CTP) Modeling Report used for the Northern Integrated Supply Project (NISP) environmental impact studies (CDM Smith, 2013). The CTP is also used in the upcoming Halligan Water Supply Project environmental impact studies. Input data selections for the PBN model were the same as the future conditions used for the NISP and Halligan projects environmental permitting analyses.

2.1.3 FCSys Model

The Fort Collins System Model (FCSys) is a MODSIM model developed by FCU that simulates the FCU water supply system under various water demand, water rights, infrastructure and operational scenarios. Output from the PBN model informs the FCSys direct flow water right yields and storage water rights owned by FCU. The FCSys simulates city water deliveries, deliveries to large contractual users (LCU), releases from Joe Wright Reservoir to meet minimum flow requirements under the Joint Operations Plan (JOP) and return flow obligations from the use of converted agricultural water rights. The model also

includes several potential future system components, including additional storage and inflow points for conditional water rights yields.

The FCSys simulates the yield from FCU's shares in several agricultural ditches. These shares are subject to specific terms and conditions, laid out in the change of use decrees. For shares that have not yet been converted to municipal use, certain assumptions have been made regarding future limitations on their use.

As part of the WSVS model upgrades, several improvements were made to the FCSys to more accurately simulate current raw water operations and to remove dependencies of the Excel preprocessing spreadsheet to streamline the automatic simulation of scenarios. Key improvements are described below.

- Simulate the operation of two change of use decrees for the South Side Ditches (SSD), which include New Mercer Canal, Larimer No. 2 Canal and Arthur Ditch, which requires the model to constrain diversions such that they do not exceed the 1-year, 10-year and 30-year running average volumetric limits specified in the decree. The model was revised to include a new side construct and custom code to iterate on the river exchanges such that the water available to meet demand does not exceed the diversion constraints or the exchange potential in the river. The new model also simulates the associated return flow obligations triggered using that water, which is dynamically calculated at run time.

- The FCSys simulates operation of FCU's Reuse Plan. The Reuse Plan is a series of water trades between FCU, Platte River Power Authority (PRPA) and the Water Supply and Storage Company (WSSC). The purpose of the Reuse Plan is to provide 4,200 AFY of reusable (wholly consumable) water produced at the Drake Water Reclamation Facility (DWRF) to the PRPA Rawhide Energy Station. The first use of 6,339 AFY of reusable water, delivered to single-use water customers, results in 4,200 AF of reusable effluent at DWRF that can be piped to the PRPA power plant to fulfill the terms of the Reuse Plan. The upgraded model implements a dynamic representation of the Reuse Plan reducing the water available to meet the City demand if any of the water sources (or combination of sources) fails to have enough water to operate the full Reuse Plan. This implementation allows the model to dynamically simulate water supply operations with a reduced Reuse Plan, making sure that the flexibility to operate the plan is reflected in meeting the requirements and the effects of different water use are carried over to the following years.

- The upgraded model enables simulation of meeting an 800 acre-feet PRPA water demand that is part of the Reuse Plan. This demand can be supplied from storage in Halligan Reservoir, Joe Wright Reservoir, Rigden Reservoir and the SSD return flows. The upgraded model simulates the SGP Reservoir node with a capacity of 1,600 acre-feet. The implementation of this demand links its operation with the Reuse Plan operation, reducing the demand if the full Reuse Plan is not able to be operated.

- The upgraded model implements a new logic for blending water from the Poudre River and Horsetooth Reservoir for water quality purposes at the water treatment plant. The blending logic

controls diversions from the Poudre River to achieve a typical or desired operational mixing ratio between those two sources. This operation supplies the city with a mix of Horsetooth Reservoir and Poudre River supply that is feasible and cost efficient for the City to treat at the current treatment plant while meeting the desired water quality. The logic relaxes the blending constraint in water stress periods when there is not enough water in either of the sources to supply the full demand, i.e., the logic uses the available water in water stress situations to avoid causing additional water shortages.

2.1.4 Data Management System

The modeling framework used for the WSVS consists of a new Data Management System (DMS). As shown in **Figure 2-2**, the DMS structure has three major components: the Structure Query Language (SQL) server database (in which model inputs such as hydrology, demand and system risks and output metrics are stored), the simulation model system and the DMS program (code) itself. User defined model settings are entered into the DMS which extracts the desired model inputs and scenario information from the database and translates them into raw input files for the CBTQ, PBN and FCSys models. The models are then run with these settings, in sequence, and the DMS calculates and extracts the output metrics. The results stored in the database can be accessed by external visualization software such as Tableau for further analysis.

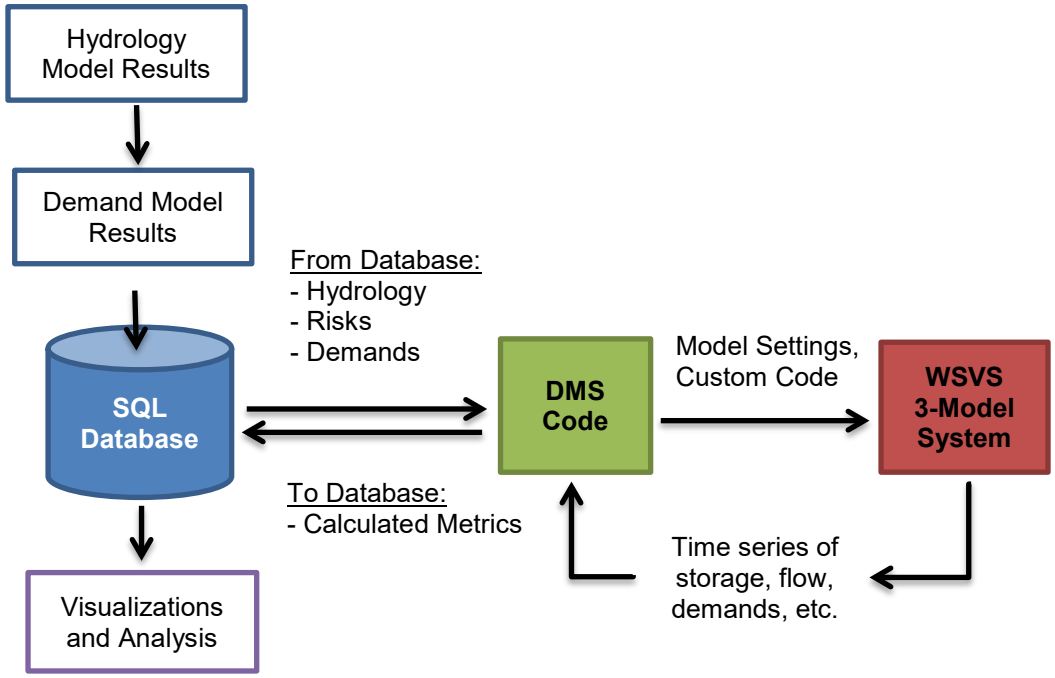

Figure 2-2 WSVS Data Management System

2.1.5 Comparison of WSVS Modeling System to Previous Models

Fort Collins has used previous versions of the PBN and FCSys models for past water resources planning and decision-making. Other agencies such as Northern Water and Greeley have used previous versions of the PBN model for their planning. For example, the Halligan Water Supply Project Environmental Impact Study (EIS) and the Northern Integrated Supply Project EIS used previous versions of the PBN and FCU's system models in a Common Technical Platform (CTP) to size the respective water supply projects and EIS alternatives and assess their hydrologic impacts in the Poudre River Basin. For the WSVS, analyses including an enlarged Halligan Reservoir were all based on the size of the enlargement developed from the CTP and used in the EIS studies.

The Halligan Project EIS modeling and the WSVS modeling are distinct modeling efforts that have been conducted for separate purposes. The WSVS modeling system was not developed to re-evaluate the proposed sizing of the Halligan Water Supply Project, and it does not simulate flows in streams that could be affected by water development projects in the Poudre River basin. Rather, the modeling system modifications made as part of the WSVS were necessary to give FCU the ability to assess future risks to the performance of its water resources system. Previous versions of the modeling system were not capable of simulating risks to the system such as climate variability, environmental risks and infrastructure outages, or of running and tracking many different scenarios simultaneously. In addition, the previous modeling system was not set up to calculate measures of system performance such as reliability and resilience that FCU wants to use in future water supply planning studies. These modeling system improvements were required as part of the WSVS to identify and prioritize future risks for which FCU should be planning with or without the proposed enlargement of Halligan Reservoir.

2.2 METRICS AND LEVEL OF SERVICE GOALS

This section summarizes the development of metrics and level of service goals that were necessary to measure and assess the performance of the FCU water resources system under simulated risks and uncertainties. More detail is provided in the Level of Service Goals and Metrics Technical Memorandum (Stantec, 2018a), included in Appendix A.

The WSVS used the FCU modeling system to evaluate FCU water supply system performance. "System performance" is defined as the ability to meet customer demands and satisfy adopted water supply planning policy criteria. For FCU, the current policy establishes an objective of:

- meeting demands calculated using a per capita use factor of 150 gallons per capita per day,
- through the 1-in-50-year drought,
- with no shortages or water restrictions,
- while maintaining a minimum of 20 percent of annual demand in reservoir storage at all times (storage reserve factor).

As part of the WSVS, the performance of the FCU water supply system was quantified using measurable parameters (metrics) with target values based on the water supply policy criteria (level of service goals). The performance metrics and level of service goals were identified and calculated as part of the modeling system outputs.

Performance metrics and level of service goals, needed to quantify satisfactory and unsatisfactory water supply system performance, are further defined as follows.

Performance Metrics are specific measures characterizing the key features of a water supply system that are definable, measurable, representative and unique. Performance metrics are traditionally presented using the terms reliability, resilience and vulnerability (RRV) but can also be calculated using statistical measures such as the mean, median, maximum, or minimum. The formal definitions of reliability, resilience and vulnerability are:

- *Reliability* is the probability that the water supply system feature is in a satisfactory state, answering the question “how often”.
- *Resilience* is the probability that a time period when the water supply system feature is in an unsatisfactory state is followed by a time period when the water supply system feature is in the satisfactory state, answering the question “how long”.
- *Vulnerability* is the severity or magnitude of the unsatisfactory state for the water supply system feature, answering the question “how severe”.

Other examples of performance metrics could be maintaining a minimum volume of water in storage in July, years without customer restrictions, or a target for use of C-BT supplies.

Level of Service (LOS) goals are thresholds used to separate key performance metrics into satisfactory and unsatisfactory states. Examples of level of service goals could be triggering customer watering restrictions 5% of the time or maintaining a volume of water equivalent to 1 year of demand in storage in April in 90% of years.

Performance metrics were identified during a workshop conducted with FCU staff and were tied to the current water supply planning policy criteria. **Table 2-1** lists the identified performance metrics for the FCU water supply system that were used for the WSVS.

Table 2-1 Identified Performance Metrics

	ID	Performance Metric	Description
Meeting Customer	1	Minimum Met Annual Demand	The minimum annual demand met in acre-ft/year across a simulation
	2	Meeting Indoor Demands	The RRV[3] of meeting indoor demands across a simulation
	3	Meeting Reduced Demands	The RRV[3] of meeting demands after they have been reduced by restrictions

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	ID	Performance Metric	Description
	4	Annual Response Level 1 Restrictions[1]	The R&R[2] of when customers are in Response Level 1 restrictions across a simulation
	5	Annual Response Level 2 Restrictions[1]	The R&R[2] of when customers are in Response Level 2 restrictions across a simulation
	6	Annual Response Level 3 Restrictions[1]	The R&R[2] of when customers are in Response Level 3 restrictions across a simulation
	7	Annual Response Level 4 Restrictions[1]	The R&R[2] of when customers are in Response Level 4 restrictions across a simulation
Maintaining Supply in Storage	**8**	0.1-Year of Demand in System Storage	The RRV[3] of maintaining 0.1-Year of Demand in Storage at all times during a simulation
	9	0.2-Year of Demand in System Storage	The RRV[3] of maintaining 0.2-Year of Demand in Storage at all times during a simulation
	10	0.3-Year of Demand in System Storage	The RRV[3] of maintaining 0.3-Year of Demand in Storage at all times during a simulation
	11	0.4 Year of Demand in System Storage	The RRV[3] of maintaining 0.4-Year of Demand in Storage at all times during a simulation
	12	0.5 Year of Demand in System Storage	The RRV[3] of maintaining 0.5-Year of Demand in Storage at all times during a simulation
	13	0.6 Year of Demand in System Storage	The RRV[3] of maintaining 0.6-Year of Demand in Storage at all times during a simulation
	14	0.7 Year of Demand in System Storage	The RRV[3] of maintaining 0.7-Year of Demand in Storage at all times during a simulation
	15	0.8 Year of Demand in System Storage	The RRV[3] of maintaining 0.8-Year of Demand in Storage at all times during a simulation
	16	0.9 Year of Demand in System Storage	The RRV[3] of maintaining 0.9-Year of Demand in Storage at all times during a simulation
	17	1.0 Year of Demand in System Storage	The RRV[3] of maintaining 1.0-Year of Demand in Storage at all times during a simulation
	18	Minimum Storage – Year of Demand	Minimum Year of Demand storage volume during a simulation
	19	Minimum Storage – acre-feet	Minimum acre-foot storage volume during a simulation
Operational	**20**	Lost Water Due to Water Quality Requirement	Statistical quantifications (average, max, count) of annual volume of water lost due to water quality blending requirements
	21	Lost Water Due to Insufficient Storage	Statistical quantifications (average, max, count) of annual volume of useable water lost due to insufficient storage capacity
	22	Meeting Reusable Demands	The RRV[3] of meeting reusable demands

Notes:
1) As defined in the Water Supply Shortage Response Plan (City of Fort Collins, 2014)
2) R&R is Reliability and Resilience
3) RRV is Reliability, Resilience and Vulnerability

The performance metrics were evaluated to determine which are applicable as level of service goals and what the thresholds for level of service are. Seven performance metrics were included as level of service goals, which are shown in **Table 2-2**. Level of service goals were selected to align with FCU's water supply planning policy criteria.

The selected level service goals are primarily customer-facing, such that futures that significantly impact customers based on the current water supply policy will be considered unsatisfactory. These are defined briefly below.

- Any future for which indoor demands are not always met (100% reliability) will be unsatisfactory.
- The current water supply policy sets a goal of meeting all demands during the 1-in-50 year drought without water restrictions. However, based on recent experience, FCU accepts future conditions in which any type of water restriction is declared as often as every 1 in 10 years (90% reliability) with more impactful water restrictions occurring less frequently.
- To comply with the current water supply policy, at least 20% of annual demand must be maintained in storage at all times for a future to be considered satisfactory. This is referred to as the Storage Reserve Factor.
- Finally, all reusable demands must be met 100% of the time.

Table 2-2 Selected Level of Service Goals

ID	Performance Metric	Level of Service Goal	Justification
2	Meeting Indoor Demands	100% Reliability	Greatest customer impact
4	Annual Response Level 1 Restrictions[1]	1 in 10 Years (90% Reliability)	Perceived customer risk tolerance
5	Annual Response Level 2 Restrictions[1]	1 in 25 Years (96% Reliability)	Perceived customer risk tolerance
6	Annual Response Level 3 Restrictions[1]	1 in 100 Years (99% Reliability)	Perceived customer risk tolerance
7	Annual Response Level 4 Restrictions[1]	1 in 500 Years (99.8% Reliability)	Perceived customer risk tolerance
9	0.2-Year of Demand in System Storage	100% Reliability	Governing policy
20	Meeting Reusable Demands	100% Reliability	Reuse Plan Agreement

[1]**As defined in the Water Supply Shortage Response Plan (City of Fort Collins, 2014)**

These LOS goals were used in the WSVS to separate futures for which water supply system performance is satisfactory from those for which it is unsatisfactory. However, these LOS goals are a policy decision, and one potential water resources strategy is to change the LOS goals or thresholds to take on more risk. For example, FCU could lower the storage requirement from 0.2 to 0.1 years of demand in storage with 100% reliability, thereby improving performance (relative to the relaxed objective) but increasing the risk

that sufficient water would not be available during an emergency. This question will be addressed as part of a future study to update the FCU Water Supply and Demand Management Policy.

3.0 HYDROLOGY

A primary input to the WSVS analysis was future inflows to the FCU water supply system. Because an objective of the WSVS was to investigate the impact of hydrologic uncertainty on the FCU system, estimating future inflows for water supply planning required a hydrologic analysis incorporating uncertainty in the timing and magnitude of future surface water supplies. Hydrologic uncertainty could be due to greater interannual variability than is present in the historical record or to long-term climate change.

This section summarizes the process used to develop 100 potential hydrologic sequences based on the same statistics as the historical hydrologic record but incorporating more variability and the adjustment of those sequences to incorporate potential future climate change. The process used to generate potential future hydrologies is described in two technical memoranda – Future Hydrologic Analysis Technical Memorandum (RTI, 2018) and Hydrologic Modeling Approach Technical Memorandum (RTI, 2018b) in Appendix D and in Appendix E.

3.1 HYDROLOGIC MODELING APPROACH

Synthetic sets of potential future hydrologic inputs that include variability and large-scale shifts in precipitation and temperature trends due to potential climate change were generated for use in the Fort Collins Modeling System. These datasets capture more natural variability and more climate effects than the historical observed streamflow record, and thus, represent sets of different potential conditions in the basin. **Figure 3-1** provides an overview of the process used to generate hydrologic datasets for the WSVS.

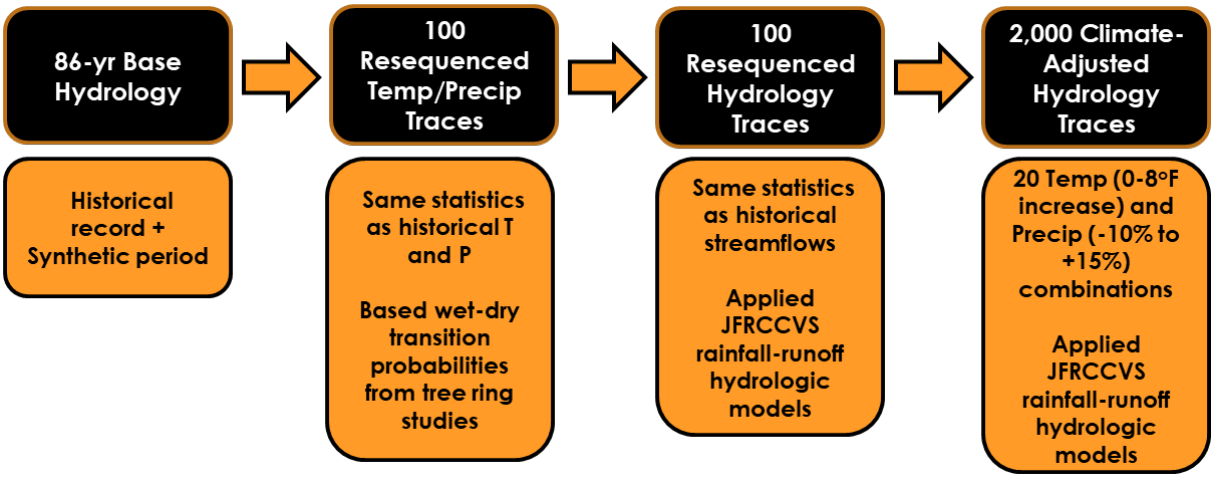

Figure 3-1 Overview of Hydrologic Analysis Process
Note: JVRCCVS = Joint Front Range Climate Change Vulnerability Study

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HYDROLOGY

To construct the WSVS hydrology datasets, 100 sets of 86-year long monthly precipitation and temperature data sequences were developed based on wet to dry year transition probabilities seen in an ensemble of reconstructed flows for the Cache la Poudre River at Canyon Mouth (Woodhouse, 2006). These traces of “weather” were then used to generate 100 streamflow traces using the Joint Front Range Climate Change Vulnerability Study (JFRCCVS) hydrologic models. These synthetic traces are similar to historical streamflow but with potentially longer dry periods or more variable transitions from wet to dry periods.

Next, each trace was climate adjusted based on 20 combinations of temperature and precipitation changes from historical conditions. The temperature and precipitation offsets were based on the range of future conditions forecast by commonly used Global Climate Models (GCMs). A range of published results for the CMIP 5 (Coupled Model Intercomparison Project Phase 5), 4.5 and 8.5 emission scenario GCM models in the Poudre River watershed are shown in **Figure 3-2**. In emission scenario 4.5, greenhouse gas emissions peak around 2040, then decline. In emission scenario 8.5, greenhouse gas emissions continue to rise throughout the 21st century.

The figure shows dots at pairs of simulated change in average temperature and precipitation from 1981-2010 to 2050-2074, for each GCM model and for each emission scenario, in relation to the selected temperature and precipitation changes selected for this study (i.e., shown by the triangles). In general, GCMs consistently show that future climate in the Poudre River watershed will be warmer, but they are not consistent in predictions about the direction of change in future precipitation. Similar findings apply to GCMs in the Upper Colorado River watershed that supplies the C-BT Project. The WSVS is concerned with hydrologic conditions that would stress the FCU water supply system, so 20 T/P combinations were selected ranging from 0 to 8 degrees Fahrenheit warmer and -10% to +15% wetter. The National Climate Change Viewer from USGS indicates precipitation changes from -6% to +31%, and temperature increases from 0.6 °C to 4.9°C for the Poudre basin across the different GCMs for the 2050-2074 period (Alder and Hostetler, 2013). If studies were to look further into the future, changes would likely continue to increase. While some GCMs indicate that precipitation may increase more than 15%, FCU does not expect larger precipitation increases to be a source of vulnerability. The result of the climate change review was selection of 2,000 (100 x 20) climate altered hydrologic sequences that could be used to test the impact of future climate on FCU system performance.

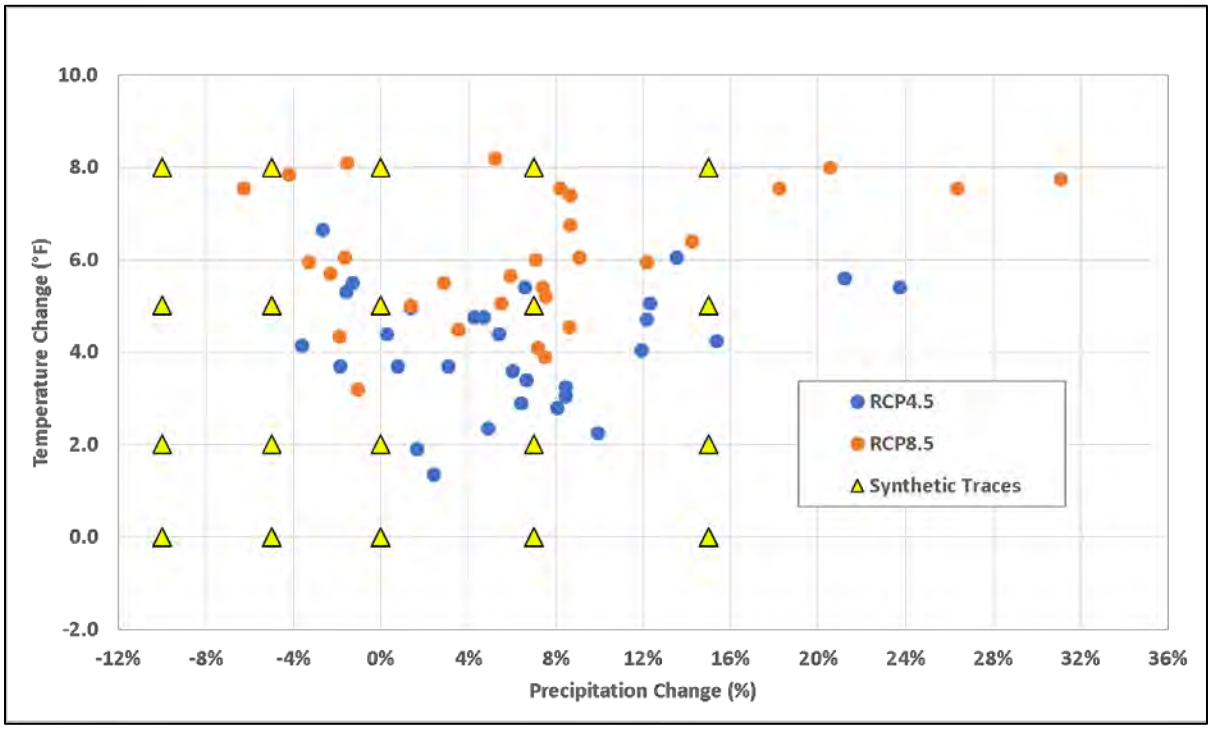

Figure 3-2 Temperature and Precipitation Combinations Used for Climate Change Hydrology Compared to Range of Selected GCMs

Note: GCM results represent the simulated increase in temperature and precipitation projected by the CMIP 5 models with emission scenarios 4.5 and 8.5. The increase in temperature and precipitation is calculated as the increase of the average simulated values for the period between 2050 and 2074 conditions, compared with the average for the period 1981-2010.

3.2 HYDROLOGIC RESULTS

The hydrology results described above capture more natural variability and more climate effects than the historical observed streamflow record; and thus, represent sets of different potential conditions in the basin. Reconstructed input data for the model were based on the sum of flows at the Cache la Poudre River at Canyon Mouth and the Colorado River at Granby Lake. **Figure 3-3** shows annual average flows for about 20 of the constructed flow traces without climate adjustments for the Cache La Poudre at Canyon Mouth and the Lake Granby gage locations. The blue line is the historically modeled flows from which the other traces were developed. As seen, there is significant year-to-year variability. The randomly chosen subset of constructed flows range from a minimum of around 50,700 AFY to a maximum of 687,800 AFY for the Cache La Poudre gage and from 79,600 AFY to 629,900 AFY for the Granby gage. The baseline trace for the Cache La Poudre gage has comparable overall annual averages between 50,700 AFY and 579,200 AFY and the baseline trace for the Granby gage has an overall average annual flow between 108,600 AFY and 514,000 AFY.

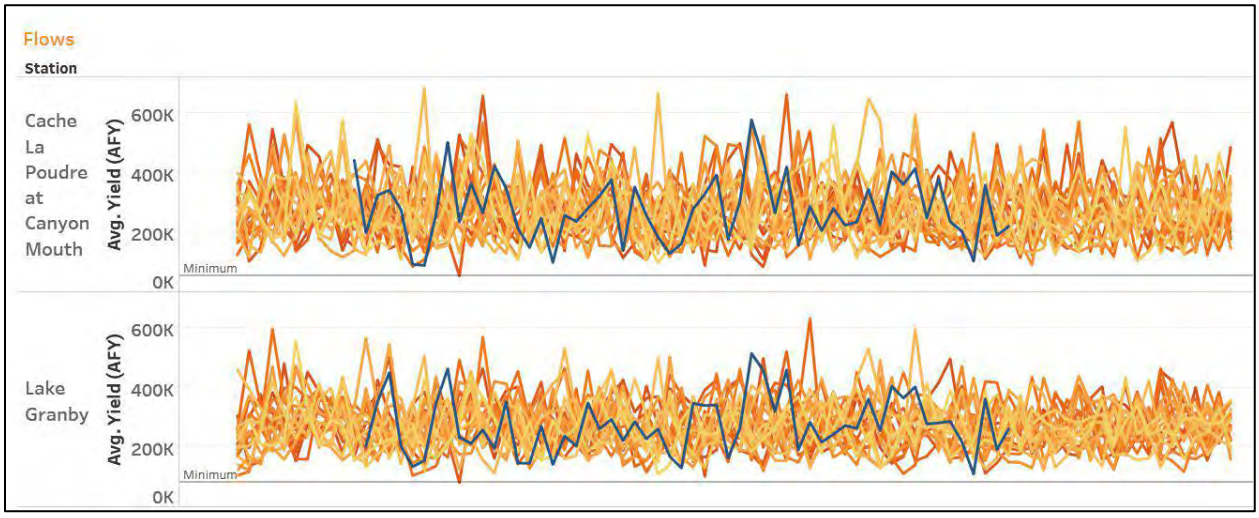

Figure 3-3 Average Annual Synthetic Flow Traces Without Climate Adjustment for the Cache la Poudre at Canyon Mouth and Lake Granby Gages

Naturalized streamflows for 11 inflow points in the PBN model that represent water availability were generated from these 2,000 new hydrology sets. The simulated naturalized flows are the source of the main hydrology inputs for the PBN model. A few PBN constructs such as the excess precipitation construct, agricultural demands and the trans-basin diversions were identified as needing an approach that would synchronize those inputs with the same future hydrologic conditions. The selected approach was based on the like-year method, used in previous PBN analyses for estimating these PBN input time series for future conditions. The like-year method determines values for the new time series based on values from a historical year with the most similar total annual flows at key locations. For consistency, all PBN model input time-series, except the generated 11 naturalized stream flows, used a like-year approach to simulate future conditions.

The synthetic naturalized flow datasets had both wetter and drier periods of flow than the historical base flow dataset. These flows also had, for some climates, an earlier shift in peak runoff. **Figure 3-4** shows an example of the peak runoff shifting from June in the no climate change condition to May in the two warmest climate conditions. Simulating these changes in the models through the synthetic hydrologic inputs incorporate identified risks by both FCU and Northern Water surrounding changes in runoff timing.

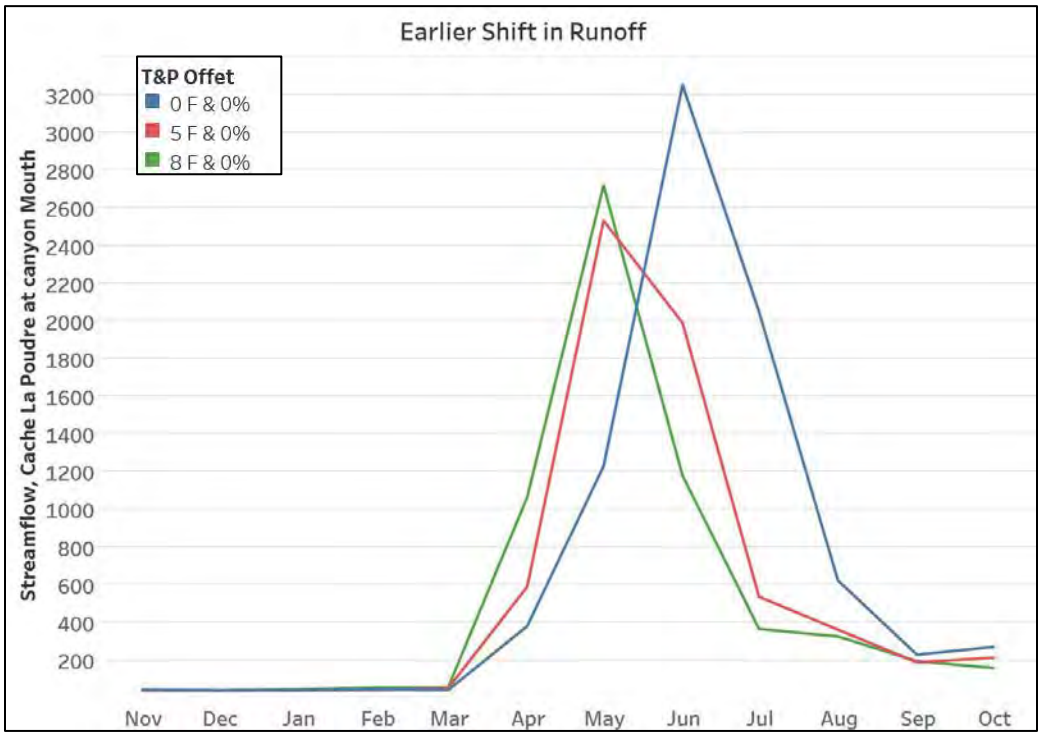

Figure 3-4 Streamflow for Selected Trace Depicting a Shift to Earlier Runoff for Warmer Climates

Figure 3-5 shows the average of the annual flows for all 100 traces for each of the 20 climate combinations for both the Poudre River at Canyon Mouth naturalized flows and the Lake Granby naturalized flows. Average annual streamflow volumes amongst the traces for the Poudre River at Canyon Mouth range from 70% of baseline flow (i.e., the flow based on historical temperature and precipitation, or delta T = 0 and delta P = 0) for the hottest, driest traces to 139% of baseline flow for the coolest, wettest traces. Flow changes at Granby were comparable. For comparison, under a plausible future climate that is 5 degrees F warmer than historical with the same average annual precipitation, the simulated average annual streamflow at the Poudre River at Canyon Mouth gage is 21,000 AFY (8%) less than historical.

		Delta P				
Basin	Delta T	-10%	-5%	0%	7%	15%
Cache La Poudre at Canyon Mouth	8 F	70% 189,516	79% 214,864	88% 241,156	103% 279,926	120% 326,717
	5 F	72% 197,600	82% 224,065	92% 251,456	107% 291,295	125% 339,726
	2 F	75% 204,550	86% 233,415	97% 263,366	113% 307,497	132% 361,271
	0 F	77% 209,967	88% 240,600	100% 272,680	118% 320,455	139% 378,560
Lake Granby	8 F	70% 190,797	80% 215,992	89% 241,377	102% 276,540	117% 316,072
	5 F	74% 200,493	84% 226,635	93% 252,835	107% 288,931	121% 328,746
	2 F	78% 210,964	88% 237,245	97% 263,351	111% 299,719	126% 340,232
	0 F	81% 218,725	90% 244,938	100% 270,981	113% 306,969	128% 347,893

Figure 3-5 Average Annual Flow Volume for Hydrologic Traces

Note: Each cell shows the mean of the average annual flows for the 100 traces with the corresponding T/P combination expressed in AFY and as a percentage of the average annual flow for the T=0, P=0 combination.

In recent water supply planning studies, including the Halligan Water Supply Project EIS, FCU has used a single 86-year hydrologic record that is a combination of historical data and a statistically developed synthetic period. The synthetic period includes the statistically developed 1-in-50-year critical drought used for previous planning studies and defined in FCU's water supply planning policy. The critical drought period has a 6-year duration with an average annual flow at the mouth of the canyon of 196,090 acre-feet. In order to compare that 6-year critical period with the most severe 6-year droughts in the synthetic hydrologic traces developed for this study, the minimum 6-year rolling average annual flow volumes were computed for each of the 2,000 hydrologic scenarios. This provides a proxy for comparing the 1-in-50-year drought used for past planning with the relative severity of the 6-year critical periods embedded in the WSVS synthetic hydrology.

Figure 3-6 shows the average magnitude of the minimum 6-year rolling average flow for the 100 traces in each of the 20 climate change combinations for the Cache La Poudre at Canyon Mouth gage, and also reports this value as a percentage of the 196,090 acre-feet annual flow used as the critical drought in past planning studies by FCU. The 100 hydrologic traces in the WSVS hydrologic dataset for the unaltered historical climate conditions (T=0, P=0%) have an average 6-year critical period flow at this location of 191,343 AFY, which is a 2% reduction from the historical critical drought period. The hottest/driest climate condition (T=+8, P=-10%) produces an average 6-year critical period annual streamflow that is 31% less than the critical period streamflow currently used for planning. The coolest/wettest climate condition (T=0, P=+15%) produces an average 6-year critical period annual streamflow that is 38% more than the critical period streamflow currently used for planning.

Basin	Delta T	Delta P -10%	-5%	0%	7%	15%
Cache La Poudre at Canyon Mouth	8 F	69% 134,494	79% 154,857	90% 175,760	105% 206,438	124% 242,757
	5 F	71% 138,641	82% 160,128	93% 182,329	109% 214,181	129% 252,189
	2 F	72% 141,549	84% 164,188	96% 187,637	113% 222,273	134% 262,657
	0 F	74% 144,201	85% 167,066	98% 191,343	116% 227,311	138% 270,817

Figure 3-6 Minimum 6-year Average Annual Flow Volume for Climate Altered Hydrologic Traces in Acre-Feet per Year and as a Percentage of Hydrologic Traces Based on Historical Climate - Cache La Poudre at Canyon Mouth gage

Notes:

a) Each cell presents values based on the average of 100 traces for the pertinent climate condition.
b) The lower value in each cell is calculated from the lowest 6-year moving average value in the 86-year synthetic streamflow traces.
c) The upper value in each cell is the minimum 6-year moving average flow volume for that climate condition expressed as a percentage of the minimum 6-year moving average flow volume from the FCU planning hydrology.

Figure 3-7 shows the percentage of the 100 traces for each of the 20 climate adjustments at the Cache La Poudre at Canyon Mouth gage that capture at least one 6-year critical drought period that is worse than the critical planning drought from the current FCU hydrologic planning timeseries. The figure illustrates the minimum 6-year average flow in a synthetic 86-year hydrologic trace is very sensitive to average annual precipitation. A 5% decrease in average annual precipitation forces essentially all traces to have at least one 6-year critical period with less average streamflow than in the critical period currently used by FCU for water supply planning. Conversely, a 15% increase in average annual precipitation forces essentially all traces to have no 6-year critical periods with less streamflow than in the critical period currently used by FCU for water supply planning.

		Delta P				
Basin	Delta T	-10%	-5%	0%	7%	15%
Cache La Poudre at Canyon Mouth	8 F	100%	100%	89%	26%	2%
	5 F	100%	100%	80%	15%	1%
	2 F	100%	99%	64%	11%	1%
	0 F	100%	99%	55%	7%	0%

Figure 3-7 Percent of Hydrologic Traces with a Minimum 6-year Average Annual Flow Volume at Cache La Poudre at Canyon Mouth Gage Less Than Critical Planning Drought

These characteristics of the WSVS hydrology are important when interpreting the vulnerability study results relative to water supply policy criteria that are based on the 6-year duration, 1-in-50-year drought in the runoff data currently used for planning. The minimum 6-year moving average flow analysis demonstrates that the 1-in-50-year drought upon which the current water supply policy is based is highly sensitive to assumed climate conditions. This explains the sensitivity of system performance metrics based on the water supply policy to future climate variability, as described in Section 7.3.

4.0 WATER DEMANDS

Future water demand is a significant uncertainty to be evaluated in the WSVS. Water demand is a function of population, development density, success of water conservation measures, technology in water fixtures and irrigation systems, economic conditions and other factors that are difficult to predict. In addition, demand varies year to year based on weather conditions during the landscape irrigation season. As a result, the WSVS required a method for estimating future water demands under a range of assumed future conditions.

Future water demands for the FCU service area were estimated using a new Demand Estimation Tool developed for this project. Development of the Demand Estimation Tool is described in the Water Demand Forecasting Tool Technical Memorandum (RTI, 2019) contained in Appendix C. This section provides a brief description of the Demand Estimation Tool and the demand forecasts developed for use in the WSVS.

4.1 DEMAND FORECASTING TOOL

The Fort Collins Demand Estimation Tool incorporates the variables and computational algorithms used in the demand forecasting model, which was developed based on input by FCU staff and implemented by RTI. The demand model consists of individual linear regression models, each developed for the following groups of water customers: single family and duplex, multifamily, commercial small, commercial medium and commercial large customers. It was developed using processed historical customer-level water use data from 2001-2016 to estimate future water demand at a monthly time step. The independent variables used in the model to estimate water use under different future conditions are listed in **Table 4-1**. Not all independent variables were used to estimate water demand for all the customer groups.

Table 4-1 Independent Variables Used in the Regression Equations in the Demand Estimation Tool

Variable Name	Description
(Intercept)	Equation constant
daysover85	Numbers of days in the month with the max temp over 85
irrig_rain_mon	Total rain in the month, only for May through September, equals zero for the other months
summer	Equals 1 if May through Sept
bed	Number of bedrooms
units	Numbers of units
unemprate	Unemployment rate (monthly)
parcel_acr_CLg	Parcel size, acres for large commercial
parcel_acr_CMd	Parcel size, acres for medium commercial
parcel_acr_CSm	Parcel size, acres for small commercial
parcel_acr_MF	Parcel size, acres for multi-family parcels

Variable Name	Description
parcel_acr_SMDUP	Parcel size, acres for single family and duplex parcels
commindust	Equals 1 if primarily an industrial or commercial zone
downtown	Equals 1 if primarily a downtown zone
harmish	Equals 1 if primarily a harmony corridor or employment zone
residential	Equals 1 if primarily a residential zone
retail	Equals 1 if primarily a retail zone

The Demand Estimation Tool estimates future water demand using the demand regression models to predict the average water use, per premise, by month for each of the five water user types. Because water demand is estimated as a function of weather variables such as monthly rainfall and temperature, the Demand Estimation Tool output consists of monthly demands for a specific sequence of hydrologic years as input by the user. The base water demand is calculated, aggregating the premise level demand across customer groups, for a predicted number of premises. The total demand includes the base demand, the supply obligations for the large commercial users (LCUs) and the estimated general distribution losses. The water demand can be estimated for different user specified grouping areas, including the FCU service area, the City, or its Growth Management Area (GMA).

The Demand Estimation Tool operates as a module of the DMS. The underlying data for the tool is parcel-based derived through spatial processing of GIS layers for grouping the variables by areas and sectors, attaching water use data and other demand drivers for the regression models. The final GIS layer attribute table, or Master Table, plays an important role in the demand estimation method, providing information to group parcels by service areas and apply densities in planning zones, for current and future predictions of water use in developed and undeveloped areas. One of the main assumptions in estimating the demand with the Master Table is that future planning zone characteristics (e.g., distribution of commercial and residential premises) are similar to current developed areas in the same zone.

4.2 FUTURE WATER DEMANDS

Because key factors affecting future water demand such as population growth, land development density and economic conditions are all uncertain, the WSVS used a scenario approach to assess the effects of water demand on water resources system performance. Three demand scenarios were developed by FCU for use in the WSVS. The demand scenarios are based on the most likely proposed future development trajectories developed as part of the Fort Collins City Plan update. The updated City Plan was adopted by City Council on April 16, 2019. The WSVS demand scenarios were developed with significant input from the City Planning Department and are based on assumed buildout conditions and 2070 population. These estimates should be reviewed and updated as new population and land use trends emerge for the City. The expected residential development densities by zone, as well as the expected split between single-family development and multi-family development for the City Plan 2 and 3 development scenarios are included in Appendix C. The demand scenarios are:

- City Plan 2 – This scenario was developed to estimate future (2070) water demands for the City Plan Development Scenario 2 – Targeted Changes. This development scenario forecasts more

dense residential development in some targeted areas of the City compared to current average residential density, mainly along existing commercial corridors.

- City Plan 3 – This scenario was developed to estimate future (2070) water demands for the City Plan Development Scenario 3 – Broad Changes. This development scenario expects even more dense residential development than in City Plan 2 across a broader set of planning zones, including a more significant shift towards multi-family units in lieu of single-family units. This scenario represents a reasonable upper bound to current expected development densities.

- City Plan 3 Plus 20% -- This scenario consists of a 20% increase of the City Plan 3 residential and general commercial demands and a portion of the LCU demands to represent unanticipated increased demands in the Fort Collins system due to factors not considered in the Demand Estimation Tool assumptions. For reference only, adding the demands associated with approximately 80% of currently undeveloped land outside the utility service area but inside the GMA plus the 20% increase in LCU demand results in nearly the same overall demands as represented by the City Plan 3 plus 20% scenario. This increase in demand could come from increased population, large commercial users, expansion of the service territory, or other factors that would stress supplies in all years and would be especially challenging in future hotter and drier climate conditions.

The demand scenarios used in the modeling system were created in the Demand Estimation Tool. For each demand scenario, the demand tool generated a time series of 86 years of monthly demands for all potential hydrologic scenarios. These time series were cataloged in the database and accessed when running the FCSys model. Note that none of the WSVS simulations include the effects of water use restrictions; thus, the demands developed by the Demand Estimate Tool were not reduced in accordance with the FCU Water Shortage Response Policy.

The number of future residential and commercial premises are estimated based on the dwelling unit densities in each zone district, the current density of commercial premises per zone district, the percent split of single-family versus multi-family development and a percent-built factor for each zone. The regression equations are used to estimate the monthly water consumption per premise for each of the five identified water use categories. The premise level monthly demand estimates are multiplied by the expected number of premises. The demand estimates include conveyance and distribution system losses. Details on the form of the regression equations and their coefficients are provided in Appendix C.

The components making up an estimate of the total FCU demand include:

- Residential and commercial indoor and outdoor demand, which includes a single estimate of commercial users with tap sizes between 6 and 8” not included in the LCU demands (Citydem node in the FCSys model);

- Large commercial users (LCU) with specified supply contract obligations, including Colorado State University, several breweries and several large manufacturers (LCU nodes in the FCSys model); and

- Contractual obligations to deliver C-BT water. These include obligations to City facilities and several homeowners' associations in the City, as well as agreements with surrounding water districts, municipalities and other entities. These are raw water demands as opposed to treated water demands. (CBTOblig node in the FCSys model).

The Demand Estimation Tool computes monthly demands for the Citydem node for each month in the 86-year simulation period based on the climate conditions in that month (tied to the hydrologic trace and climate condition being simulated) and the development scenario assumptions. LCUs and C-BT obligations are then added to the Demand Estimation Tool results to compute the total demand for a given scenario.

The Demand Estimation Tool as applied in the WSVS was used to generate monthly water demand values for the 86-year model period that represent one specific future condition. For example, for a water system simulation performed for 2070 conditions, the demand for every year in the 86-year simulation period will represent 2070 population and development conditions. Monthly and annual variability in demand are driven by climate factors. The purpose of the analysis is to investigate water resources system performance at a fixed point in the future (i.e., fixed population and development conditions) over a range of 86 years of variable hydrology. The WSVS analysis does not attempt to capture the incremental increase in demand from current conditions to some future condition over the 86-year simulation period.

The median average annual water demand in 2070 under City Plan 2 assumptions, including the effects of climate change is 37,700 AFY. The more aggressive growth assumptions in the City Plan 3 scenario result in a median average annual water demand of 39,200 AFY, for an increase of 4% compared to City Plan 2. The City Plan 3 Plus 20% scenario increased both the general residential and commercial portion of the total demand (i.e., Citydem node) and a portion of the LCU demand by 20%. However, the CBTOblig demands and the remaining portion of the LCU demands were kept constant. This resulted in a median total water demand of about 45,200 AFY. The average annual demand for 2065 based on previous FCU planning studies is 40,629 AFY. This was based on a future population of 178,000, 150 gallons per capita per day water use, and current C-BT obligations and LCU demands. This is referred to as the "Baseline demand" in this study.

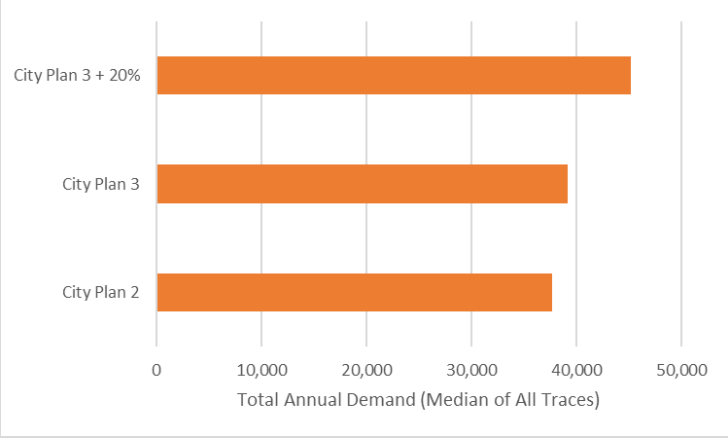

Figure 4-1 Total Annual Demand in 2070 Including Climate Change (Median of All 2,000 Possible Futures for Each Development Scenario)

Note: Average Annual Baseline Demand = 40,629 AFY

Figure 4-1 compares the total annual demands for these three scenarios. The impact of this range of demands on the FCU water resources system was

explored in the WSVS scenarios described in Section 6.

Because water demand is partially a function of weather, the monthly demand simulated by the Demand Estimation Tool is unique to each hydrologic time series it is paired with. **Figure 4-2** shows the simulated CityDem node annual demand for a single representative trace under the City Plan 3 Demand Scenario with a subset of climate adjustments. As shown, the demand time series have the same general pattern but are shifted according to the climate combinations. Impacts of long-term climate change can vary annual demands by about 14%. Impacts from inter-annual climate variability can vary annual demands by up to 10% within a given trace and temperature and precipitation. This shows that both long-term climate change and inter-annual climate variability can impact annual demands more than growth assumptions in City Plan 2 or City Plan 3.

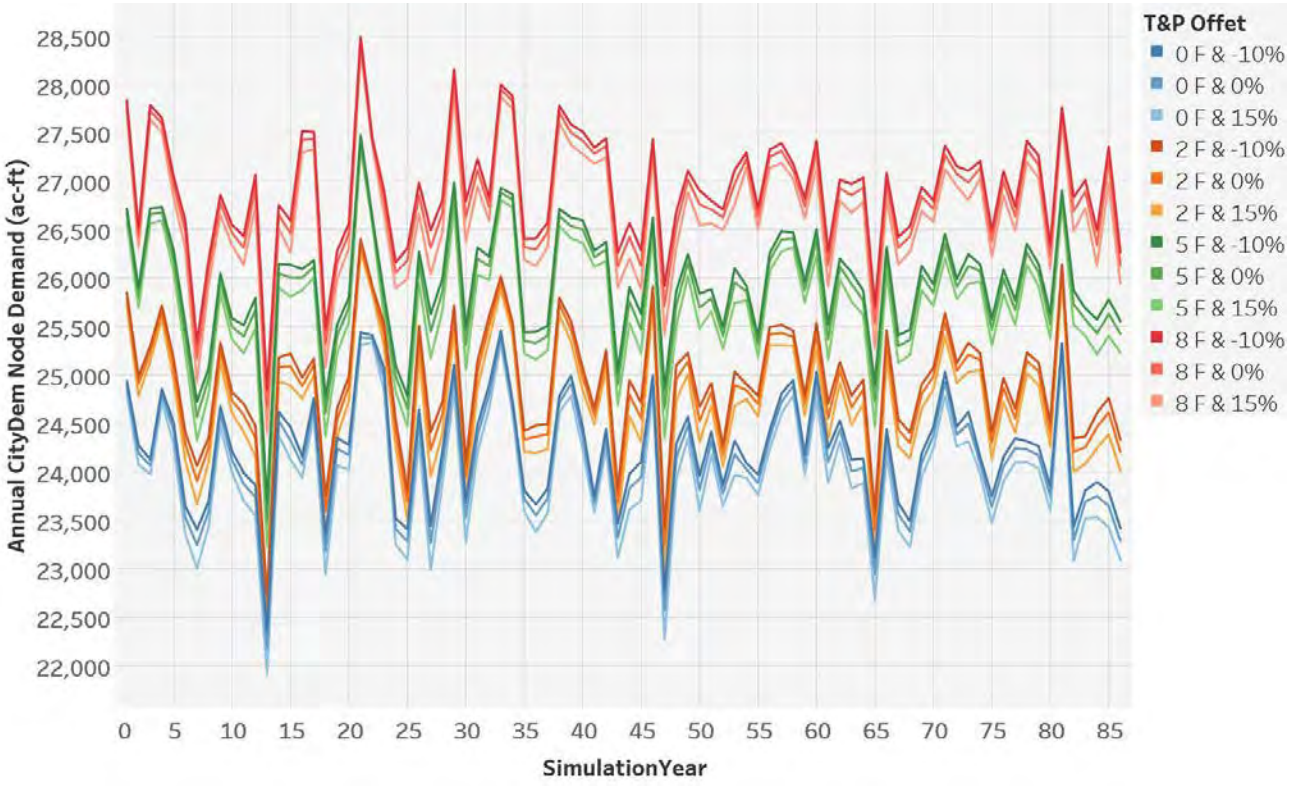

Figure 4-2 Annual Demand Variability in the CityDem Node for a Representative Trace with Select Climate Adjustments and City Plan 3 Development

Because 2,000 possible hydrologic futures were simulated for each of the demand scenarios (100 re-sequenced traces multiplied by 20 climate combinations for each), each scenario has an associated range of possible annual demands. **Figure 4-3** shows the median, minimum and maximum average annual demand for the 2,000 future possibilities generated for each of the two future development scenarios, as well as the City Plan 3 + 20% scenario. As shown in **Figure 4-3**, the average annual demands for City Plan 2 and City Plan 3 are typically lower than the “baseline demand”. The baseline demand for the WSVS was developed from existing FCU demand planning estimates, modified to reflect

similar demand estimate methods as developed for the Demand Estimation Tool. The WSVS City Plan 2 and City Plan 3 general residential and commercial demands are lower than baseline in all cases, but the LCU portions are larger. The LCUs and CBTOblig demands are based on contracts that are not dependent on climate, hydrology or other factors, so they are the same for all scenarios. The highest average demand scenario for City Plan 3, associated with a hydrologic trace with long periods of drought and a warmer climate, has a higher average annual demand than the baseline. This plot shows how the overall averages of the scenarios compare to each other, including variability of the minimum and maximum values; however, the interannual variability of the demand timeseries is seen in **Figure 4-2** above.

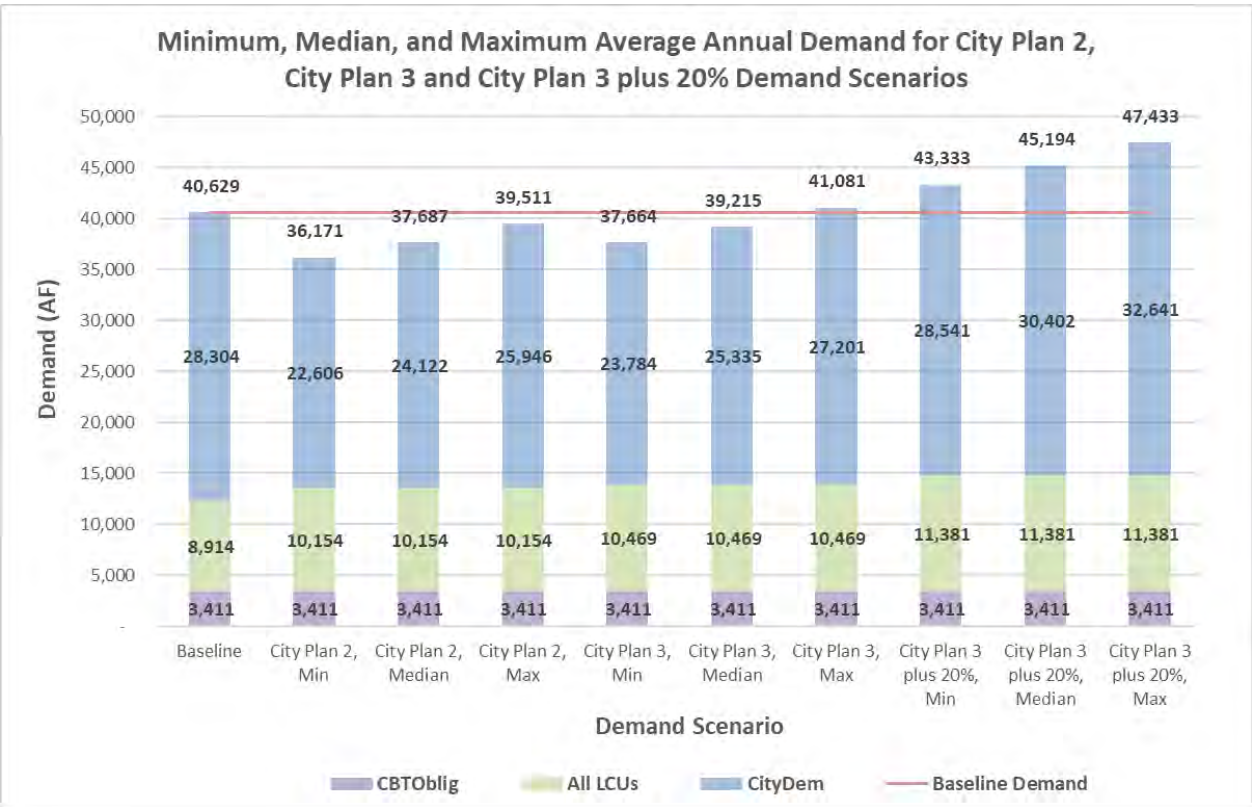

Figure 4-3 Comparison of 86-year Average Annual Demands for Demand Scenarios

Notes:

a) There are 2,000 timeseries of 86-years behind each demand scenario. The average annual demand was determined for each timeseries, and the minimum, median, and maximum values are included in the chart. The CityDem value represents the population and general commercial based demands, which vary based on weather inputs.
b) Baseline has an estimated population of 178,000. City Plan 2 has an estimated population of 179,000. City Plan 3 has an estimated population of 195,000.
c) City Plan 3 Plus 20% represents a demand scenario independent of an estimated population. This situation could present itself in a variety of ways. One example is presented earlier in Section 4.2.

The assumptions used to develop the WSVS demands are different than those used to develop the baseline demand. The baseline demand used a single population forecast and an assumed per capita

use rate based on historical water use patterns and an allowance for uncertainty. The previous demand estimation methodology accounted for some variability in year to year demand based on hydrologic conditions, but in a less robust way than in the Demand Estimation Tool. The functionality of the Demand Estimation Tool provided the variability needed to investigate the sensitivity of the Fort Collins water resource system performance to a range of possible future demands in the WSVS.

Figure 4-4 and **Figure 4-5** show the effect of climate conditions on general residential and commercial demand for the City Plan 2 and City Plan 3 demand scenarios. Each cell in the tables shows the average annual demand over the 100 hydrologic traces for the given T and P combination, as well as the percent increase or decrease compared to the T=0/P=0 average annual demand for the specified demand scenario. It is seen that changes in precipitation would have minimal effect on average annual demand but increases in average temperature of 8 degrees F would increase municipal water demand by up to 12 percent. Because higher temperatures would also be associated with lower water supply, this condition could represent a significant threat to the FCU water resources system.

	Delta P				
Delta T	-10%	-5%	0%	7%	15%
8 F	112% 25,791	112% 25,742	112% 25,692	112% 25,622	111% 25,543
5 F	108% 24,783	108% 24,733	108% 24,683	107% 24,613	107% 24,534
2 F	104% 23,732	103% 23,682	103% 23,632	103% 23,562	102% 23,483
0 F	100% 23,026	100% 22,976	100% 22,926	100% 22,856	99% 22,777

Figure 4-4 Effect of Climate on Annual Water Demand (Citydem only) for City Plan 2

Note: The bottom value in each cell is the average of the 86-year average annual demand for CityDem in acre-feet across the 100 traces for the specified future climate condition. The top value in each cell is the percent difference from the T=0/P=0 cell.

	Delta P				
Delta T	-10%	-5%	0%	7%	15%
8 F	112% 27,043	112% 26,993	112% 26,942	111% 26,870	111% 26,789
5 F	108% 26,011	108% 25,960	107% 25,909	107% 25,838	107% 25,756
2 F	103% 24,936	103% 24,885	103% 24,834	103% 24,763	102% 24,681
0 F	100% 24,214	100% 24,163	100% 24,112	100% 24,040	99% 23,959

Figure 4-5 Effect of Climate on Annual Water Demand (Citydem only) for City Plan 3

Note: The bottom value in each cell is the average of the 86-year average annual demand for CityDem in acre-feet across the 100 traces for the specified future climate condition. The top value in each cell is the percent difference from the T=0/P=0 cell.

Figure 4-6 shows more detail on the effect that climate has on demand. This figure depicts the minimum, maximum and average annual demands across all years and traces for each of the climate scenarios and reiterates that demand is more impacted by temperature increases than by changes in precipitation. The difference between minimum and maximum annual demand for any climate variation is about 6,000 AFY. While the maximum and minimum in the figure did not necessarily come from the same trace, it is possible for FCU to see differences in annual demand this large between years.

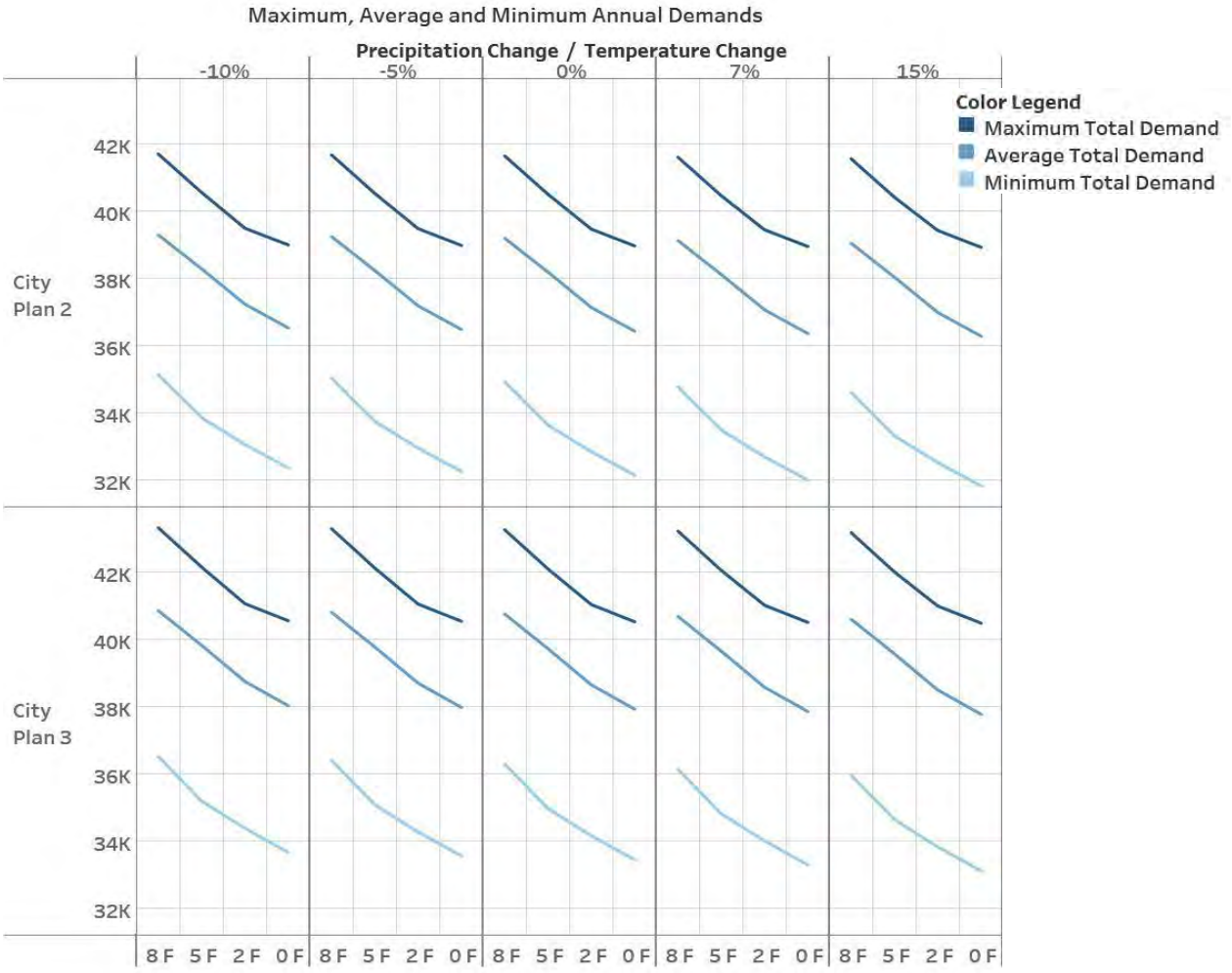

Figure 4-6 Maximum, Average and Minimum Annual Trace Demands

Notes:

a) Y-axis units are acre-feet
b) The shading of each line represents the maximum (darkest shade), average (medium shade) or minimum (lightest shade).
c) The maximum and minimum values are taken from the list of all 100 traces for each climate condition. Each point plotted represents the annual demand for a single year of a single trace.
d) The average values are taken from all years and all 100 traces. This data is most similar to what is plotted in Figure 4-4 and Figure 4-5, except this plot is the total demand and not only CityDem.

5.0 RISKS AND UNCERTAINTIES

This section summarizes the methodology and results of the process to identify and prioritize risks and uncertainties to the FCU water supply system. The purpose of the risk and uncertainty assessment was to look out 50 years and forecast events that could adversely affect FCU water supplies or infrastructure. The 50-year timeframe is the period adopted for the WSVS. It is recognized that anticipating conditions that may exist 50 years in the future is highly speculative. However, for purposes of the WSVS it is appropriate to investigate a broad range of possible future conditions to determine which conditions could stress the performance of the current water supply system.

The spatial scope of the WSVS includes source water areas and infrastructure upstream of the FCU water treatment plant. In addition to local Poudre River Basin supplies, the scope includes supply derived from the C-BT Project. Therefore, risks and uncertainties were identified by both FCU staff and Northern Water staff. Separate but consistent methods were used to identify and prioritize risks and uncertainties associated with FCU local supplies and with supplies provided by Northern Water from the C-BT Project.

A more detailed discussion of the risk and uncertainty analysis is in the Water Supply System Risk Identification Technical Memorandum (Stantec, 2018c), contained in Appendix B.

5.1 METHODOLOGY

Risks and uncertainties that could affect the future performance of the FCU water supply system were brainstormed in workshops held at Fort Collins Utilities and Northern Water. Identified risks and uncertainties were organized in the following categories that span the various aspects of the FCU water supply system.

- ***Climate and Hydrology*** risks relate to weather variability and other hydrologic factors, both short- and long-term, that can impact the potential yields from a watershed.
- ***Watershed*** risks relate to physical watershed conditions that can impact the yields available to FCU.
- ***Operational and Infrastructure*** risks relate to how FCU delivers physically and legally available water to its treatment facilities.
- ***Administrative and Legal*** risks relate to conditions, regulations, or policies that could impact the legal allocation or availability of water supplies.
- ***Demand*** risks relate to changes in required volume, timing and quality of water that will need to be delivered to water treatment facilities to meet customer needs.

Some risks are long-term, or chronic and would persist indefinitely and affect all future years. Other risks are short-term, or acute and would only occur for a short period of time (e.g., several months or a few years). Although long-term and short-term risks could have very different impacts on the FCU raw water system performance, both types of risks were assessed together in the WSVS.

The identified risks were rated as part of the prioritization process. Individual risks were rated by assigning a 1 to 5 score for both likelihood (possibility of the risk or uncertainty occurring) and impact (consequences to the FCU/C-BT water supply system if the risk or uncertainty were to occur) according to the definitions in **Table 5-1**. The composite score was calculated by multiplying the likelihood score by the impact score and was then used to prioritize risks.

Table 5-1 Definitions of Likelihood and Impact Used in Risk Rating Process

Score	Likelihood Definition	Impact Definition
1	***Rare*** – the risk will only occur in exceptional circumstances.	***Insignificant*** – If the risk occurs the impact to the water supply system would be negligible.
2	***Unlikely*** – the risk will occur in occasional circumstances.	***Minor*** – If the risk occurs the impact to the water supply system would be minimal.
3	***Possible*** – the risk will occur in some circumstances.	***Moderate*** – If the risk occurs there would be a noticeable impact to the water supply system.
4	***Likely*** – the risk will occur in a majority of circumstances.	***Major*** – If the risk occurs there would be substantial impact to the water supply system.
5	***Almost Certain*** – the risk will occur in almost all circumstances or is imminent.	***Extreme*** – If the risk occurs there would be extensive or catastrophic impact to the water supply system or customers.

5.2 FORT COLLINS WATER SUPPLY SYSTEM RISKS AND UNCERTAINTIES

Risks and uncertainties to the FCU water supply system were identified and prioritized by FCU staff members representing a variety of groups within the organization during a half-day workshop. Workshop attendees included representatives from water supply, water treatment, demand and conservation, watershed management, legal and water operations groups. FCU identified a total of 46 risks and uncertainties. Each of the identified risks and uncertainties were prioritized, selecting those that would be simulated. All risks with a composite score of 12 or above (out of a possible 25) were deemed impactful enough to warrant further examination and potential simulation. In addition, all risks that received an impact score of 4 or 5 were examined further, as these risks could be significantly impactful, even if their likelihood of occurring was low. Of these highly impactful risks, an outage of Joe Wright Reservoir (O8) and an outage of the Pleasant Valley Pipeline (O11) were prioritized for further analysis. An expanded description of each of the risks and the priority score they were given can be found in the *Water Supply System Risk Identification Technical Memorandum* contained in Appendix B. The prioritized risks and uncertainties were organized into five major threat groups that span the various risk categories. These threat groups are climate change, demands, critical outages, enhanced environmental stressors and shared infrastructure (i.e. risks or uncertainties due to lack of infrastructure ownership by FCU). **Table 5-2** lists all the key risks and uncertainties prioritized for simulation and indicates their threat group.

Table 5-2 List of Key Risks and Uncertainties Prioritized for Simulation

ID	Risk or Uncertainty Name	Threat Group	Description
O1	Outage - 24 Pipeline	CO	Short term outage due to flooding, landslides, wildfire, etc.

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RISKS AND UNCERTAINTIES

ID	Risk or Uncertainty Name	Threat Group	Description
O2	Outage - 27 Pipeline	CO	Short term outage due to flooding, landslides, wildfire, etc.
O3	Algal Blooms	EES	Algal blooms in storage reservoirs and rivers increases water quality issues and potential treatment problems.
C1	Longer duration droughts	CC	Multi-year and/or more severe droughts occur in the future that are not captured in the observed record.
A1	New Regulations	EES	New regulations (either federal or state) impact availability of yields from existing water rights.
W1	Wildfires	EES	Wildfires occur, causing a variety of impacts on water quality, runoff and threats to infrastructure.
C3	Change in precipitation type - Hydrology	CC	More precipitation falls as rain instead of snow during the Fall and Spring.
C4	Changes in frequency/ magnitude of precipitation events - Hydrology	CC	Precipitation events, particularly summer rainstorms, become less frequent and more intense.
C2	Changes in runoff timing	CC	Early higher runoff and lower late-season baseflow reduces yield from volumetric decrees that list specific diversion dates.
W2	Forest Health Degradation	EES	Forested area health decreases due to beetle kill, pollution, warming climate, etc.
A4	Changing state administration	CC	Policies around state water administration change, impacting yields from water rights
D3	Development Uncertainty	D	The composition of development in service area (e.g. density, type, outdoor area) is different that past.
A2	Increased Basin Demands	D	Higher demands across the entire Poudre River basin (due to climate change/population growth) impact use of water rights.
O5	Outage - Horsetooth Reservoir Intake	CO	Short term outage of reservoir outlet and intake to WTP; higher risk due to lack of redundancy.
O4	Outage - Michigan Ditch	CO	Short term outage due to flooding, landslides, wildfire, etc.
D2	Water Use Changes	D	Decrease in per capita use continues and how water is used (e.g. indoor vs. outdoor) changes.
D1	Service area growth and Regionalization	D	Ft. Collins expands its service area or enters into agreements to provide water to regional entities.
A9	Elimination or Interruption of Reuse Plan	SI	Platte River Power Authority decommissions Rawhide Energy Station, effectively eliminating the need for the Reuse Plan. In multi-year droughts, water from the Reuse Plan is reduced or unavailable.
D8	Change in precipitation type - Demands	CC	More precipitation falls as rain instead of snow during the Fall and Spring.
D9	Changes in frequency/ magnitude of precipitation events - Demands	CC	Precipitation events become less frequent and more intense.
A3	Changes to Northern Water C-BT Operations	SI	Allocation of C-BT water through setting of the quota and ways in which C-BT water can be managed, changes in the future.

ID	Risk or Uncertainty Name	Threat Group	Description
W3	Development in Watersheds	EES	Land development in watersheds (recreation, residential, O&G, mining) increases risk of water quality contamination.
D6	Hotter summer changes irrigation	D	A warmer climate increases the length of the irrigation season and hotter days increase demand during the summer.
O6	Outage - Chambers Reservoir	CO	Short term outage due to flooding, landslides, wildfire, etc.
O8	Outage - Joe Wright Reservoir	CO	Short term outage due to flooding, landslides, wildfire, etc.
O11	Outage - Pleasant Valley Pipeline	CO	Short term outage due to flooding, landslides, wildfire, etc.

Note: CC = Climate Change, D = Demands, CO = Critical Outages, EES = Enhanced Environmental Stressors, SI = Shared Infrastructure

5.3 COLORADO-BIG THOMPSON SYSTEM RISKS AND UNCERTAINTIES

Risks and uncertainties to the C-BT Project were identified by staff members from Northern Water during a half-day workshop. Staff from Northern Water represented at the workshop included experts in water supply, watershed management, water quality and operations. While the primary goal was to generate risks around the C-BT system that would impact FCU, Northern Water generated risks across their entire C-BT collection and storage system. These same staff members then scored the identified risks using the rubric described in Section 3.1 based on their perceptions and professional judgment. Therefore, scoring is presented as a *perceived* threat to the water supply system; the actual impact to the water supply system was quantified later for selected key risks using the FCU water resources simulation models.

The scope of the Northern Water risk and uncertainty evaluation included the C-BT source watersheds, collection system and storage reservoirs. Risks to the delivery and distribution system were only considered insofar as they could affect deliveries to FCU. As with the FCU risk assessment process, the planning horizon was 50 years and risks and uncertainties were organized in the five categories of Climate and Hydrology, Watershed, Operations and Infrastructure, Legal and Administrative and Demand. Fifty-three risks and uncertainties were identified. The identified risks and uncertainties were prioritized, identifying those that would be simulated in the Fort Collins modeling system for quantitative analysis. An expanded description of each of the risks and the priority score they were given can be found in the *Water Supply System Risk Identification Technical Memorandum* contained in Appendix B. Similar to the process used by FCU, the first step to prioritize risks was to include all risks with a composite score of 12 or above (out of a possible 25). Northern and FCU felt these risks were impactful enough to warrant further examination and potential simulation. Additionally, all risks that received an impact score of 4 or 5 were further examined (regardless of their composite score) as these risks could be significantly impactful even if their likelihood of occurring was low. Of these highly impactful risks, those prioritized were:

- Conveyance system to Horsetooth Reservoir Outage (ON12)
- Adams Tunnel Outage (ON18)
- Farr Pump Plant Outage (ON17)
- Lake Granby Dam/Dike System Outage (ON19)

- Colorado River Hydrologic Uncertainty / Major Outage of C-BT Project (AN2)
- Windy Gap Plant Outage (ON20)

The prioritized risks and uncertainties were then summarized around the same five major threat groups used by FCU: climate change, demands, critical outages, enhanced environmental stressors and shared infrastructure. **Table 5-3** lists the key risks and uncertainties prioritized for simulation and their threat group.

Table 5-3 List of Northern Water Prioritized Risks and Uncertainties

ID	Name	Threat Group	Description
CN1	Longer Duration Droughts	CC	Long-term droughts that have longer durations than occurred in past.
WN1	Changes in wildfire characteristics	EES	Increase in extent and severity of wildfires in high elevation forests degrades water quality, increases sediment loads and changes runoff characteristics.
CN2	Increased frequency of extreme dry years	CC	Years like 2002 and 2012 become more frequent.
ON1	Green Mountain Replacement Pool Inadequacy	D	If a change in hydrology reduces water supply in the Blue River drainage, the 52,000 acre-ft replacement pool may be inadequate to mitigate against a variety of future risks This could reduce Northern's ability to divert out-of-priority water.
WN2	Wildfires - Upstream of Grand Lake/Shadow Mountain	EES	Increased occurrence of wildfire leads to short term reduced capacity and ability to use Grand Lake/Shadow Mountain Reservoir. Long term channel and sediment changes.
WN3	Watershed forest health degradation	EES	Poorer forest health leads to increase in wildfire risk, water quality impacts, hydrology impacts and increased sediment load.
AN1	Environmental Regulations (changes, new, compliance)	EES	New regulations or changes in federal permitting compliance may lead to more water used for environmental mitigation/flows.
CN3	Changes in runoff volume	CC	Long-term reductions in runoff volume due to hotter, drier climate reduce overall yield.
ON3	Power Arm Outage	CO	Failure of Power Arm prevents moving water into Carter Lake
ON4	Southern Water Supply Project Outage	CO	Failure of Southern Water Supply Project prevents delivering water to southern allottees.
ON2	Unit No3 of Flatiron Facility Outage	CO	Failure of Unit 3 in the Flatiron Pump Station prevents pumping water into Carter Lake.
WN5	Increased sediment loading	EES	Increased sediment loading from several causes reduces reservoir or conveyance capacity and affects water quality.
WN4	Wildfires - East Slope	EES	Increased occurrence of wildfires in Big Thompson River basin degrades water quality and may prevent ability to use Big Thompson

ID	Name	Threat Group	Description
			River to move C-BT water. Watershed above Lake Estes has lower wildfire impact risk but higher likelihood.
AN2	Colorado River Hydrologic Uncertainty / Major Outage of C-BT Project	CC/CO	Possible changes in C-BT operations based on hydrologic uncertainties and a large C-BT Project outage.
ON12	Conveyance Systems to Horsetooth Outage	CO	Variety of events could cause outages or reduced in deliveries in conveyance system components to Horsetooth Reservoir.
ON18	Adams Tunnel Outage	CO	Tunnel failure prevents moving all C-BT/Windy Gap water to East Slope.
ON17	Farr Pump Plant Outage	CO	Pump station failure prevents moving water from Lake Granby to Grand Lake and Adams Tunnel.
ON19	Lake Granby Dam/Dike System Outage	CO	Reduced capacity due to safety reduction or other outage issue limits ability to move water to Grand Lake and Adams Tunnel.
ON20	Windy Gap Plant Outage	CO	Pump station failure prevents transfer of Windy Gap water into the C-BT delivery system.

Note: CC = Climate Change, D = Demands, CO = Critical Outages, EES = Enhanced Environmental Stressors

5.4 SIMULATION APPROACH FOR SELECTED RISKS AND UNCERTAINTIES

The impacts of the selected high priority risks and uncertainties on the water supply system were quantified using the FCU modeling system to provide objective information about which risks and uncertainties represent the most significant threats.

The risk and uncertainty simulation process required identification of the water supply feature being impacted by each key risk/uncertainty, the duration of the impact and determination of the models that should be used to simulate its effects. Some risks or uncertainties, although prioritized, were not explicitly simulated in the models though their specific impacts could be qualitatively described. Appendix B provides additional detail on how each of the risks and uncertainties was simulated in the FCU modeling system.

As described in Section 2, the following three models are linked in the FCU modeling system to represent FCU's water supply resources.

- The CBTQ simulates the anticipated quota for C-BT allottees based on hydrology, operations of the major reservoirs in the C-BT system and other factors.
- The PBN model simulates the water allocation and storage for water users in the Poudre River basin.
- The FCSys simulates the operation of infrastructure used to deliver yields from sources to FCU's water treatment plant.

Table 5-4 presents the adopted simulation approach for the prioritized risks and uncertainties related to the FCU water supply system. For risks with a simulation approach that is applied for a fixed period of time (e.g., June-October, 5 years), the simulated year in which the risk occurs was fixed (e.g. year 10 of the simulation) across all three models. Because 100 different hydrologic traces were simulated, risks occurring in the same simulated year were tested across a variety of hydrologic conditions (e.g., they could occur during short droughts, multi-year droughts, wet periods, or drought recovery periods).

Table 5-5 presents the simulation approach for the prioritized risks and uncertainties related to the C-BT water supply system.

Table 5-4. Simulation approach for FCU water supply system risks and uncertainties

ID	Risk or Uncertainty Name	Model for Simulation	Simulation Approach
O1	Outage – 24” Pipeline	FCSys	100% outage between October and March, when impact would be most severe to operations. Will be combined with 27” Pipeline Outage in model.
O2	Outage – 27” Pipeline	FCSys	100% outage between October and March, when impact would be most severe to operations. Will be combined with 24” Pipeline Outage in model.
O3	Algal Blooms	FCSys	C-BT water use will be shut off between June-October.
C1	Longer duration droughts	All	Incorporated into new stochastic hydrology
A1	New Regulations- Water quality and environmental	Not Simulated	New regulations impact wastewater discharge, minimal impact to water supply
W1	Wildfires	FCSys	Outage of non-C-BT supply between June-September, followed by 10-year, 20% reduction in non-C-BT-supply.
C3	Change in precipitation type - Hydrology	All	Incorporated into new stochastic hydrology
C4	Changes in frequency/magnitude of precipitation events - Hydrology	All	Incorporated into new stochastic hydrology
C2	Changes in runoff timing	All	Incorporated into new stochastic hydrology
W2	Forest Health Degradation	Not Simulated	Gradual water supply impacts over a long period of time that cannot be effectively simulated
A4	Changing state water rights administration	Not Simulated	Water supply impact of existing water rights minimal, greater potential impact on new or transferred water rights
D3	Development Uncertainty	FCSys/PBN	Captured in demand scenario modeling
A2	Increased Basin Demands	Not Simulated	A separate sensitivity analysis around this was completed by FCU and found no significant impact on water availability.
O5	Outage - Horsetooth Reservoir Outlet	FCSys	Horsetooth Reservoir empties in October, then 100% storage capacity reduction for 9

ID	Risk or Uncertainty Name	Model for Simulation	Simulation Approach
			months, though water can still flow through the reservoir.
O4	Outage - Michigan Ditch	FCSys	100% reduction for 24 months
D2	Water Use Changes	FCSys	Captured in demand scenario modeling
D1	Service area growth and regionalization	FCSys	Apply a percent increase to demands in new demand model based on how much demands may increase.
D8	Change in precipitation type - Demands	FCSys	Captured in demand scenario modeling
D9	Changes in frequency/magnitude of precipitation events - Demands	FCSys	Captured in demand scenario modeling
A3	Changes to Northern Water C-BT Operations	FCSys/PBN	Various factors cause C-BT quota to be 25% for 10 years.
W3	Development in Watersheds	Not Simulated	Minimal land in watersheds available for development
D6	Hotter summer changes irrigation	FCSys	Captured in demand scenario modeling
O6	Outage - Chambers Reservoir	Not Simulated	Mainly used to pass through yields, assumed that operational use could be maintained during outage
O8	Outage - Joe Wright Reservoir	FCSys	100% reduction in capacity for 24 months starting in November. All inflows bypassed.
O11	Outage - Pleasant Valley Pipeline	FCSys	100% reduction from April-October
A9	Elimination or Interruption of Reuse Plan	FCSys	A 100%, 75%, 50% and 25% reduction in the water available from the reuse plan for the entire simulation

Table 5-5 Simulation approach for C-BT Project water system risks and uncertainties

ID	Name	Model for Simulation	Simulation Approach
CN1	Longer Duration Droughts	CBTQ	Incorporated into new hydrology.
WN1	Changes in wildfire characteristics	Not Simulated	
CN2	Increased frequency of extreme dry years	CBTQ	Incorporated into new stochastic hydrology.
ON1	Green Mountain Replacement Pool Inadequacy	CBTQ	Reduce inflows into model to account for loss of out-of-priority diversions.
WN2	Wildfires - Upstream of Grand Lake/Shadow Mountain	Not simulated	Potential quota changes captured in other risks.
WN3	Watershed forest health degradation	Not simulated	Gradual water supply impacts over a long period of time that cannot be effectively simulated

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RISKS AND UNCERTAINTIES

ID	Name	Model for Simulation	Simulation Approach
AN1	Environmental Regulations (changes, new, compliance)	CBTQ	Reduce inflows into model to account for loss due to increased environmental flows.
CN3	Changes in runoff volume	CBTQ	Incorporated into new stochastic hydrology.
ON3	Power Arm Outage	Not simulated	Doesn't impact quota setting or deliveries of C-BT supply to FCU
ON4	Southern Water Supply Project Outage	Not simulated	Doesn't impact quota setting or deliveries of C-BT supply to FCU
ON2	Unit No3 of Flatiron Facility Outage	Not simulated	Doesn't impact quota setting or deliveries of C-BT supply to FCU
WN5	Increased sediment loading	Not Simulated	Shadow Mountain Reservoir is mostly a pass-through reservoir, so may not be greatly affected by reduced capacity.
WN4	Wildfires - East Slope	CBTQ	Reduction in Big Thompson-captured inflows. No delivery of C-BT water to certain water users (e.g. Greeley) through Big Thompson River.
ON12	Conveyance Systems to Horsetooth Outage	FCSys	Doesn't impact quota setting. 100% reduction in C-BT delivery to Horsetooth Reservoir from January – June. Existing water in Horsetooth Reservoir still useable.
ON18	Adams Tunnel Outage	FCSys/PBN	100% reduction in West Slope yields for a single year.
ON17	Farr Pump Plant Outage	FCSys/PBN	60% reduction in West Slope yields for a single year.
ON19	Lake Granby Dam/Dike System Outage	FCSys/PBN	100% reduction in West Slope yields for a single year.
AN2	Colorado River Hydrologic Uncertainty / Major Outage of C-BT Project	FCSys/PBN	A reactive response that is a reduction in West Slope inflows resulting in a 25% C-BT quota for 10 years.
ON20	Windy Gap Plant Outage	CBTQ	100% reduction in West Slope yields for a single year.

6.0 RISK SCENARIOS

Risk scenarios were developed by FCU to represent combinations of future conditions for which a vulnerability analysis was desired. Scenarios are comprised of single or multiple risks described in Section 3 and are designed to allow FCU to understand how its water resources system would behave under a range of future stressful conditions. This section summarizes the scenario development process and briefly describes the planning scenarios selected for analysis. More detail on this process is provided in the Scenarios for Vulnerability Analysis Technical Memorandum (Stantec, 2018b) in Appendix F.

6.1 BASELINE CONDITIONS

To quantify the impacts of risks and uncertainties that make up each scenario, baseline conditions were established in each of the three models that comprise the Fort Collins Modeling System: the C-BT Quota Model, the Poudre Basin Network Model and the Fort Collins System Model. The baseline conditions across all three models establish the basic model initial settings and do not include any identified risks, new demand model projections or climate altered hydrology. The baseline conditions are intended to represent the most reasonable future for planning purposes under the future demand historically used by FCU in its previous modeling.

Baseline conditions are described in Appendix F. Key aspects of the baseline conditions include:

- Constant annual demand of 40,629 AFY (the baseline demand described in Section 4)
- Current FCU and C-BT water supply infrastructure
- Halligan Reservoir Enlargement of 8,125 AF as currently proposed
- C-BT carryover storage “on”
- Current water rights portfolio with assumed future acquisitions
- Current operation of FCU’s water supply infrastructure

Results of water supply system performance under the baseline conditions were used to test the functionality of the updated model constructs and new modeling system.

6.2 SCENARIO DEVELOPMENT METHODS

In general, a WSVS scenario consists of three parts:

- A climate condition, defined as one of the 20 temperature and precipitation combinations, which determines 100 hydrologic traces representing climate variability around that climate condition as described in Section 5.

- A demand condition, defined as one of the two future City Plan demand scenarios described in Section 4. (The City Plan 3 + 20% demand scenario encompassing conditions beyond those currently anticipated by the City Planning Department was only included in the Increased Demands risk scenario described below because it represents a risk that demands would significantly exceed the range of demands associated with conditions currently being planned for by the City.)
- A system risk condition, defined as a combination of one or more of the risks and uncertainties described in Section 5.

The process for creating WSVS scenarios is shown in **Figure 6-1**

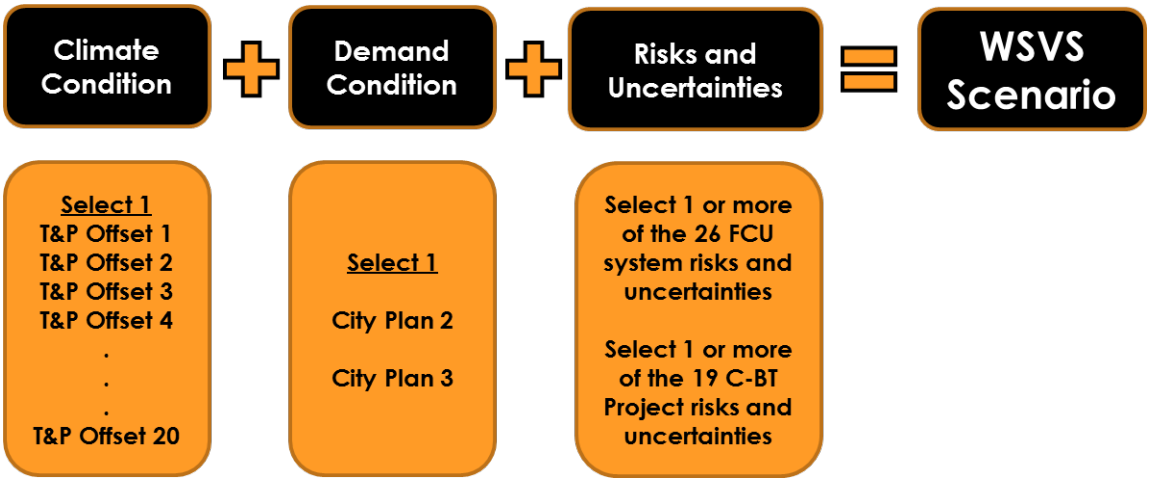

Figure 6-1 Process of Creating WSVS Scenarios

6.3 ADOPTED PLANNING SCENARIOS

FCU Staff, in coordination with Northern Water, identified 13 scenarios for simulation, including the baseline scenario. The 12 non-baseline scenarios were selected to represent a range of future conditions believed to be possible and potentially impactful to the FCU water resources system. They represent both long-term or chronic conditions (i.e., those that occur over the entire simulation period) and short-term or acute conditions (i.e., those that occur for only a short period of time). The WSVS scenarios are briefly described below.

- Climate Change Impacts –This scenario includes the full hydrologic ensemble of 100 traces and captures the full range of potential future climate change conditions resulting in 2,000 hydrologic scenarios. It uses a constant annual future demand of 40,629 acre-feet. It does not include

additional system risks. It is used for isolating the potential effects of climate change on FCU system performance.

- Loss of Storage –This scenario captures the impacts to the water supply system if the Halligan Reservoir expansion (8,125 AF) does not happen and if FCU loses its C-BT Carryover Storage account in Horsetooth Reservoir. Decisions regarding both actions are ultimately beyond FCU's control. This scenario was simulated with the full 2,000 hydrologic scenarios for both the City Plan 2 and City Plan 3 demand scenarios.

- Increased Demands –This scenario includes the three demand scenarios described in Section 4 – City Plan 2, City Plan 3 and City Plan 3 Plus 20%. It does not include additional system risks. It is useful in isolating the potential effects of increased demand on FCU system performance. Each of these demand scenarios was simulated with the full 2,000 hydrologic scenarios.

- No Halligan Enlargement – The baseline condition includes the 8,125 AF expansion of Halligan Reservoir as currently proposed. At the time of this study the Halligan Reservoir enlargement project has not been permitted and therefore there is no guarantee it can be implemented. Because of the uncertainty around that assumption, this scenario is included to represent a future condition without the expansion of Halligan Reservoir. This scenario was simulated with the full 2,000 hydrologic scenarios for both the City Plan 2 and City Plan 3 demands.

- Poudre River System, Acute Outage – Infrastructure to deliver yield from the Poudre River to the city is potentially vulnerable to failures due to either natural disasters (landslides or wildfires) or emergency maintenance outages. This scenario captures the impact of a short-term simultaneous outage of the 24-inch Pipeline, the 27-inch Pipeline and the Pleasant Valley Pipeline. This scenario was simulated with the full 2,000 hydrologic scenarios for both the City Plan 2 and City Plan 3 demands.

- C-BT System, Environmental Impacts – This scenario quantifies impacts on C-BT quota allocations due to environmental issues resulting from wildfires in the receiving East Slope watershed or restricted use of Horsetooth as a water source because of algal blooms. This scenario was simulated with the full 2,000 hydrologic scenarios for both the City Plan 2 and City Plan 3 demands.

- Poudre River System, Environmental Impacts –This scenario quantifies impacts on water supply performance due to algal blooms or environmental issues resulting from wildfires in source watersheds (e.g. increased sediment deposition) that would limit FCU's diversions from the Poudre River. This scenario was simulated with the full 2,000 hydrologic scenarios for both the City Plan 2 and City Plan 3 demands.

- C-BT System, Acute Outage –There are a variety of potential causes for a short-term outage of critical C-BT delivery infrastructure such as an outage of the Adams Tunnel or Farr Pumping Plant. This scenario captures the impact of this C-BT infrastructure risk to the performance of the FCU water supply system. This scenario was simulated with the full 2,000 hydrologic scenarios for both the City Plan 2 and City Plan 3 demands.

- C-BT System, Long-Term Reduction – For purposes of the WSVS, FCU assumed that in the event of a long-term C-BT Project outage, the C-BT quota will be set to 25% for a 10-year period. This assumption was made by FCU based on total storage capacity in the C-BT system and the potential length of this type of outage. It is intended to capture the possible effects of a wide range of conditions that could affect C-BT deliveries over an extended period of time. This scenario was simulated with the full 2,000 hydrologic scenarios for both the City Plan 2 and City Plan 3 demands.

- Horsetooth Reservoir Outage – Lack of redundancy with the Horsetooth Reservoir outlet works puts deliveries of FCU's C-BT yield from this reservoir at risk. Recent problems with the outlet works have shown that this type of risk can occur. This scenario was simulated with the full 2,000 hydrologic scenarios for both the City Plan 2 and City Plan 3 demands.

- Reuse Plan Changes –This scenario is actually two scenarios which capture impacts to FCU water supply system performance due to changes to the Reuse Plan that would reduce the available supply to FCU. One scenario reduced the use of the Reuse Plan by 50% and another eliminated it altogether. These scenarios were simulated with the full 2,000 hydrologic scenarios for both the City Plan 2 and City Plan 3 demands.

7.0 VULNERABILITY ASSESSMENT

7.1 INTRODUCTION

This section summarizes the results of the Water Supply Vulnerability Study. It presents the result of key modeling analyses using visualization templates developed specifically for this project. Many thousands of model simulations were performed, and dozens of metrics were explored as means of understanding the response of the FCU water supply system to different stressors. This section includes selected displays; many other sets of results were separately provided to FCU, in the form of Tableau files.

As described in Section 5, many factors could negatively impact FCU's ability to reliably meet future water demands. These factors include hydrologic risks due to climate variability and climate change; increased demands due to population growth or changes in development density; and risks to the water supply system such as legal and regulatory changes, environmental factors, aging infrastructure, etc. The impacts of these various risks on the FCU water supply system were investigated in a systematic manner based on the steps outlined below and shown in **Figure 7-1**.

- Determine the system's baseline scenario performance before the addition of altered hydrology or demands.
- Investigate how potential climate change could affect the performance of the baseline system.
- Assess the impacts of increased demands generated by the new Demand Estimation Tool in combination with the climate-adjusted hydrologies.
- Evaluate the superposition of the risk scenarios described in Section 6 with the climate hydrologies and each City Plan demand scenario.
- Identify the individual risks and risk combinations with the greatest potential to adversely affect the FCU system performance.

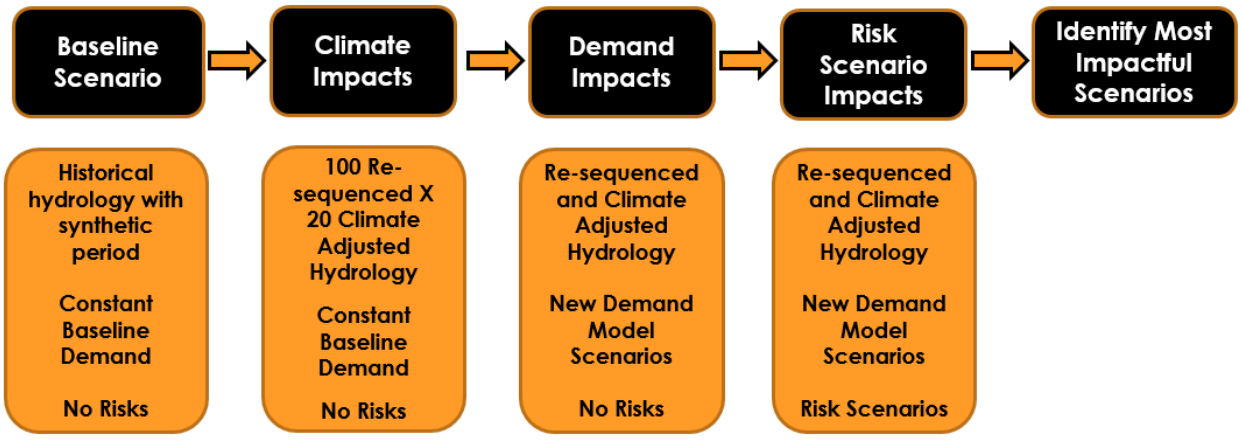

Figure 7-1 Method for Risk Evaluation

Many performance metrics were identified to help quantify the impacts of these risks. As the WSVS progressed, FCU staff found that the following four performance metrics were most useful for identifying the impactful risks.

- Average annual total demand shortage in years when shortages occur
- Reliability (i.e., frequency) of maintaining 20%of annual demand in storage (storage reserve factor)
- Percentage of years in which conditions would trigger any level of water use restrictions per the current water supply planning policy and Water Shortage Response Policy
- Indoor demand reliability

Section 2 describes the relationship between metrics (measures of system performance) and level of service goals (metric values that define acceptable vs unacceptable performance). For purposes of the WSVS, the current FCU water supply planning policy criteria described in Section 2.2 were used as level of service goals by which to assess the impacts of the various risks and uncertainties.

As described previously, WSVS simulations were performed without applying demand reductions due to implementation of water use restrictions, consistent with the Water Shortage Response Policy. As such, the metric for “percentage of years in restrictions” represents the percentage of years one or more of the water supply planning policy criteria would not be met and FCU would have to implement some type of management response (e.g., water use restrictions, emergency supplies, other demand management strategies). The restriction metric captures times when a violation of any of the water supply planning policy criteria (100% demand reliability, 100% SRF reliability) would occur. Because the WSVS modeling does not capture any possible carryover benefit of restrictions or management measures from one month or year to the next, results for this metric overstate the actual percentage of years these conditions would occur if management measures were implemented. However, the metric is still valuable for relative comparison of water supply system performance impacts between different future scenarios.

FCU decided that additional level of service goals would not be considered when evaluating system performance for the WSVS. Establishment of new level of service goals based on the results of the vulnerability assessment modeling was considered a policy decision, and thus it was postponed until the Water Supply and Demand Management Policy is updated based on the results of the WSVS.

The following sections describe the results of the WSVS modeling.

7.2 BASELINE PERFORMANCE

Assumptions for baseline conditions were established in the three models included in the WSVS: The C-BT Quota Model, the Poudre Basin Network Model and the Fort Collins System Model and were described in Section 6. The baseline simulation included a constant annual future demand of 40,629 AFY. It did not include any identified risks or climate altered hydrology. Instead, the historical hydrology with a synthetic period was used, to be consistent with previous modeling efforts by FCU. The conditions in which the baseline scenario was run were intended to represent the most reasonable future condition in which historical conditions persist and no additional improvements are made to the FCU water supply system beyond the proposed Halligan Reservoir enlargement and currently anticipated water acquisitions.

Figure 7-2 compares two sets of model runs: the baseline simulation, as defined above and the baseline settings, run under current climate conditions (T=0, P=0), across all 100 traces and averaged. Ideally, the metrics from both sets of runs would be identical, meaning the new modeling method that utilizes re-sequenced hydrologic traces does not perform significantly better or worse than the method previously used by FCU.

It can be seen in **Figure 7-2,** that both the baseline simulation and the current climate conditions simulations perform similarly for the existing system, including the proposed Halligan Reservoir enlargement. Both sets of simulations are able to meet all demands, including Reuse Plan demands, with 100% and 99.1% reliability (i.e., there is a shortage in only 9 of the 1,032 months of simulation). Indoor demands are met 100% and 99.8% of the time (2 months of shortage out of 1,032). The results also showed that the system maintained the required 20% storage reserve factor 98.8% and 97.1% of the total simulated months (i.e., the 20% storage reserve factors were not maintained in only 12 and 30 out of the 1,032 months of simulation). Note that none of the WSVS simulations include the effects of water use restrictions.

Figure 7-2 also shows the average lengths of shortages and the average volumes of those shortages when they occur. For example, when FCU cannot meet the 20% storage reserve factor, the average number of consecutive months of shortage is 1.2 months for the baseline simulation and an average of 2 months for the current conditions scenario. The average monthly shortage volume is 2,121 AF for the baseline simulation and 2,358 for the current conditions scenario. These values are manageable within current policies and available management strategies.

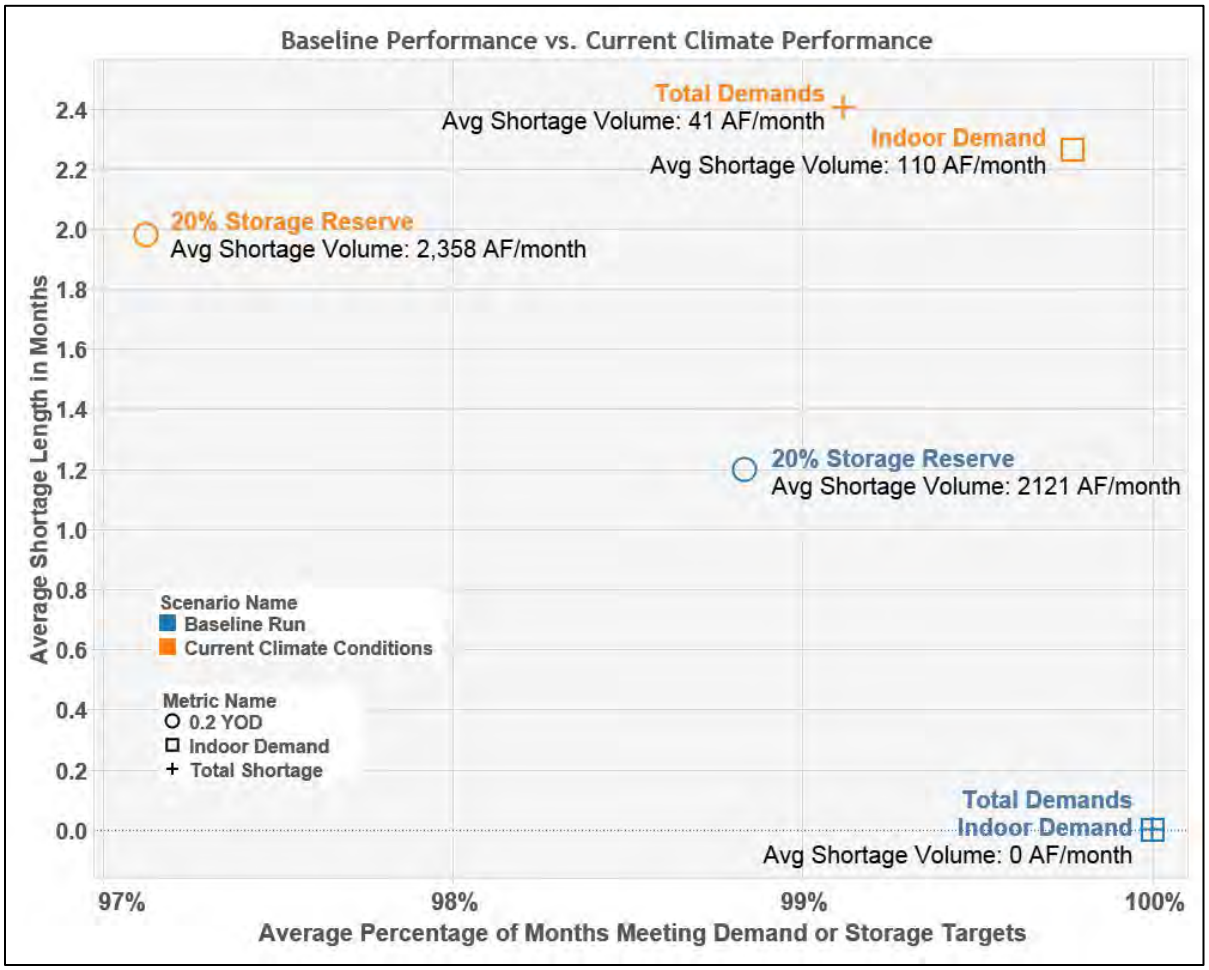

Figure 7-2 Baseline Performance Compared to Current Climate Performance for Three Key Metrics

These results demonstrate that the updated modeling method used for the WSVS is consistent with past FCU methods. The results also demonstrate that FCU has been successful in planning for and developing a water rights portfolio and water supply infrastructure to meet its customers' water needs under future baseline conditions and planned operation of its raw water systems. As shown in Section 4, the baseline demands used in this part of the analysis are similar to the future City Plan 2 and City Plan 3 demands developed for the WSVS; therefore future performance of the current water resources system under either of these other demand forecasts should be similar to the baseline results described above. It is noted again, that the baseline conditions for WSVS include the proposed Halligan Reservoir enlargement of 8,125 AF. As shown in subsequent sections, this additional storage is critical to maintaining desired system performance under more stressful future conditions.

7.3 CLIMATE VARIABILITY AND CLIMATE CHANGE VULNERABILITY RESULTS

After the baseline analysis, the Climate Change Impact scenario was simulated to evaluate the vulnerability of the FCU raw water system to climate variability and climate change. This scenario applied the 20 combinations of temperature and precipitation changes to the baseline model with a constant annual demand of 40,629 AFY without simulating any system risks, thereby isolating the potential effects of climate on the FCU system performance.

The reliability metric can be calculated either on an annual basis or a monthly basis. In the annual calculation, a shortage in one month of the year counts the entire year as a failure, whereas the monthly calculation is more of a true reliability calculation.

Figure 7-3 shows both the annual and monthly reliability for three key metrics for the current climate scenario. The blue shapes are monthly reliability calculations and the orange shapes are annual reliability calculations. The different shapes represent the three different metrics; total demand, indoor demand and 20% storage reserve. Annual reliability is always less than or equal to the monthly reliability.

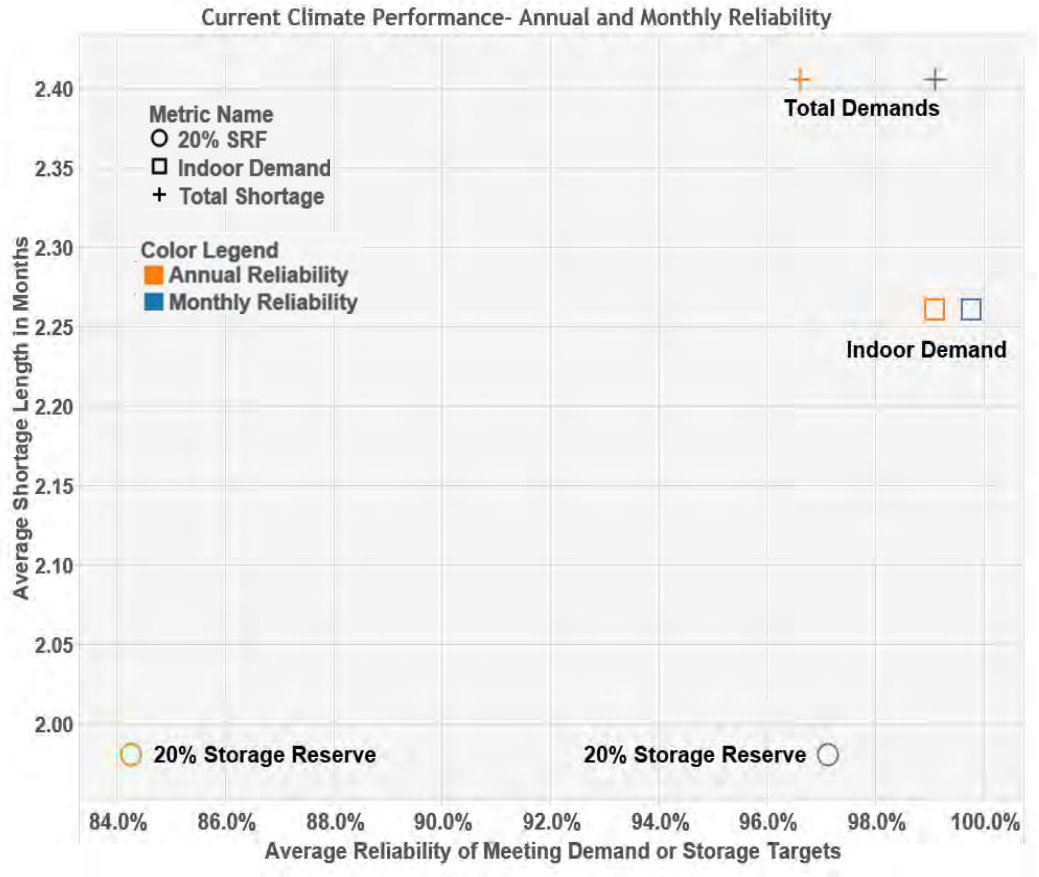

Figure 7-3 Comparison of Annual and Monthly Reliability

Reviewing annual reliability is perhaps more intuitive for many of the metrics, but the annual calculation can mask important information. If shortages occur only in one month every year, the annual reliability may be very low, even though the system may be performing without shortages for the majority of the year. Conversely, reviewing monthly reliability may be a bit more difficult to grasp, but is more of a true reliability calculation. If shortages occur only one month every year, the overall monthly reliability will be high, but there is no way to tell from the monthly reliability if the shortages occurred in each year or if the shortages occurred in a single year because of a drought. Only by looking at both annual and monthly reliability metrics is the full story available.

These results show that for the metrics related to the current water supply planning policy, the 20% storage reserve factor has the lowest reliability and thus, is the most difficult criterion to meet for baseline conditions. Normal operations would have to be modified (e.g., through implementation of water use restrictions, alternate operating rules, or acquisition of emergency supplies) in about 3% of the months and 16% of the years. This is typical of FCU's historical experience of requiring watering restrictions 1 in every 10 years.

7.3.1 Results for Selected Metrics

The results summarized in the following "heat maps" depict the average value of the specified metric over all 100 hydrologic traces in each of the 20 T/P climate combinations. As described in Section 3, hydrologic traces represent climate conditions with 0 to 8 degrees F warmer annual temperatures and – 10% to +15% change in annual precipitation.

Figure 7-4 shows the average percentage of months in which all system demands were met. At the 0-degree temperature increase and 0% precipitation change level (i.e., the 0/0 cell), total demands are met in 99.1% of the months of simulation. The heat map shows how system performance responds to climate conditions. As climate gets warmer and drier, the reliability of meeting total system demands decreases (i.e., shortages occur more frequently). In the extreme condition of 8 degrees warmer and 10% less precipitation, total system demands can only be met in 62.9% of months. Results suggest that the FCU water resources system can tolerate warmer temperatures when annual precipitation is at or above historical conditions. If annual precipitation decreases or remains constant, any temperature increase would have a significant adverse impact on FCU system performance.

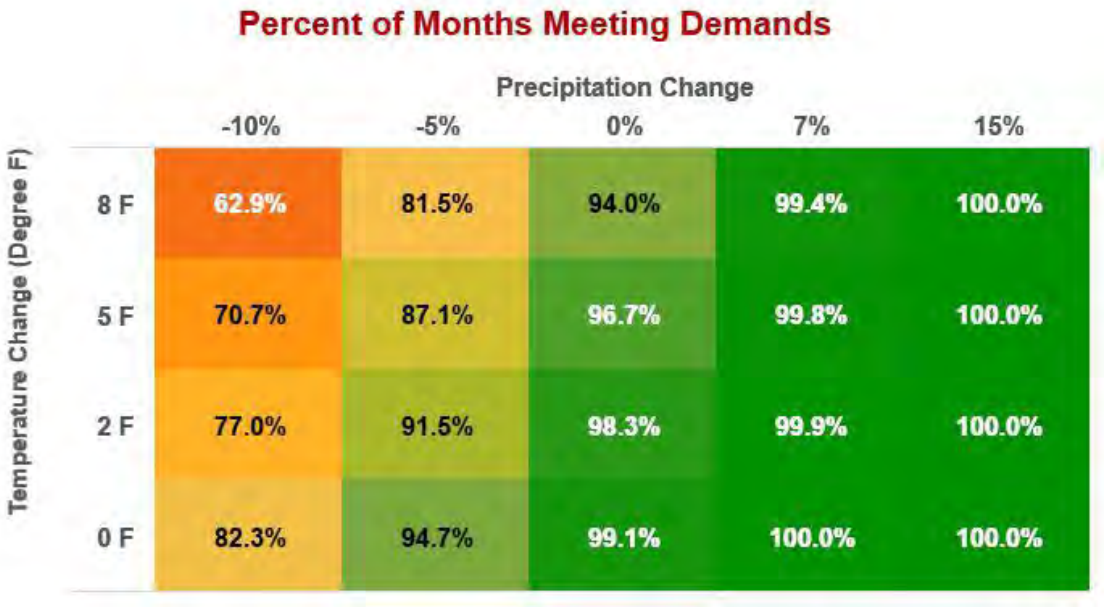

Figure 7-4 Average Monthly Reliability of Meeting Total Demands for All Climate Conditions

Note: The value in each cell is the average of the percentage of months in which total demands are met across the 100 traces for the specified future climate condition.

Figure 7-5 shows the average annual shortage volume in meeting total demand in the months when total demand could not be met. Except for the most extreme climate conditions, average annual shortage volumes are small compared to the total demand of 40,629 AFY.

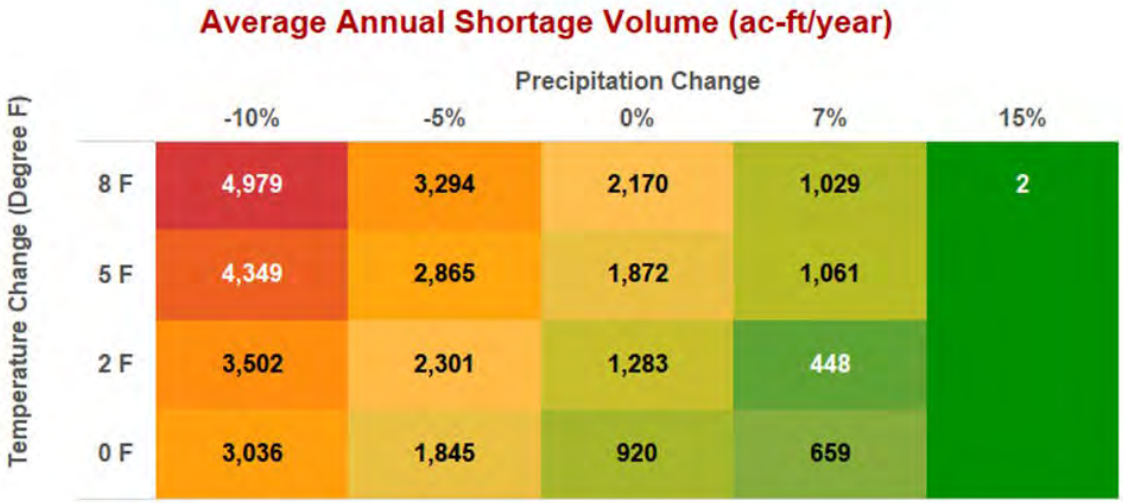

Figure 7-5 Average Annual Total Demand Shortage Volume for All Climate Conditions

Notes:

a) Blank, green cells had no shortages.

b) The value in each cell is the average annual shortage volume (difference between total annual demand and annual volume of water supplied) averaged across the 100 traces for the specified future climate condition.

FCU's Water Supply and Demand Management Policy requires at least 20% of annual demand be maintained in storage at all times for possible use in emergencies. **Figure 7-6** is a heat map for reliability of meeting the 20% storage reserve factor objective. It shows that with no changes in precipitation or temperature, the 20% storage reserve factor could be maintained in 97.1% of the simulated months across all 100 re-sequenced hydrologic traces. Any warmer or drier shift in climate from the 0/0 cell results in significant challenges in meeting the storage reserve factor policy. It is noted that these Climate Change Impact simulations assume the proposed Halligan Reservoir enlargement project is implemented. The effect of not enlarging Halligan Reservoir was investigated in the No Halligan Enlargement scenario, which is described in a following section.

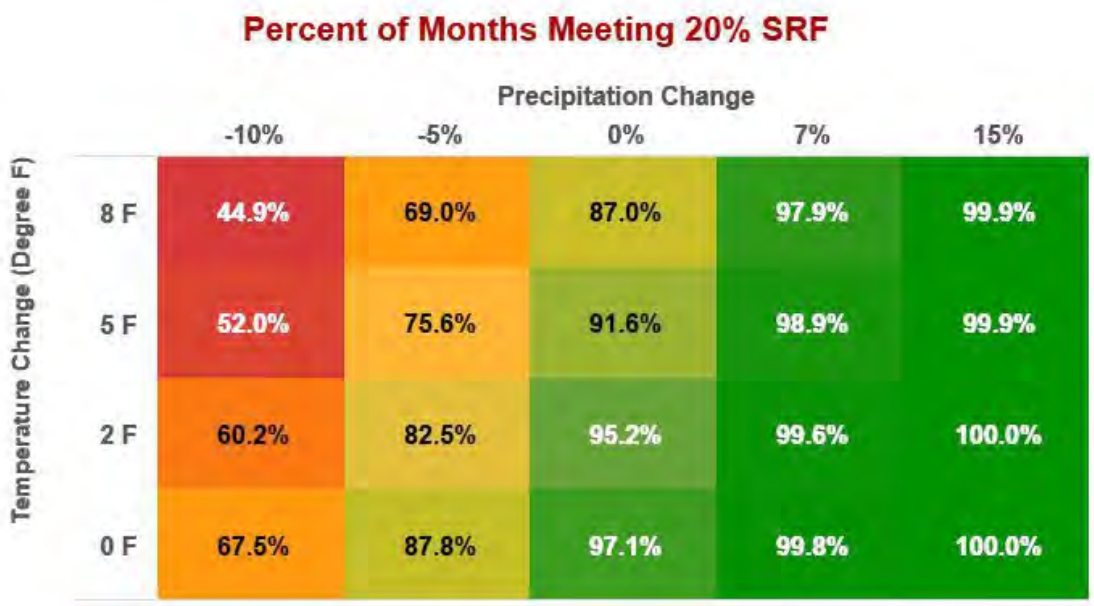

Figure 7-6. Average Monthly Reliability of Meeting 20% Storage Reserve Factor for All Climate Conditions

Although these Climate Change Impact simulations were performed without applying demand reductions due to implementing water use restrictions, the number of years in which restrictions would have been implemented according to FCU's Water Supply Shortage and Response Plan (City of Fort Collins, 2014) was calculated. The Plan has four levels of water use restrictions that are triggered based on the anticipated amount of supply shortage. The metric calculation counts all years when water use restrictions of any level would have been triggered. It represents times when one or more of the water supply planning policy criteria would not be met and FCU would have to implement some type of management response (e.g., water use restrictions, emergency supplies, other demand management strategies).

Figure 7-7 shows the average percent of years restrictions would have been activated for each climate combination. In this analysis water use restrictions are a surrogate for any operational measure implemented to respond to a water shortage condition. FCU could choose to implement other measures such as alternate operating strategies or acquisition of emergency supplies in lieu of declaring water use restrictions. The heat map in **Figure 7-7** shows that future climate has a significant effect on the frequency with which water use restrictions or other measures would be implemented. With baseline demands and no other risks applied, a 5 degree F warmer annual temperature and 5% less annual precipitation would require application of management measures in an average of 6 years in 10. In contrast, a future climate with 5-degree warmer annual temperature and 7% more annual precipitation would require application of management measures in an average of less than 1 year in 10.

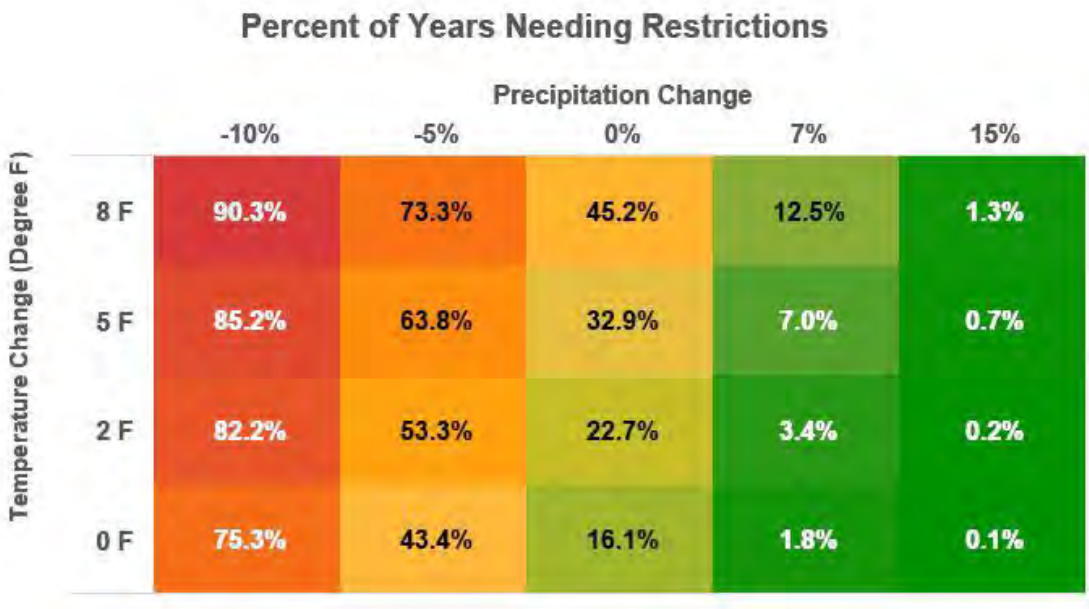

Figure 7-7 Average Percentage of Years During Which Water Use Restrictions Would Be Implemented Based on Current FCU Policy, for All Climate Conditions

Note: “Restrictions” is a surrogate for any demand management or emergency supply enhancement measures FCU would implement in response to potential violations of the water supply planning policy

As described in Section 2.2, failure to meet indoor demands with 100% reliability would have severe adverse public health and safety impacts on FCU customers. **Figure 7-8** shows that without any changes to temperature or precipitation, FCU can reliably meet indoor demands 99.8% of the time (2 months of shortage in 86 years when no restrictions are applied). In an extreme hotter and drier future, the reliability of meeting indoor demands drops to 83.5%.

Again, it is noted that all model simulations in the WSVS use full water demands in every year without application of water use restrictions. FCU would implement water use restrictions and other management measures long before indoor shortages would occur. Past experience has shown that customers in Fort Collins are capable of significantly reducing their water use in response to droughts or emergency conditions such as wildfires. Additional analysis will be needed to determine whether available management measures would be effective in eliminating the risk of indoor water demand shortages for the most severe future climate conditions.

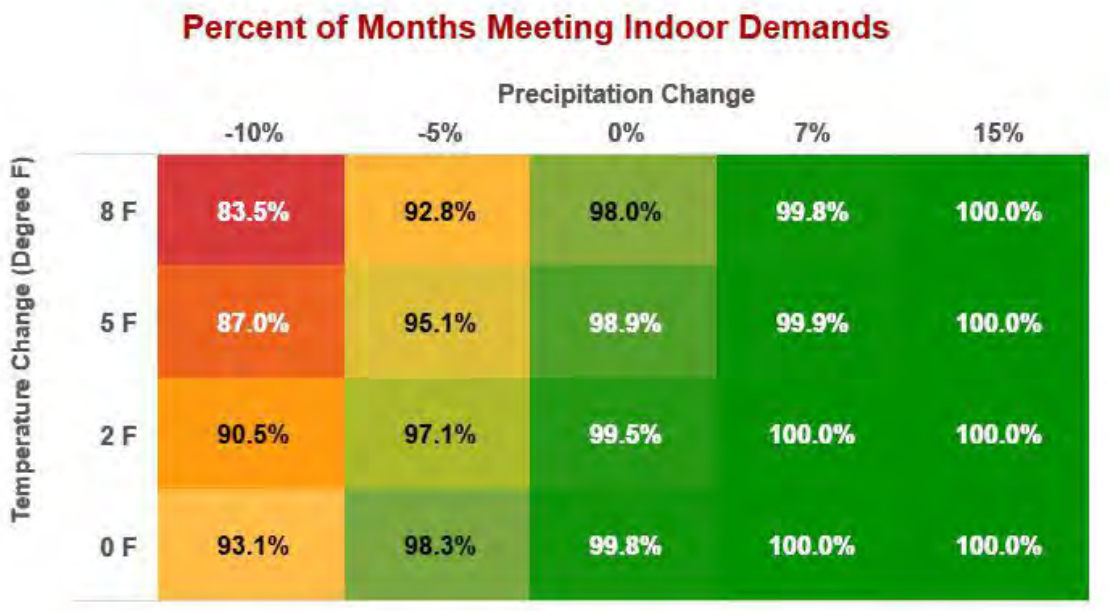

Figure 7-8 Average Indoor Demand Reliability for All Climate Conditions

7.3.2 Monthly Distribution of Shortage Periods

Figure 7-9 shows the 100-trace average count of monthly shortages. The upper plot is for the current climate conditions (T=0, P=0) and the lower plot is for the most severe climate condition (T=+8, P=-10). Note the scales of the two plots are different. In both climate conditions, the fewest number of shortages occur in the late spring and early summer months of May, June and July while storage is replenished and streamflows are the greatest. In the current climate conditions, shortages occur most often in March, April, September and October. These are shoulder seasons 1) before the spring runoff peaks when reservoir levels may still be low or 2) after the peak demands of summer have depleted reservoir storage levels. This pattern also appears in the most stressful climate future but is not as pronounced. The shortages are more evenly distributed over all months except than May and June because the stress of the climate provides little time to recover from a shortage.

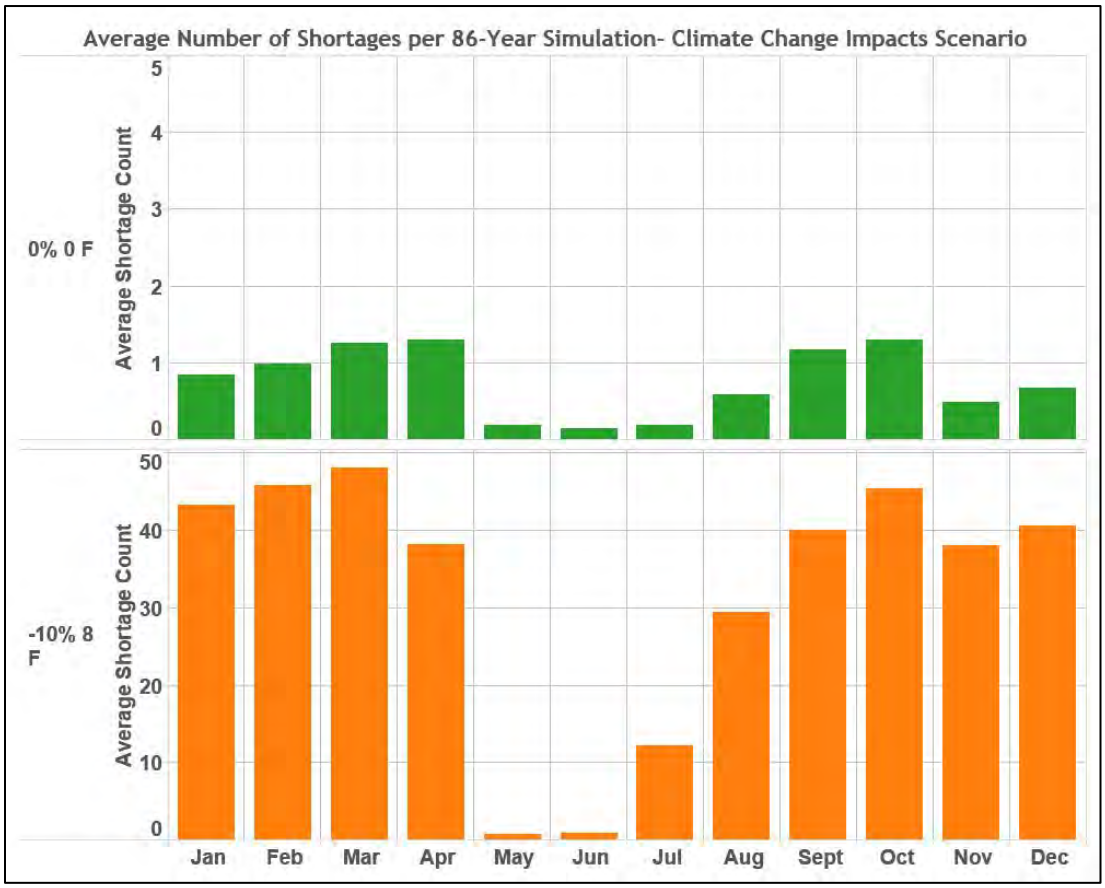

Figure 7-9 Average Monthly Distribution of Shortages for Climate Change Impacts Scenario

Notes:

a) The value in each bar is the average number of shortages in each month for an entire 86-year simulation period averaged across the 100 traces for the specified future climate condition.

b) The y-axis scales differ between the two plots.

7.3.3 Effect of Future Climate on C-BT Quota Calculated by CBTQ Model

The effects of climate change can be seen in the C-BT quotas estimated by the CBTQ model. C-BT quota is a direct output of the model. The C-BT quota determines the annual amount of water available to Fort Collins from the C-BT Project; this represents a significant source of supply to the FCU water resources system. Lower quotas mean less C-BT water is available to Fort Collins to supplement its local Poudre River supplies.

Figure 7-10 shows a series of box plots of the range of average quotas set for each of the 20 temperature and precipitation combinations. Each dot in the figure represents the average of the 86 annual quotas calculated for a single re-sequenced hydrology trace in the 86-year simulation period.

Figure 7-11 shows the variability and ranges of modeled quotas for four selected climates. The quota model produced a full range of quotas that have not been seen historically. Even for current conditions (0% precipitation and 0-degree temperature changes), the quota model produced some 10% quotas and 100% quotas.

For the current precipitation conditions (0% precipitation increase) and for drier climates (-5% and -10% precipitation), quotas tend to decrease as temperatures rise. However, for the much wetter condition (+15% precipitation), quotas tend to increase when temperatures rise. This is because the warmer temperatures create an increase in demand and the increase in precipitation augments supply such that a higher quota can be set. The average quota historically has been about 70%. The CBTQ model estimates quotas similar to the historical average for current and wetter future climates, but lower quotas (i.e., less C-BT supply for FCU) for drier future climates.

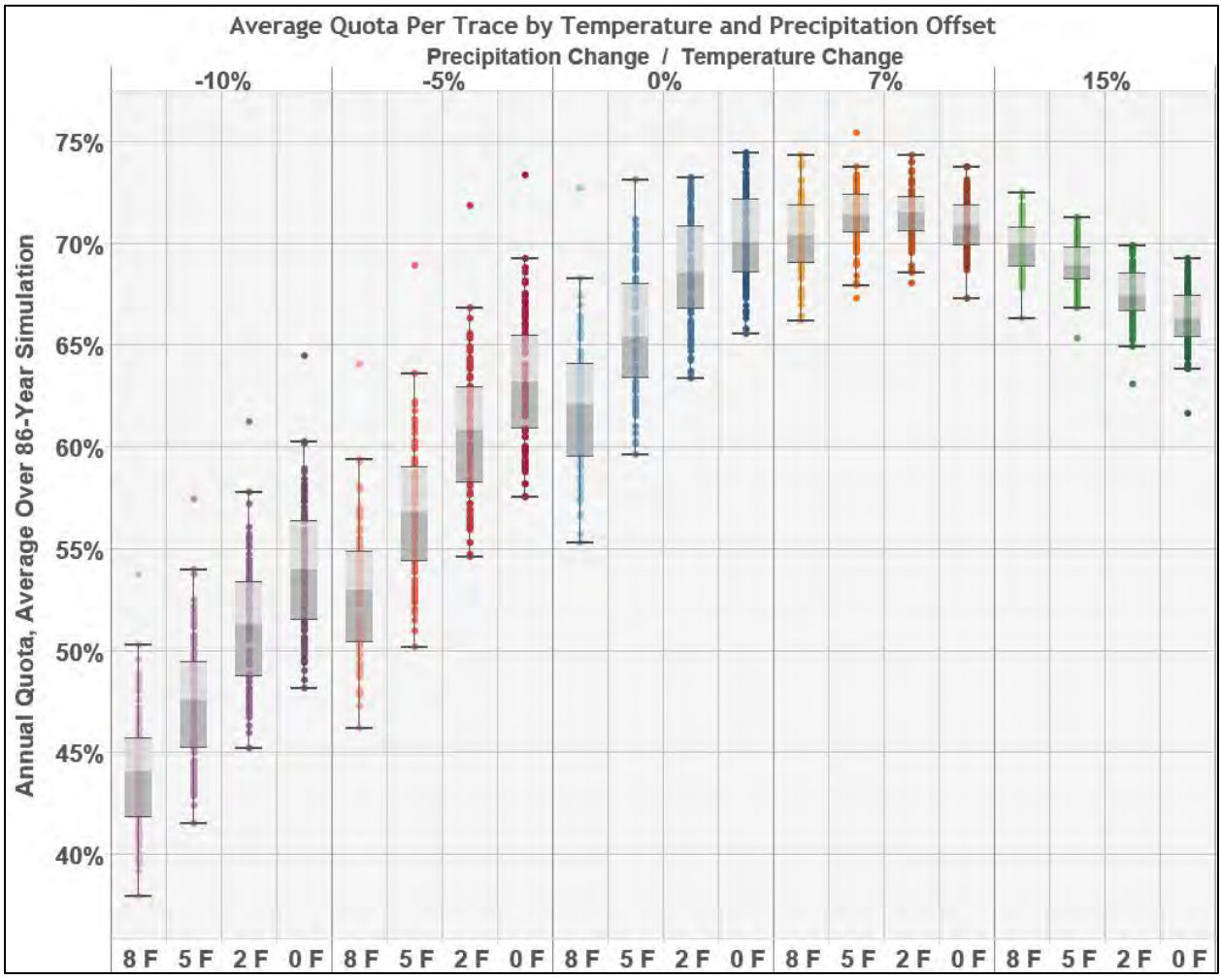

Figure 7-10 Annual C-BT Quota from CBTQ Model by Temperature and Precipitation Offset, Averaged over 86 Years for Baseline Scenario

Notes:

a) Poorer performance indicated by lower quota towards bottom of graph.
b) Each dot is the average of the annual quotas for an 86-year hydrologic trace. 100 traces (dots) are shown in each box plot.
c) Average quota historically is 70%.

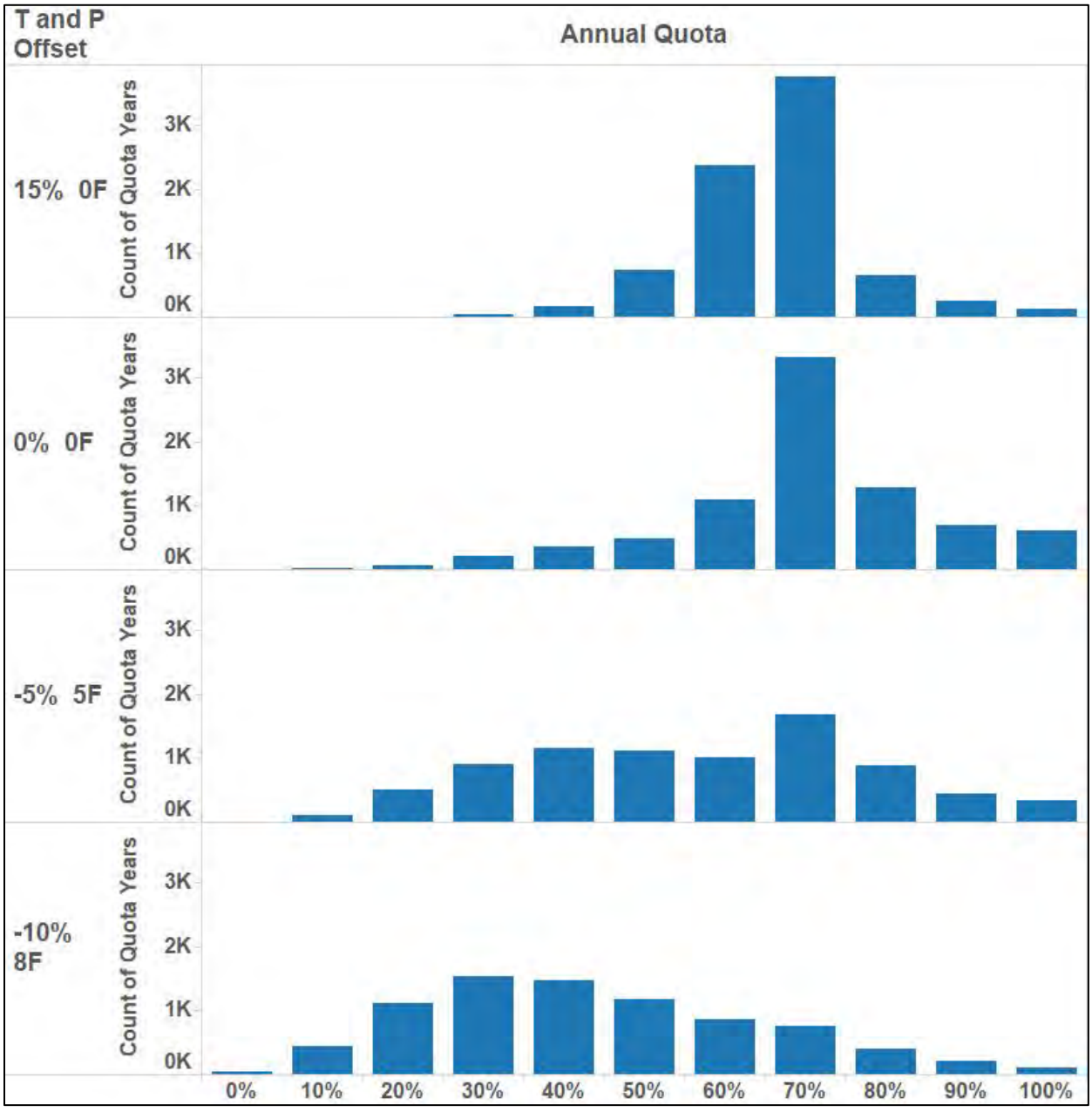

Figure 7-11 Range and Variability of Annual Quotas for all Traces and Selected Climates

Notes:

a) Each bar sums the number of times each Quota percentage was set for all 100 traces of the selected climate offsets.

b) Selected climates get warmer and drier with each plot moving down

7.4 DEMAND VULNERABILITY RESULTS

The Increased Demands Scenario was simulated to assess the sensitivity of the FCU water resources system to variable demands in 2070 which incorporate climate variability, some of which are an increase over the baseline water demand. This scenario includes the three demand scenarios described in Section 4 – City Plan 2, City Plan 3 and City Plan 3 Plus 20%. **Table 7-1** summarizes the average annual demands for the future conditions evaluated in the Increased Demands Scenario.

The Increased Demands Scenario does not include additional system risks. Each demand scenario was simulated for all 100 hydrologic traces for each of the 20 temperature and precipitation climate combinations. As described in Section 4, model simulations apply the same demand assumptions for all 86 years of the simulation period. That is, all years in the model represent the future 2070 condition described by the assumed demand scenario. The WSVS simulations do not account for a gradual increase in demand over time but focus only on the future condition. Additional analysis would be needed to evaluate FCU water system performance in intermediate years between current conditions and 2070.

Table 7-1 Summary of Average Annual 2070 Demands for Demand Scenarios

Demand Scenario	2070 Population	Minimum Average Annual Demand for 86-Year Simulation for Current Climate Conditions (AFY)	Median Average Annual Demand for 86-Year Simulation for Current Climate Conditions (AFY)	Maximum Average Annual Demand for 86-Year Simulation for Current Climate Conditions (AFY)
Baseline	179,000		40,629[(a)]	
City Plan 2	178,000	36,171	37,687	39,511
City Plan 3	195,000	37,664	38,215	41,081
City Plan 3 + 20%	234,000[(b)]	43,333	45,194	47,433

Notes:
a) Not based on application of Demand Estimation Tool or 86-year simulation. Included for comparison to previous studies.
b) Population is 20% increase over City Plan 3 population. This demand scenario incorporates other factors besides population increase, so all demand increase compared to City Plan 3 demand may not be due to population increase.

Results of the modeling for the Increased Demands Scenario are shown in the parallel line plots below (**Figure 7-12** through **Figure 7-14**). These plots show the values of the specified metric for the three demand scenarios as a function of temperature across the range of change in average annual precipitation. Each set of lines applies to one of the values for the assumed change in precipitation. Within a precipitation column, temperature decreases (i.e., improves in terms of influence on water supply) from left to right. The upper panel y-axis shows the average annual demand shortage in acre-feet per year only during times of shortage. Lines that rise to the top of the graph have worse system performance as they show more demand shortage over the simulation. The lower y-axis shows the average number of years with shortages. Lines that rise to the top of the graph have worse system performance because more of the years have shortages.

Key results from the analysis of the Increased Demands Scenario are summarized below.

- Results for each of the metrics show similar trends. This simplifies the interpretation of results and suggests FCU could select the most convenient or best-understood metric to assess relative system response to future demand increases.

- The City Plan 2 and City Plan 3 scenarios result in very similar system performance across the range of climate conditions in the WSVS. This indicates City planning decisions affecting growth within the range encompassed by these two scenarios will have only minor impacts on total water demand, although they could play a significant role in reducing per capita water demand.

- Under City Plan 2 and City Plan 3, the current water supply planning policy criteria (no shortages, no water use restrictions and 20% storage reserve factor at all times) can only be satisfied for the wettest future climate (+15% precipitation). For a moderate climate change condition (T=+5, P=-5%), additional supply or demand management measures would be required in about 23% of years (20 out of 86) and would need to make up for an average annual shortage volume in those years of about 2,500 AFY (**Figure 7-12**). For the same moderate climate change condition, the storage reserve factor would fail to be maintained in about 20% of months (**Figure 7-13**), putting FCU water supply at greater risk under emergency conditions. If management measures were not implemented, the FCU system would be in a condition when water restrictions would be declared under the current water supply policy in about 6 years in 10 (**Figure 7-14**).

- The City Plan 3 Plus 20% demand condition, which assesses an unanticipated future demand increase, results in significantly worse performance than the City Plan 3 condition. Current water supply planning policy criteria could not be satisfied under any future climate condition simulated for the WSVS. For a moderate climate change condition (T=+5, P=-5%), if management measures were not implemented, the FCU system would be in a condition when water restrictions would be declared under the current water supply policy in about 8 years in 10.

- Without the 20% demand increase, the City Plan 2 and City Plan 3 showed the FCU system would perform well in the future at current or wetter precipitation conditions and no changes in temperature. When temperatures rise or precipitation decreases, system performance decreases.

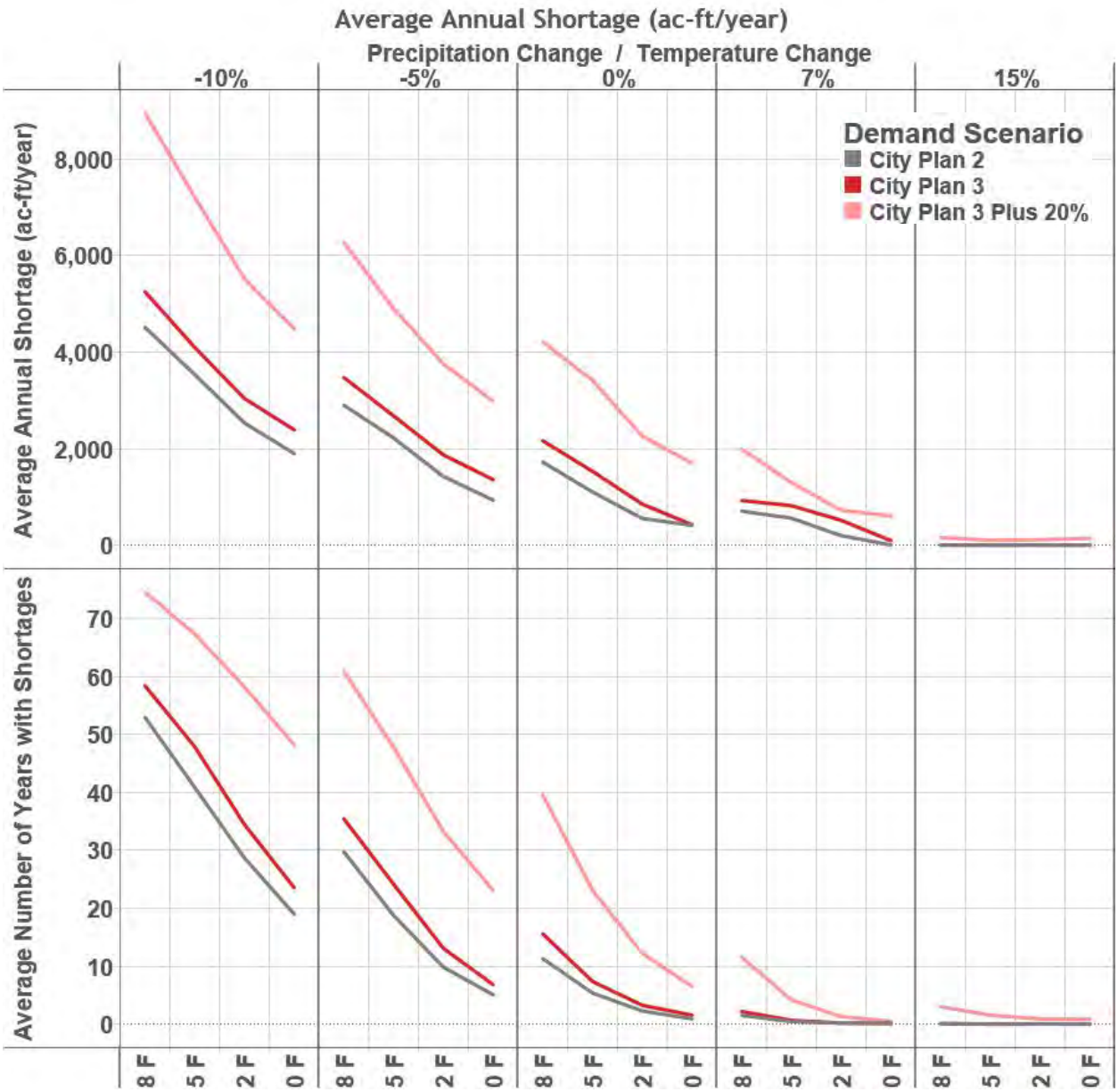

Figure 7-12 Average Annual Total Demand Shortage for Increasing Demand Scenarios and All Climate Conditions

Notes:

a) Demands represent 2070 population and development conditions.
b) Average annual shortage metric is calculated as the sum of annual shortages over the 86-year simulation period divided by the number of years when shortages occurred.
c) Average number of years with shortage is based on 86 years in the model simulation period.
d) Poorer performance indicated by greater shortage towards top of graph.

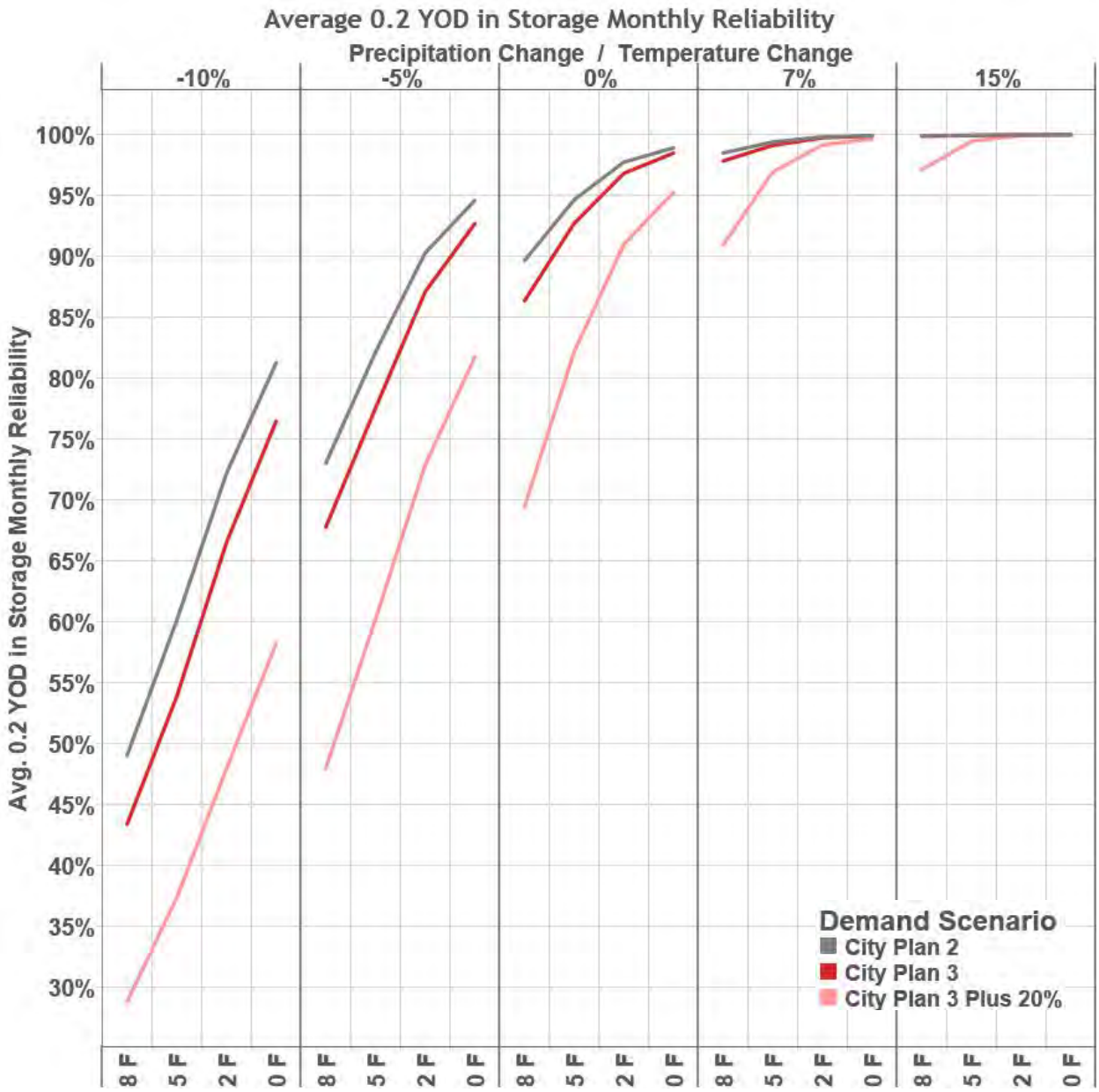

Figure 7-13 Average Monthly Reliability of Meeting 20% Storage Reserve Factor for Increased Demands Scenario and All Climate Conditions

Notes:

a) Demands represent 2070 population and development conditions.
b) Poorer performance indicated by lower reliability towards bottom of graph.

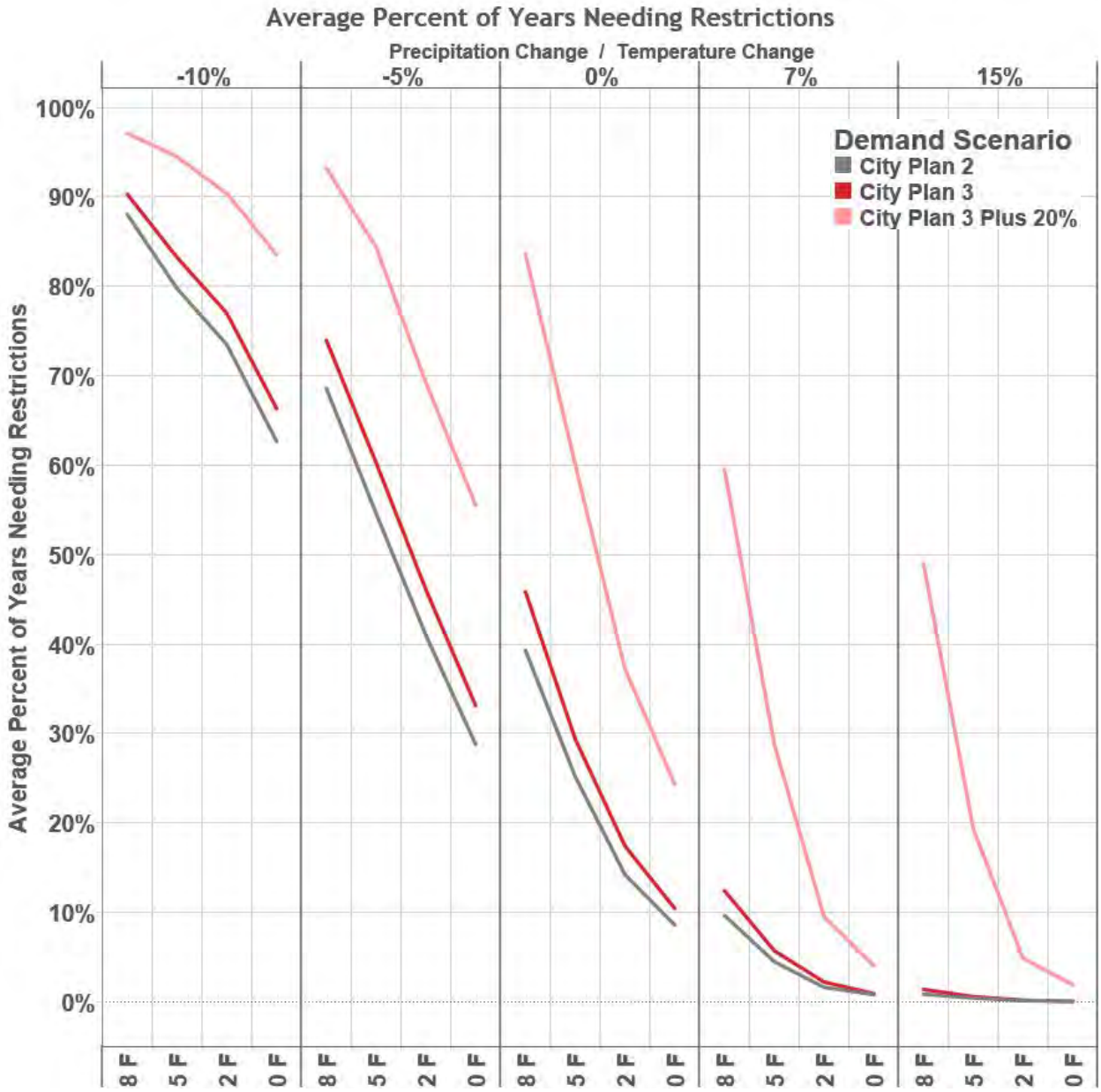

Figure 7-14 Average Percent of Years When Water Use Restrictions Would be Declared for Increased Demands Scenario

Notes:

a) Demands represent 2070 population and development conditions.
b) Poorer performance indicated by more restriction need towards top of graph
c) "Restrictions" is a surrogate for any demand management or emergency supply enhancement measures FCU would implement in response to potential violations of the water supply planning policy

Any values of indoor demand reliability less than 100% suggest potential critical conditions. **Figure 7-15** shows that under all climate conditions except 7% and 15% increase in precipitation, all three demand scenarios could create risks for the current FCU water resources system if demand management measures were not implemented. FCU would aggressively implement demand management or emergency supply measures if there was threat of not meeting all indoor demands. For example, indoor demand reliability would be greatly improved by implementing water use restrictions that reduce outdoor demand in summer and preserve more water in storage for use in meeting indoor demands in winter before the next runoff period.

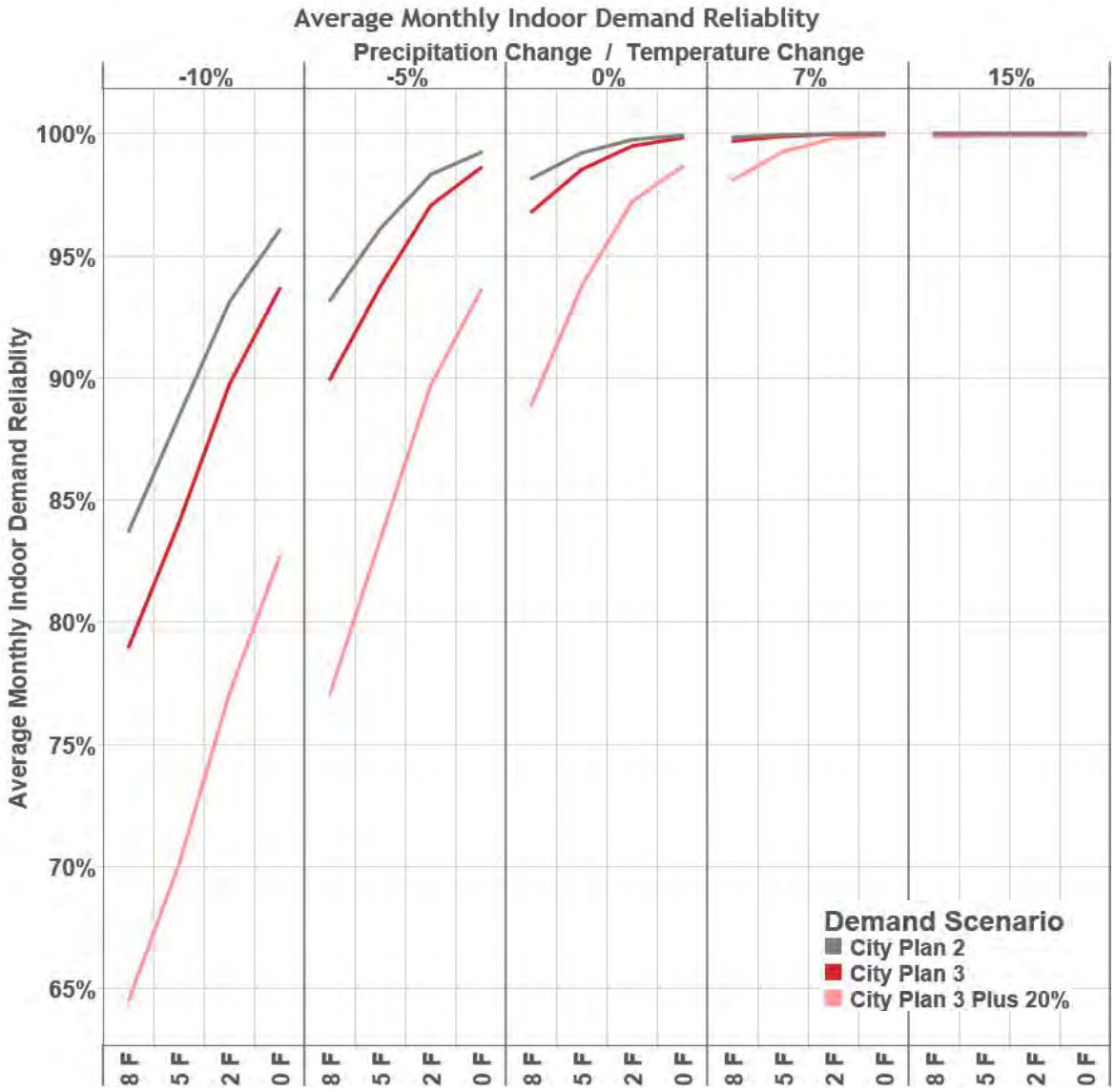

Figure 7-15 Average Monthly Indoor Demand Reliability for Increased Demands Scenario

Notes:

a) Demands represent 2070 population and development conditions.
b) Poorer performance indicated by lower reliability towards bottom of graph.

Due to the way the City Plan 3 scenario was developed, it represents the most reasonable upper bound for future demands based on current expected growth patterns and trajectories. Therefore, results of the vulnerability simulations for the City Plan 3 demand scenario at 0 temperature and precipitation change (0/0) can be considered a reasonable basis to compare the effects of the demand risks to the effects of climate change uncertainty. **Table 7-2** compares the influence of demand increases under current climate with the influence of climate change under baseline demands for four selected metrics related to the current water supply planning policy criteria. Results show that over the range of future climate and demand conditions considered in the WSVS, modest climate change and modest demand increases have similar impacts on the ability to meet the water supply policy criteria. However, the most severe climate change condition will create greater challenges for meeting the current policy criteria than the highest future demand forecast.

Table 7-2 Comparison of Influence of Demand Increases Under Current Climate with Influence of Climate Change Under Baseline Demand

Climate/Demand Condition	Average Number of Years When Total Demand is Not Met	Average Annual Demand Shortage in Years When Shortages Occur	Average Number of Months when 20% Storage Reserve Factor is Not Met	Average Percentage of Years in Restrictions if No Management Measures are Implemented
Current Climate [(a)]				
City Plan 2 Demand	1	412 AFY	11	7
City Plan 3 Demand	2	424 AFY	15	9
City Plan 3 + 20% Demand	6	1,700 AFY	49	21
Constant Annual Demand [(b)]				
T=0, P=+15 Climate	0	0 AFY	0	0
T=0, P=0 Climate	3	920 AFY	30	14
T=+5, P=-5% Climate	27	2,865 AFY	252	55
T=+8, P=-10% Climate	58	4,979 AFY	569	78

Notes:
a) Current Climate: Demands vary annually based on each trace. Results are averaged over all 100 traces for climate T=0, P=0
b) Baseline Demand: Demands are constant between years. Results are averaged over all 100 traces for climate scenarios listed

7.5 RISK SCENARIO RESULTS

Each of the identified vulnerability scenarios from Section 6 were run for the City Plan 2 and City Plan 3 demand levels for all hydrologic traces and climate combinations. Exceptions are the baseline simulation, which was run for a constant demand and historical climate only; the Climate Change Impacts scenario, which was run for constant demand only; and the Increased Demands scenario, which was run for the two City Plan demand levels plus the City Plan Plus 20% demand described above. The results shown in this section, unless otherwise noted, are for the City Plan 3 demand scenario. Results with the City Plan 2 demand scenario are similar but have slightly better metric values than the results with the City Plan 3 demand scenario.

The discussion of the risk scenarios is organized around a series of key metrics. Performance of the scenarios based on each metric is discussed, then the scenarios are compared according to the overall vulnerability they pose to the Fort Collins raw water system.

7.5.1 Comparison of Scenarios Based on the Average Annual Demand Shortage Metric

Figure 7-16 compares system performance for all the scenarios based on the average annual demand shortage metric. This metric is calculated for a given model run by summing the volume of the demand shortage (difference between the volume of total annual demand and actual volume of water supplied in each year) across the full 86-year simulation period and dividing by the number of years in which demand shortages occur. Results are displayed as parallel line plots. Each set of lines applies to one of the values for the assumed change in precipitation. Within a precipitation column, temperature decreases (i.e., improves in terms of influence on water supply) from left to right. The upper panel y-axis shows the average annual demand shortage in acre-feet per year only during times of shortage. The lower y-axis shows the average number of years with shortages.

Parallel line plots are effective in displaying the relative performance of all the risk scenarios across the range of climate conditions simulated in the WSVS. As expected, the greatest annual shortages for nearly every risk scenario are seen in simulations with lower precipitation. Greater precipitation can lessen the effects of the risks on FCU's water supply system despite warming temperatures. Most of the risk scenarios have a similar impact on the average annual shortage metric, as future climate temperature and precipitation change. The exception is some of the short-term risk scenarios for wetter future climates; these anomalies are discussed in a following section.

The risk scenario with the greatest average annual demand shortage is the Increased Demands Scenario (City Plan 3 Plus 20%) for simulations with reduced precipitation. Other scenarios that perform poorly for drier conditions are the Loss of Storage Scenario (no Halligan Reservoir enlargement and no C-BT carryover storage in Horsetooth Reservoir) and the Reuse Plan Change 1 Scenario (elimination of Reuse Plan). In scenarios with greater precipitation, the Poudre River System – Environmental Impacts Scenario has the greatest average annual demand shortage. This scenario simulates the effects of algal blooms and wildfires by eliminating the use of water from Horsetooth Reservoir for one year and preventing full use of the water supply pipelines from the Poudre River for 10 years.

The following plots and paragraphs discuss results for several categories of similar risk scenarios.

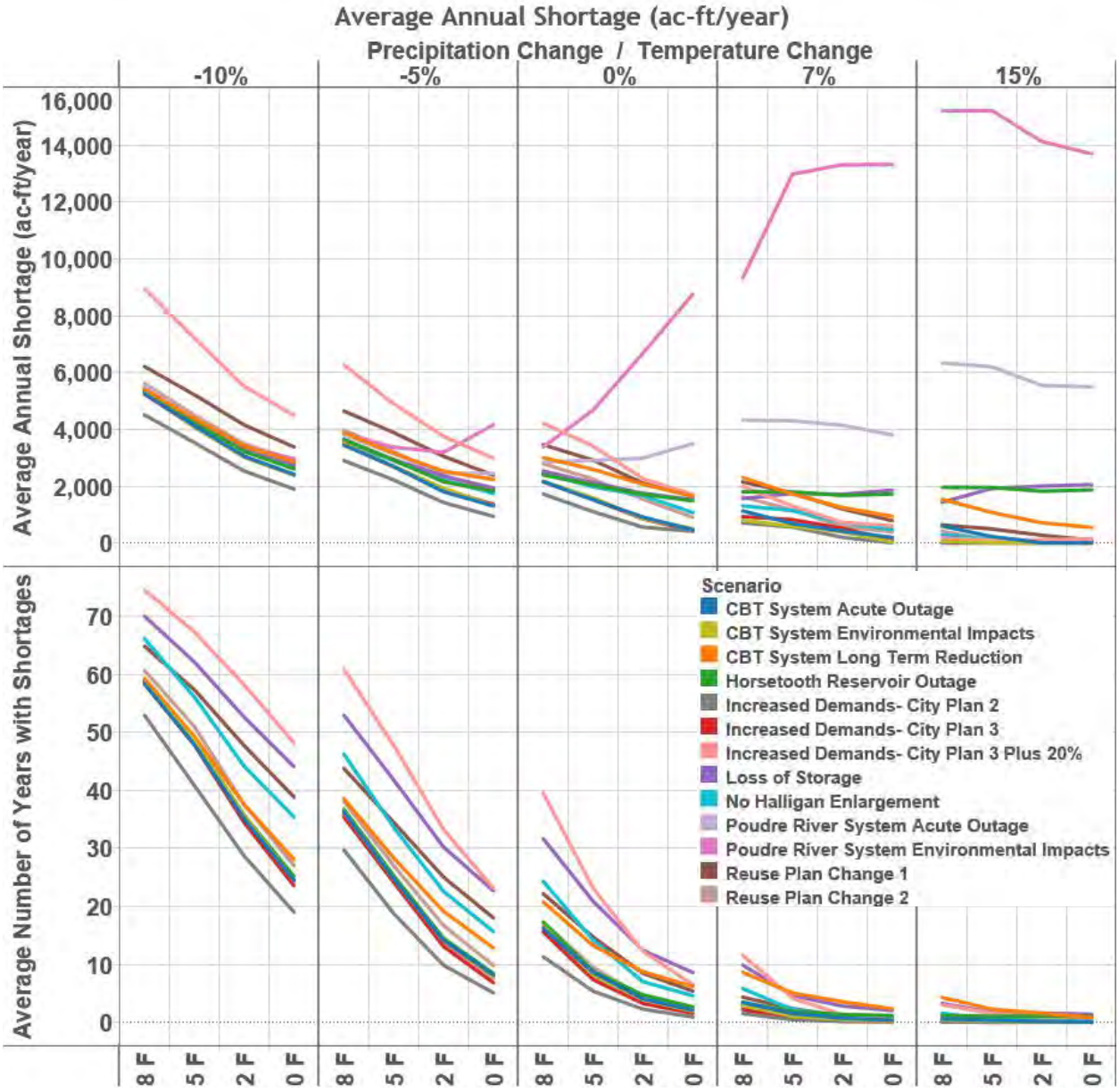

Figure 7-16 Average Annual Shortage and Number of Years with Shortages - All Scenarios

Notes:

a) Average annual shortage metric is calculated as the sum of annual shortages over the 86-year simulation period divided by the number of years when shortages occurred.
b) Average number of years with shortage is based on 86 years in the model simulation period.
c) Poorer performance indicated by greater shortages towards top of graph.

Figure 7-17 shows the average annual demand shortage for the two reuse plan scenarios. Reuse Plan Change 1 eliminates the reuse plan for the entire simulation period whereas Reuse Plan Change 2 reduces the reuse plan by 50% for the entire simulation period. Again, during simulations with increased precipitation, the average annual demand shortage is low, while simulations with decreased precipitation show higher annual demand shortages. This is particularly true when the reuse plan is eliminated in the Reuse Plan Change 1 scenario. Comparison with other scenarios shows that reductions to, or elimination of the reuse plan are some of the more potentially impactful risks evaluated in the WSVS.

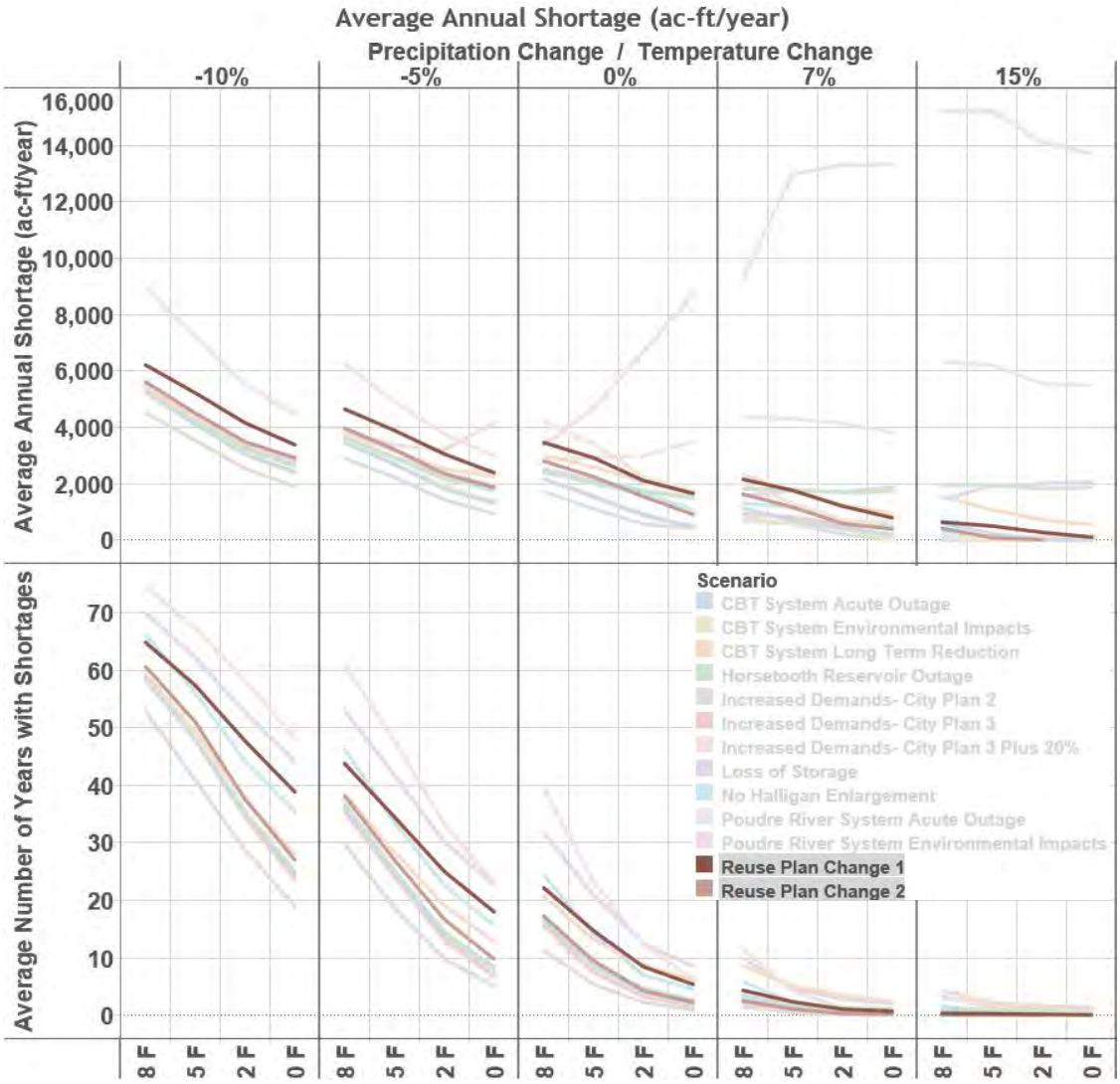

Figure 7-17 Average Annual Shortage and Number of Years with Shortage - Reuse Plan Change Scenarios

Notes:

a) Average annual shortage metric is calculated as the sum of annual shortages over the 86-year simulation period divided by the number of years when shortages occurred.
b) Average number of years with shortage is based on 86 years in the model simulation period.
c) Poorer performance indicated by greater shortages towards top of graph

Figure 7-18 shows the average annual shortage metric for the No Halligan Expansion scenario and the Loss of Storage Scenario. As shown, unless there is an increase in precipitation, there are significant shortages in meeting the future demand. The Loss of Storage scenario combines the risk of not having the Halligan Expansion with the risk of not being able to use C-BT carryover storage in Horsetooth Reservoir. Without the ability to use these two storage facilities, overall annual demands cannot be met. These scenarios demonstrate the importance of storage to FCU's system.

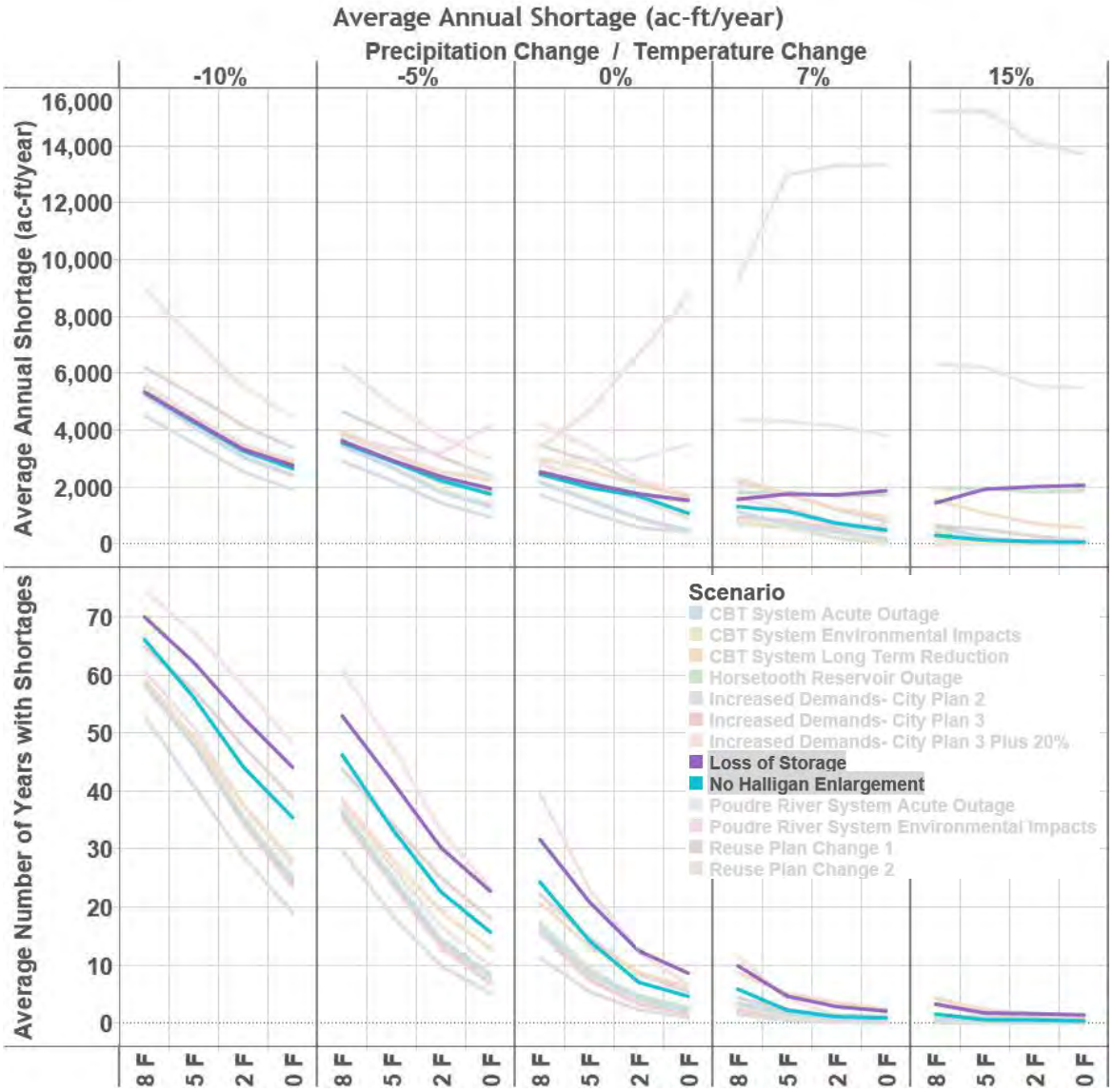

Figure 7-18 Average Annual Shortage and Number of Years With Shortage - Loss of Storage and No Halligan Enlargement Scenarios

Notes:

a) Average annual shortage metric is calculated as the sum of annual shortages over the 86-year simulation period divided by the number of years when shortages occurred.
b) Average number of years with shortage is based on 86 years in the model simulation period.
c) Poorer performance indicated by greater shortages towards top of graph

Figure 7-19 shows results for the C-BT System Long Term Reduction Scenario. In this scenario, the C-BT Quota is set to 25% for 10 years following a randomly selected dry year. This scenario shows more shortages than many of the other scenarios in both wet and dry years. As described in Section 1.2, FCU receives approximately half of its water supply from the Poudre River and half from the C-BT and/or Windy Gap Projects, on an annual basis. Therefore, it is logical that the very low quota simulated in this scenario would impact FCU's ability to meet demands, regardless of the climate conditions.

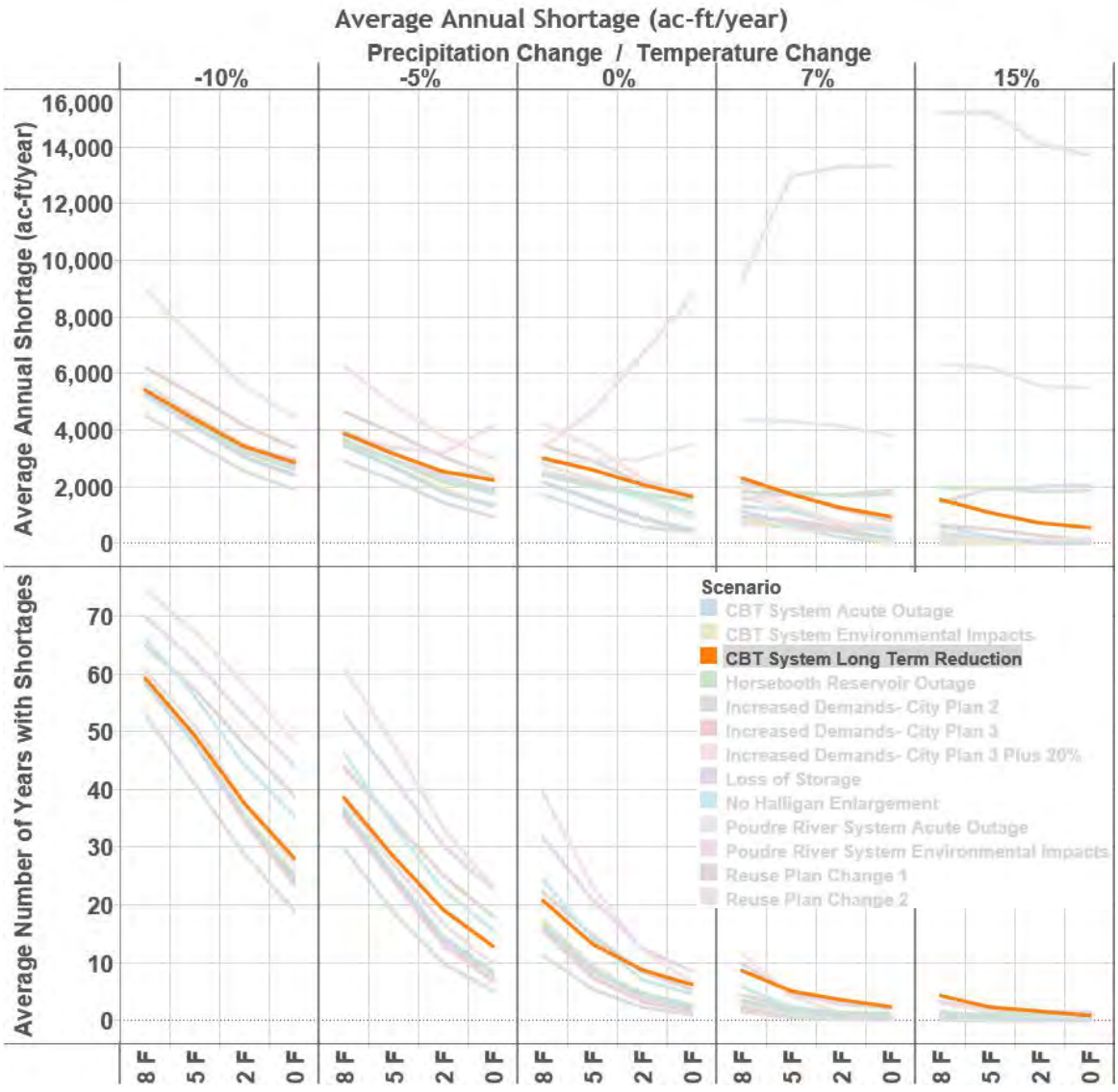

Figure 7-19 Average Annual Shortage and Number of Years With Shortage – C-BT Long Term Reduction Scenario

Notes:

a) Average annual shortage metric is calculated as the sum of annual shortages over the 86-year simulation period divided by the number of years when shortages occurred.
b) Average number of years with shortage is based on 86 years in the model simulation period.
c) Poorer performance indicated by greater shortages towards top of graph

Figure 7-20 shows results for the two Poudre River short-term outages. The average annual shortage increases substantially for the wetter climates because the number of years with shortages due to climate influence decreases. These short-term risks, associated with infrastructure outages or water quality degradation, occur for only a few months during the 86-year simulation period, so effects on system performance are relatively brief but severe. This generates a high value for the average annual shortage metric. The comparison in the figure demonstrates the fundamental difference in FCU water resources system response to short-term vs long-term risks. Because all other metrics are calculated over the entire 86-year simulation period they are not effective in isolating effects of short-term risks. Additional analysis will be required to more fully understand effects of short-term risks on system performance.

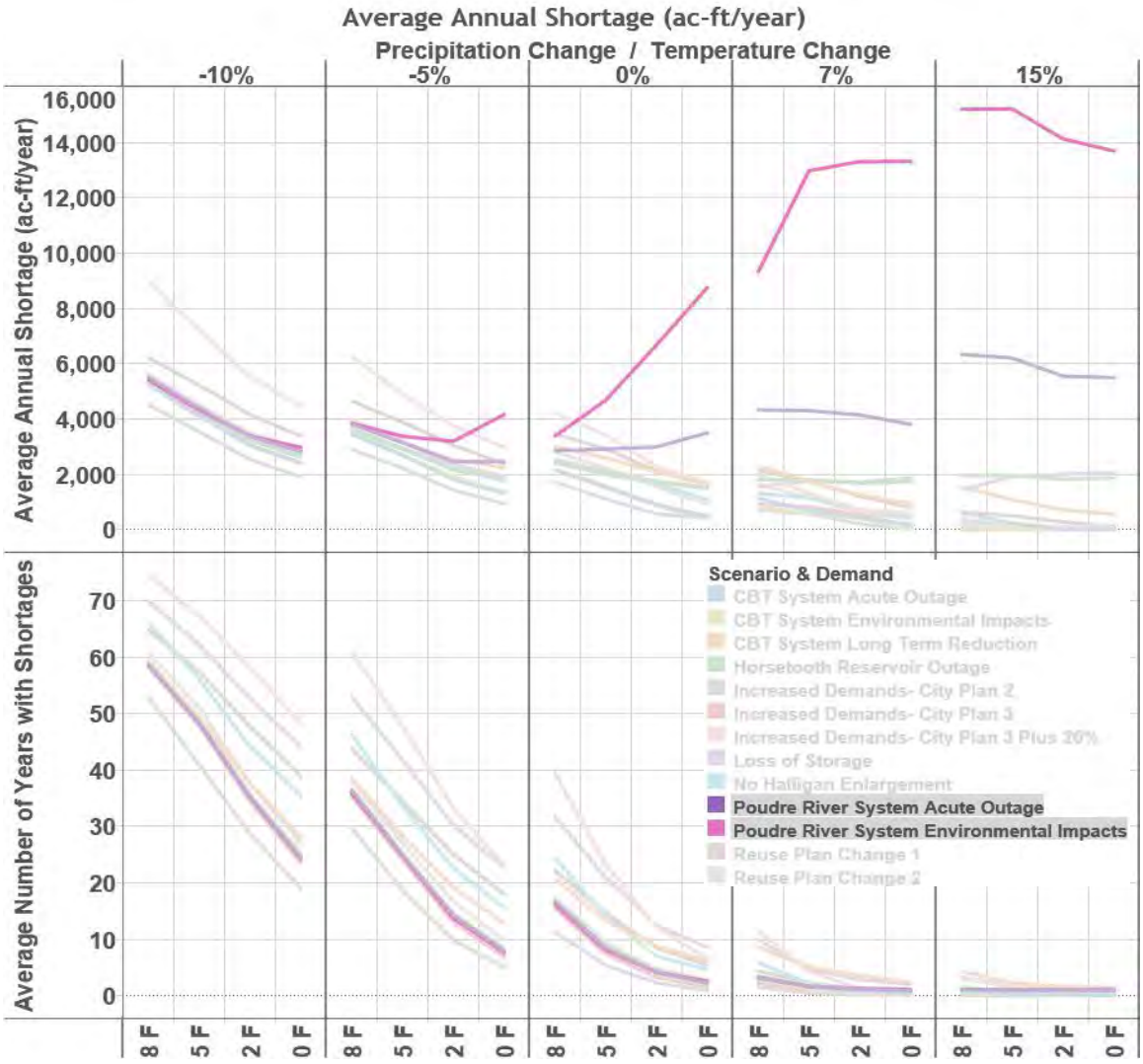

Figure 7-20 Average Annual Shortage and Number of Years with Shortages - Poudre River Short Term Risks

Notes:

a) Average annual shortage metric is calculated as the sum of annual shortages over the 86-year simulation period divided by the number of years when shortages occurred.
b) Average number of years with shortage is based on 86 years in the model simulation period.
c) Poorer performance indicated by greater shortages towards top of graph.

7.5.2 Comparison of Scenarios for the Storage Reserve Factor Metric

The next set of parallel line graphs, starting with **Figure 7-21**, depict the performance of the scenarios with respect to the reliability of maintaining 20% of the annual demand in storage as a storage reserve factor (SRF). The SRF typically equates to about 1.5 months of summer demands or 4 months of winter demands. The current water supply planning policy sets the SRF target of 20% of annual demand at 100% reliability (i.e., at all times) as insurance against unforeseen future conditions or emergencies. For this metric, scenario lines at the bottom of the graph have worse performance as they are less often able to maintain the 20% SRF.

The 20% SRF reliability metric behaves similarly for all the risks scenarios as the assumed future climate is varied. As was the case with the average annual shortage metric, the scenarios with the worst performance for the 20% SRF metric are the City Plan + 20% demands, the changes to the reuse plan, Loss of Storage and No Halligan Enlargement and the C-BT Long-Term Reduction.

The water supply planning policy goal of 20% SRF with 100% reliability cannot be met for any of the risk scenarios, with the exception of some short-term risks and the City Plan 2 demand scenario under the wettest and coolest climate conditions. Under nearly all future conditions, FCU would have to implement water supply enhancement or demand management measures to maintain the 20% SRF reliability goal at all times. Under the most severe climate condition (T=8, P=-10%), the 20% SRF goal can be met only 30% to 50% of the time across the range of risk scenarios. It is expected that significant water resources system improvements, likely consisting of additional storage, would be needed to maintain the 20% SRF goal for any of the WSVS risk scenarios in this severe climate condition.

Results for categories of similar risk scenarios are described in the following paragraphs.

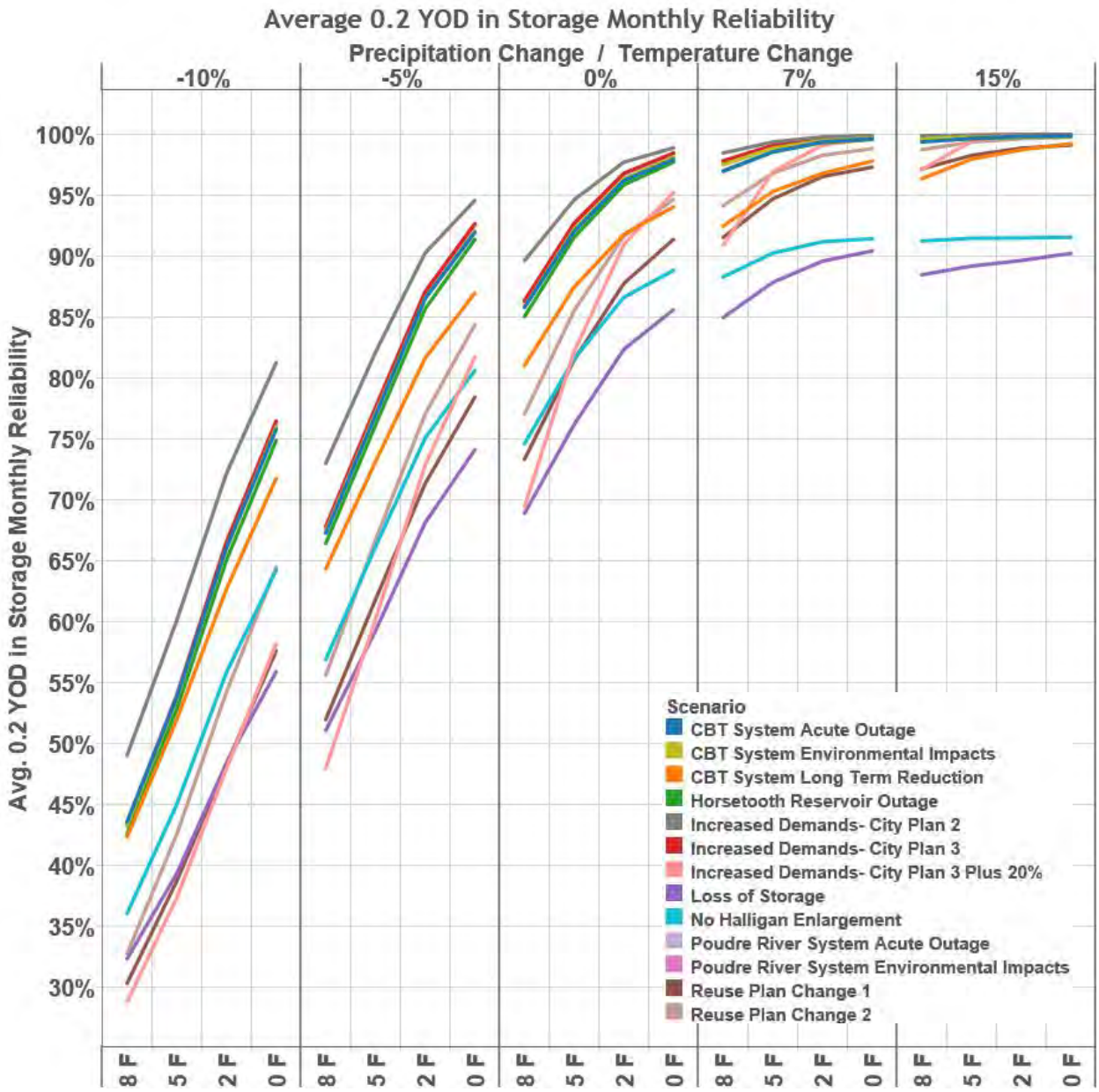

Figure 7-21 Storage Reserve Metric for All Risk Scenarios

Notes:

a) Poorer performance indicated by lower reliability towards bottom of graph.
b) YOD = years of annual demand.
c) Water supply planning policy goal is 100%

The Loss of Storage and the No Halligan scenarios have very poor performance for the storage reserve factor reliability metric (**Figure 7-22**). The Loss of Storage scenario assumes No Halligan Enlargement of 8,125 AF and no use of C-BT Carryover storage. FCU does not have many reservoirs and without these storage accounts, overall storage reserves are reduced and the ability to keep 20% of the annual demand in storage becomes very difficult. Even in wet future climate conditions, the performance of this metric is low. In these conditions, there is more supply than for the drier climates but because these two risk scenarios have less reservoir storage, it is still more difficult to maintain the 20% SRF goal than under the other risk scenarios with more reservoir storage. These results point out the importance of the proposed Halligan Water Supply Project.

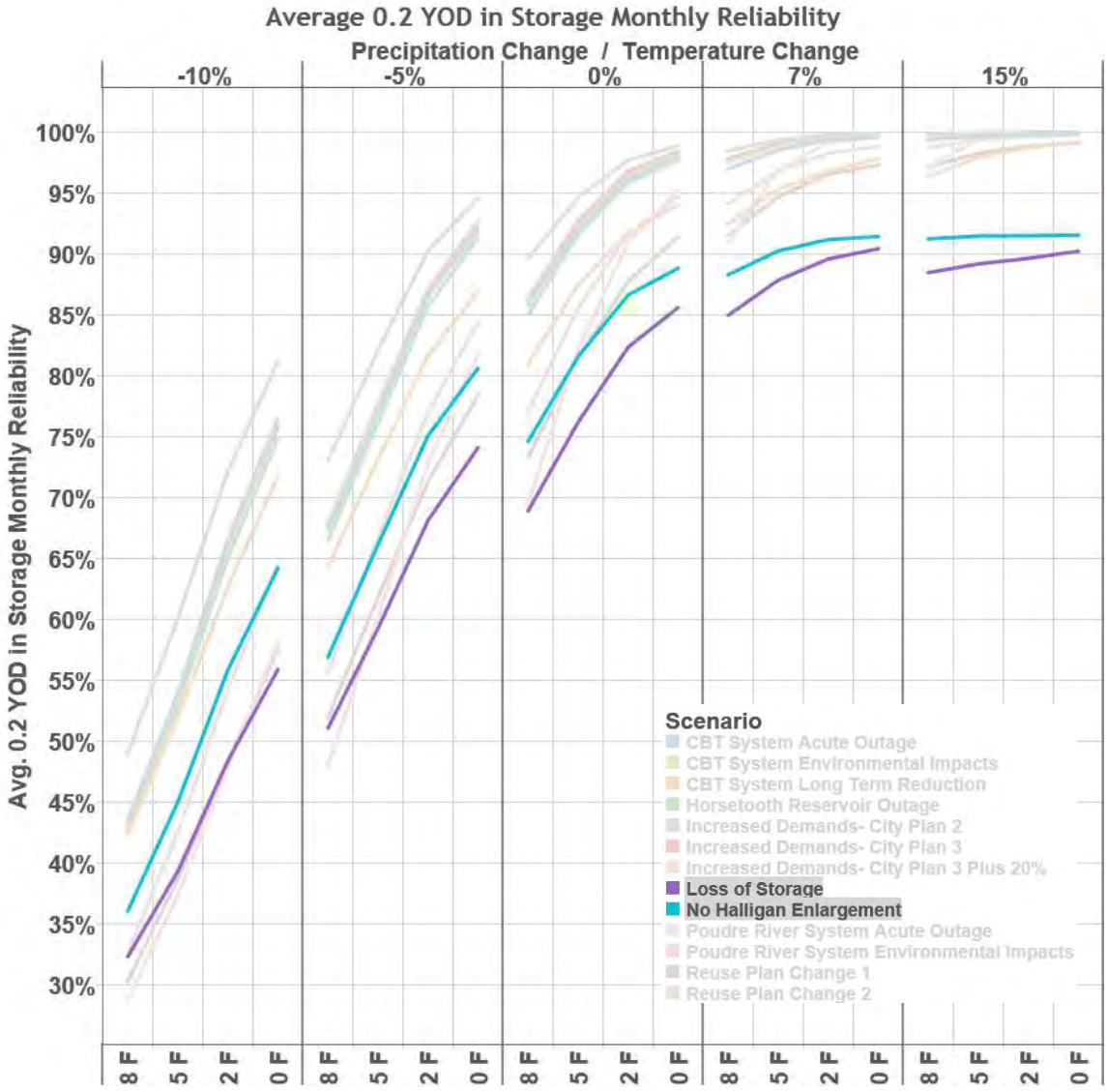

Figure 7-22 Storage Reserve Metric- Loss of Storage and No Halligan Enlargement Scenarios

Note: Poorer performance indicated by lower reliability towards bottom of graph

The Reuse Plan is a very important mechanism for increasing water supply in the FCU system. **Figure 7-23** shows impacts to the storage reserve metric without the Reuse Plan and with a 50% reduction in the ability to utilize the Reuse Plan. Lack of this supply requires heavier dependence on storage, thus depleting it beyond the 20% SRF threshold.

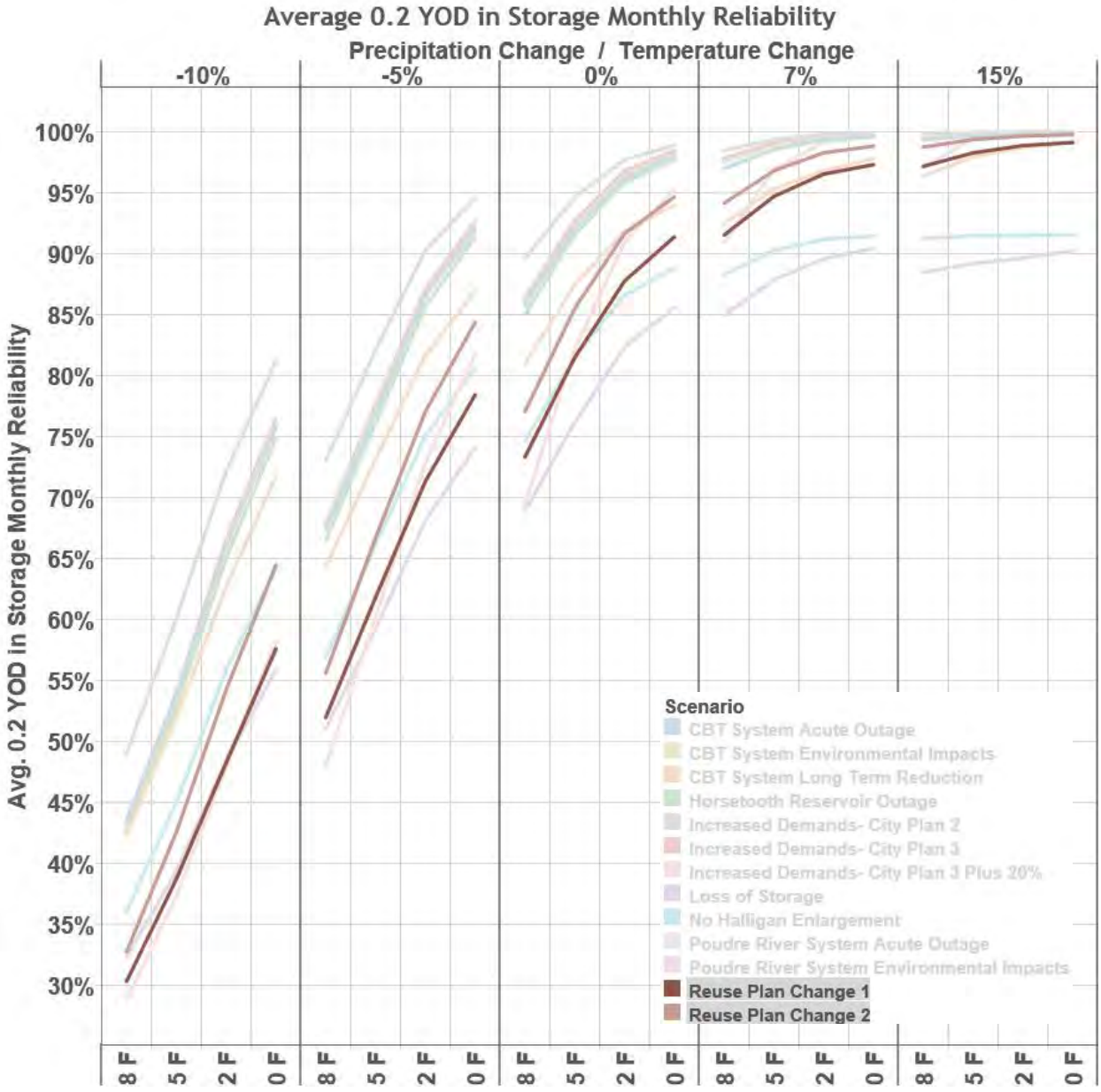

Figure 7-23 Storage Reserve Metric- Reuse Plan Change Scenarios

Note: Poorer performance indicated by lower reliability towards bottom of graph

A long-term reduction in C-BT supply simulated by a 25% quota for 10 consecutive years affects the storage reserve factor metric similarly to the Reuse Plan Change scenarios. C-BT water is an important supply for FCU and is also a critical component of the Reuse Plan. **Figure 7-24** shows that when this supply is significantly curtailed for a decade, the ability to meet the 20% SRF is diminished. Even scenarios with 15% increases in precipitation and no increase in temperature have a reliability of 99.3% for the 20% SRF metric and are thus, unable to meet the 100% reliability goal in the water supply planning policy.

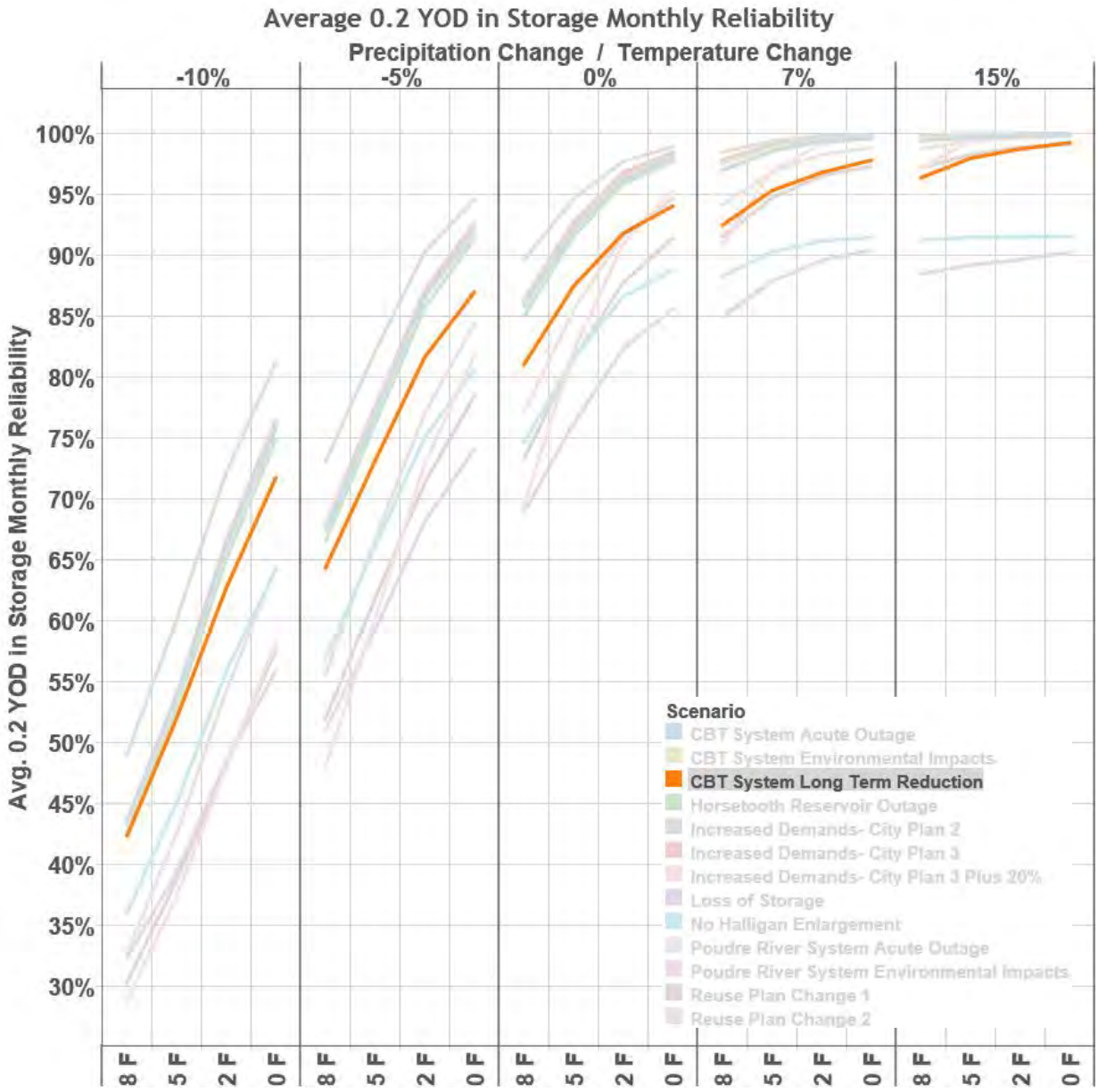

Figure 7-24 Storage Reserve Metric – C-BT Long Term Reduction Scenario
Note: Poorer performance indicated by lower reliability towards bottom of graph

7.5.3 Comparison of Scenarios Based on the Years in Restrictions Metric

A metric was calculated to determine how often water use restrictions would have been implemented during a model run based on the Fort Collins water shortage policy, assuming no demand management or emergency supply strategies were implemented. Water use restrictions could be triggered by impending shortages in meeting demand or total reservoir storage falling below the 20% SRF target. Because the current water supply planning policy sets a goal of meeting all demands during the 1-in-50-year drought and maintaining the 20% SRF without implementing water use restrictions, this “years in restrictions” metric provides a relative comparison of the threat of each risk scenario to cause violations of the policy.

WSVS simulations do not include demand management measures or changes to normal water resources system operations like FCU has implemented in the past and could implement in the future in response to droughts or other emergencies. Thus, the results should not be interpreted as an estimate of the frequency of declaring water use restrictions based on current FCU policy, but more as a proxy for the relative frequency with which FCU would have to implement responses based on its water shortage policy. Response of the FCU water resources system to water use restrictions is complex and implementing restrictions during one drought year may have continuing benefits by conserving supplies, thereby reducing or eliminating shortages in future dry years. It is noted that the limited storage in the FCU water supply system, relative to the annual demand, constrains the potential benefits of demand management in one year, on system performance in subsequent years. Despite complex interaction of operations during drought or emergency periods, the results of the “years in restrictions” metric are useful for comparing the relative threat of triggering water shortage response policy actions among the different risk scenarios.

The figures below show the percentage of years in which the FCU water system would have been in any stage of water restrictions based on the current Fort Collins water shortage policy. **Figure 7-25** shows results for this metric for all scenarios. Lines near the top of the graph indicate more time spent in restrictions and therefore, worse system performance.

Virtually all risk scenarios would drive the need for demand management or water supply enhancement actions to avoid violations of the water supply planning policy criteria. Future temperature and precipitation significantly affect the threat of being in conditions that would trigger water use restrictions to meet the other policy criteria.

The following paragraphs discuss results for categories of similar risk scenarios.

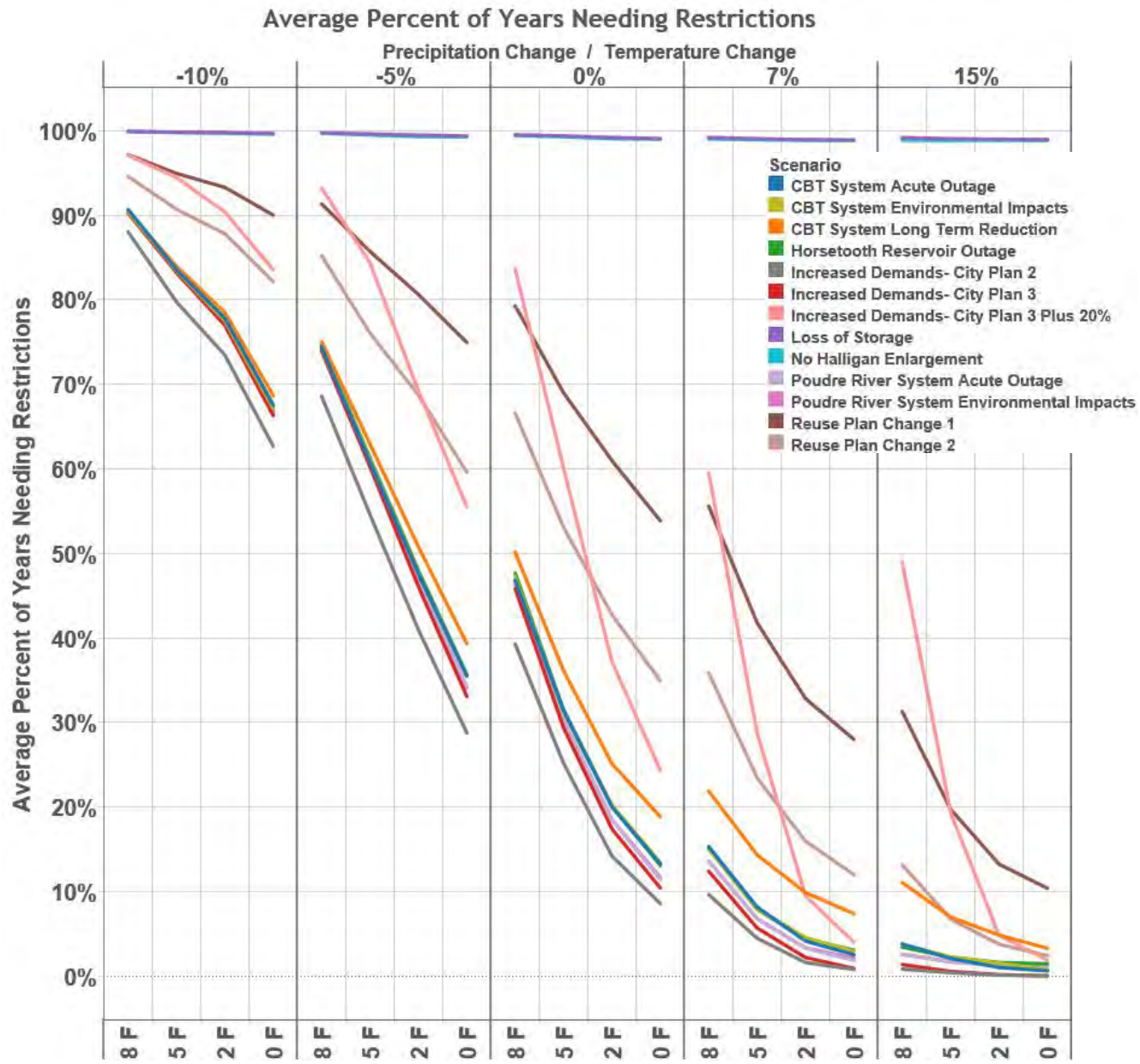

Figure 7-25 Years in Restrictions Metric for All Risk Scenarios

Notes:

a) Poorer performance indicated by greater frequency of being in restrictions towards top of graph

b) "Restrictions" is a surrogate for any demand management or emergency supply enhancement measures FCU would implement in response to potential violations of the water supply planning policy

Figure 7-26 shows that the No Halligan Enlargement and the Loss of Storage scenarios would require some level of restrictions throughout the simulations in at least 99% of years in the absence of implementing management measures. The proposed Halligan Reservoir Enlargement is a critical component of FCU's future water supply system and without it, current water supply planning policy criteria could not be met in most years.

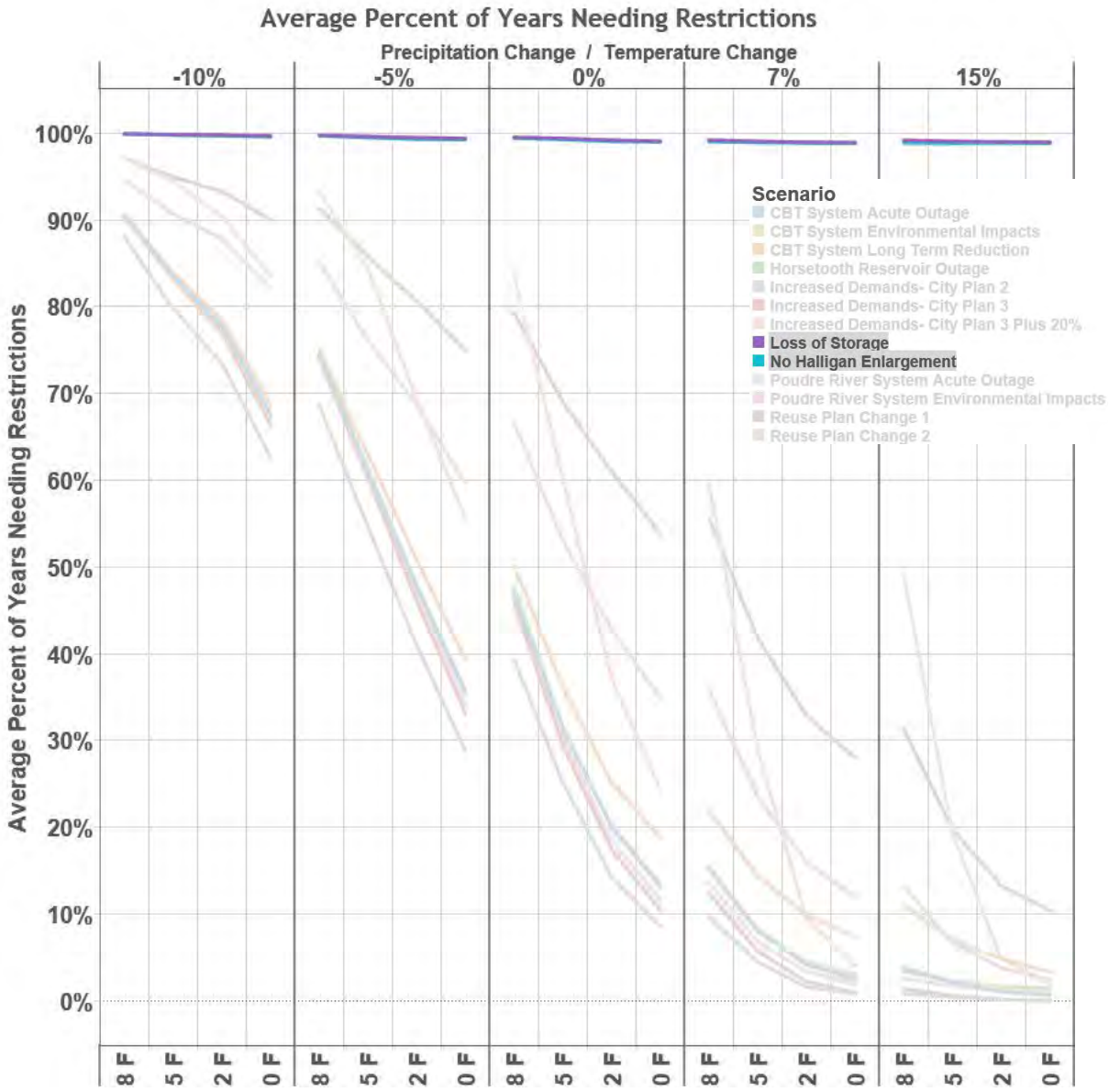

Figure 7-26 Years in Restrictions Metric- Loss of Storage and No Halligan Enlargement Scenarios

Notes:

a) Poorer performance indicated by greater restriction needs towards top of graph

b) "Restrictions" is a surrogate for any demand management or emergency supply enhancement measures FCU would implement in response to potential violations of the water supply planning policy

Figure 7-27 shows that any change to the reuse plan would increase the average percentage of years the system would be in restrictions without implementation of management measures. Either a 50% or a 100% reduction in the reuse plan would impact the system significantly, requiring the need for frequent restrictions or other demand management or supply enhancement measures.

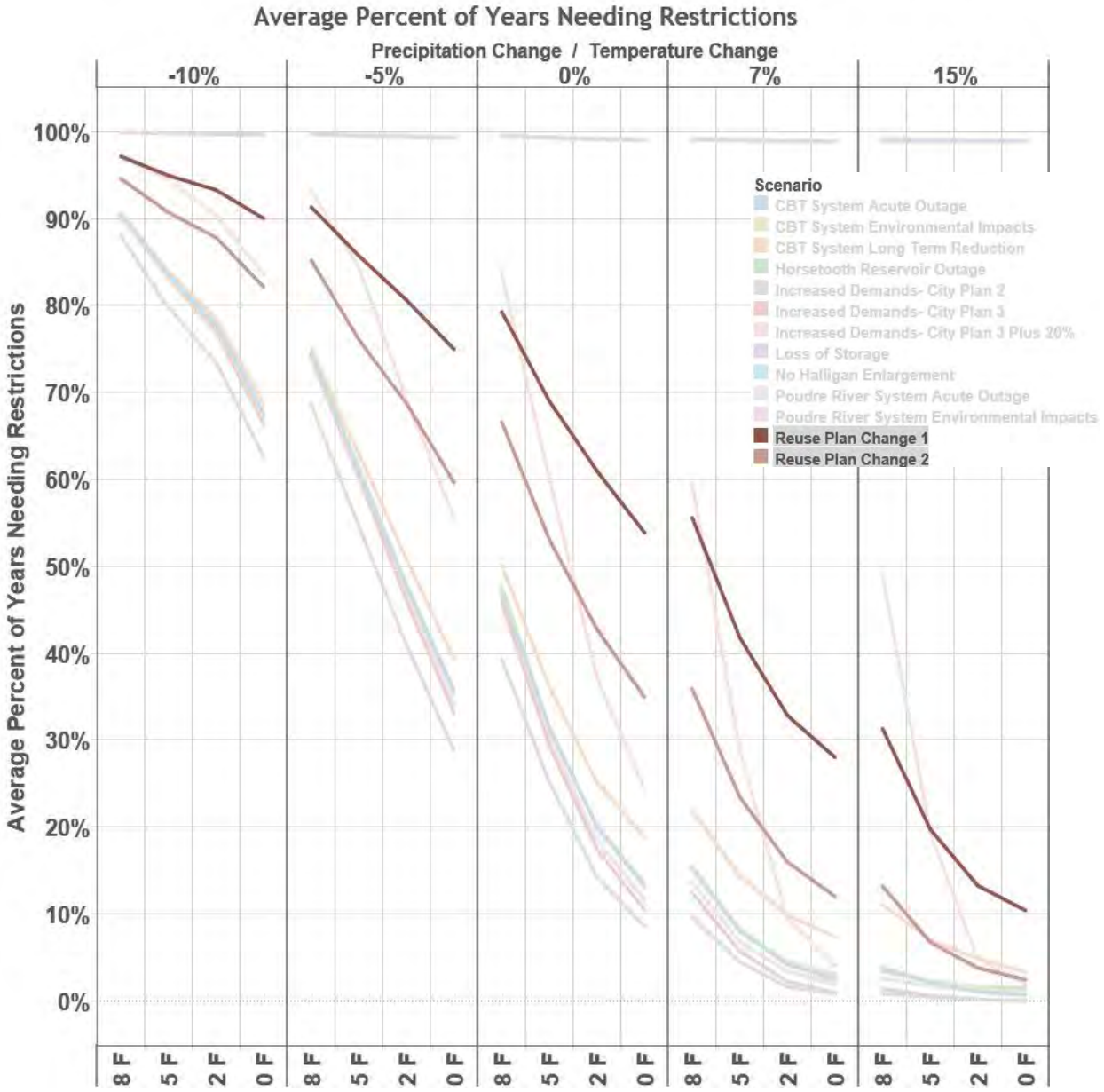

Figure 7-27 Years in Restrictions Metric - Reuse Plan Change Scenarios

Notes:

a) Poorer performance indicated by greater restriction needs towards top of graph
b) "Restrictions" is a surrogate for any demand management or emergency supply enhancement measures FCU would implement in response to potential violations of the water supply planning policy

7.5.4 Comparison of Scenarios Based on Indoor Demand Reliability Metric

The next set of figures, starting with **Figure 7-28,** show the reliability of meeting indoor demands for each of the risk scenarios. For modeling purposes, indoor demand is defined as the sum of February demand for the CityDem and LCU nodes in the FCSys model. Meeting all indoor demands with 100% reliability is a critical performance objective for FCU. Any situation with less than 100% reliability represents a public health crisis and a serious risk. It is important to note that watering restrictions or other demand management strategies were not modeled as a part of this study. FCU would take proactive steps to implement restrictions or obtain emergency supplies if there was a threat of not meeting indoor demands for all its customers. So, in practice, the actual indoor demand reliability would be much higher for any of the risk scenarios than calculated for the WSVS simulations. Results in this section are merely an indication of the relative threat among the risk scenarios for indoor demand shortages without implementation of appropriate management strategies.

Figure 7-28 is a parallel line plot showing the average indoor demand reliability metric for all risk scenarios and all climate conditions. Similar to the other metrics, the indoor demand reliability metric is strongly influenced by climate conditions. All risk scenarios for current and drier climates present a significant threat to meeting indoor demands with 100% reliability.

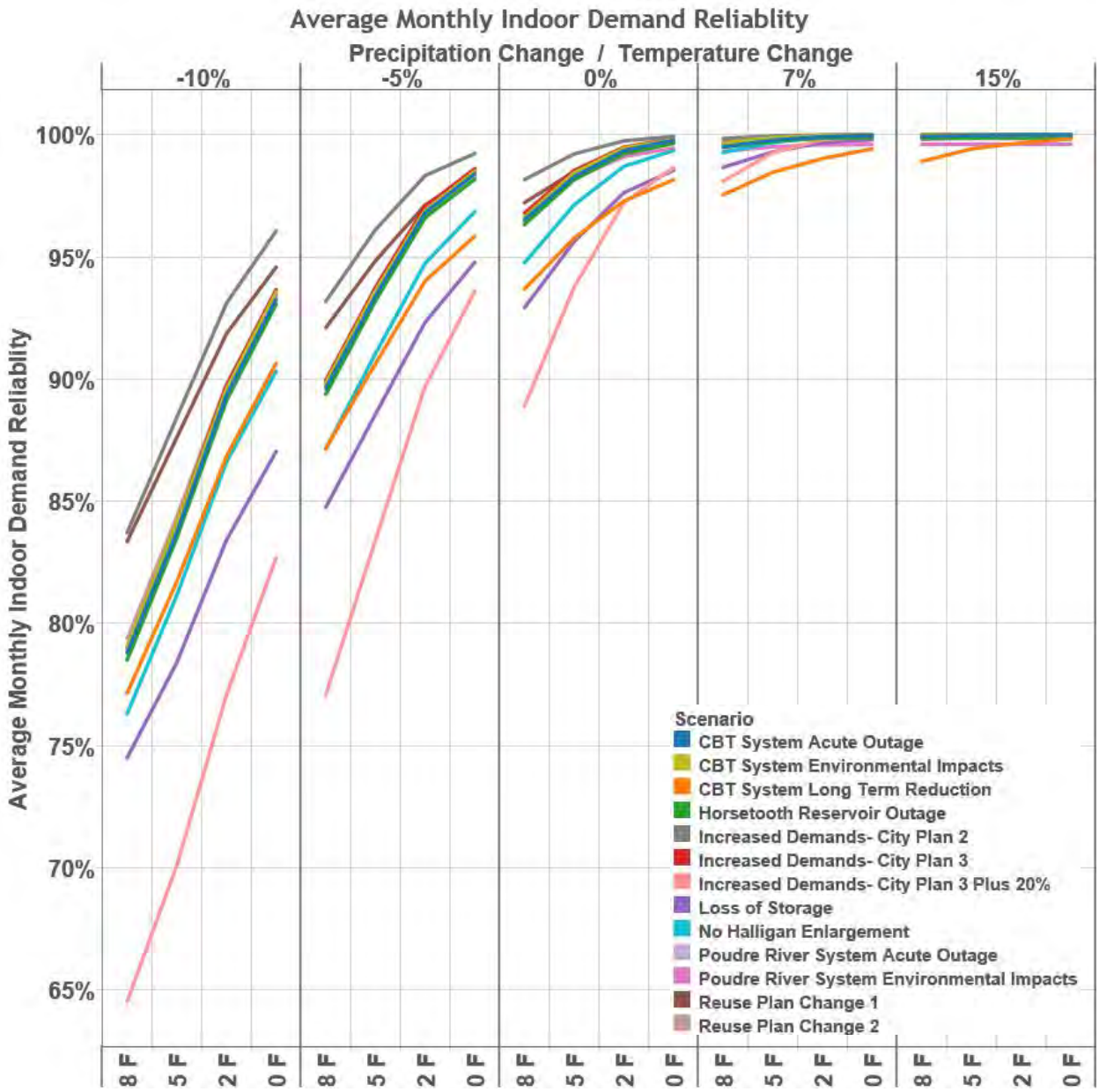

Figure 7-28 Indoor Demand Reliability Metric for All Risk Scenarios

Note: Poorer performance indicated by lower reliability towards bottom of graph. Water supply planning policy goal is 100%.

Figure 7-29 shows the performance of the Loss of Storage and the No Halligan Enlargement scenarios. Even under current climate conditions (T=0/P=0%), a reduction in storage due to loss of C-BT Carryover and/or the proposed Halligan Reservoir enlargement would create shortages in meeting indoor demands.

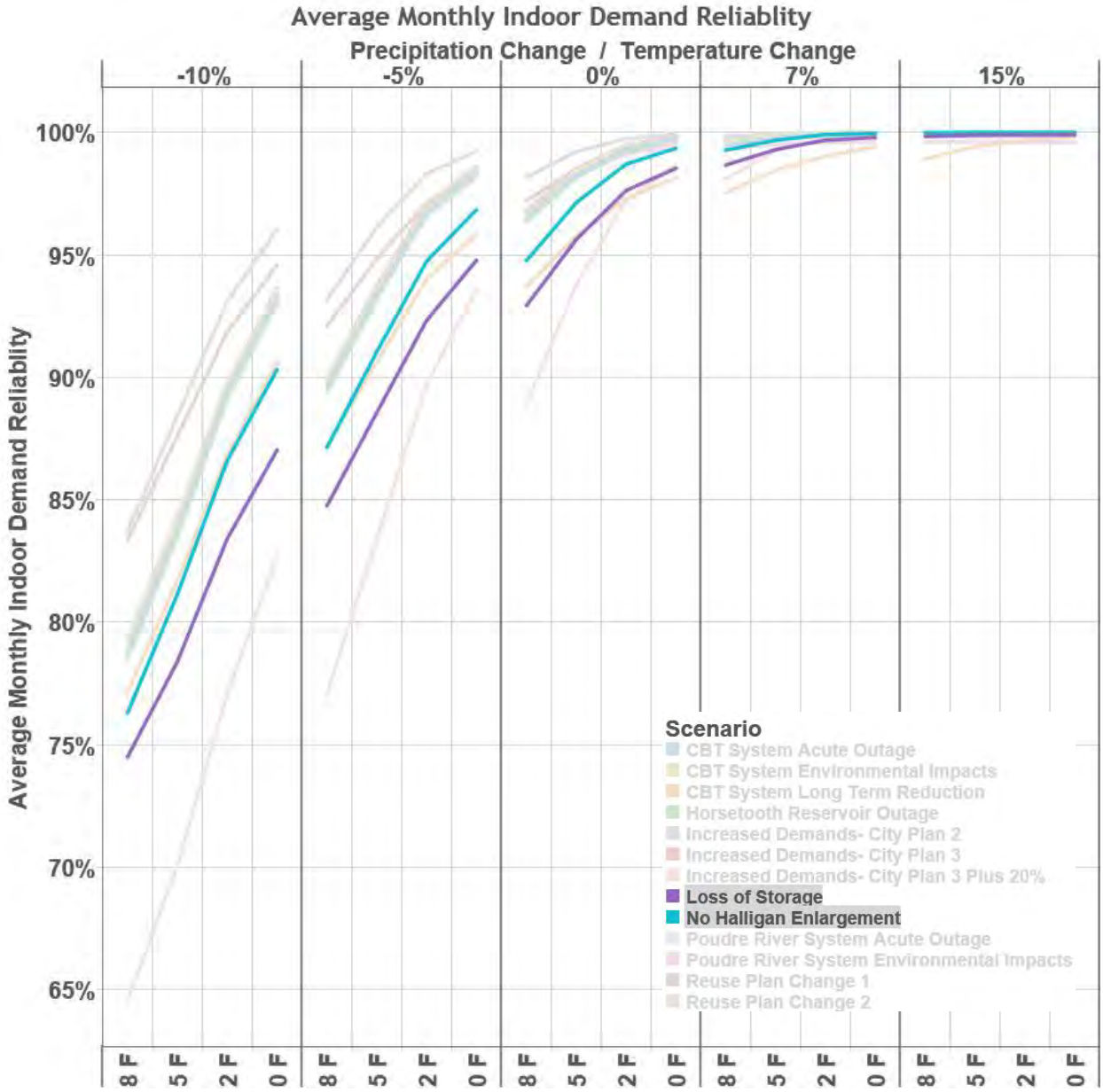

Figure 7-29 Indoor Demand Reliability Metric - Loss of Storage and No Halligan Enlargement Scenarios

Note: Poorer performance indicated by lower reliability towards bottom of graph

Figure 7-30 shows the C-BT Long Term Reduction Scenario represents a critical risk to the ability to reliably meet indoor demands. Even with a 7% increase in precipitation and no change in temperature, the current system is unable to meet indoor demands with 100% reliability. This risk is driven strongly by temperature increases. In the wettest future (+15% precipitation), this is the only risk with decreasing indoor demand reliability as temperature increases.

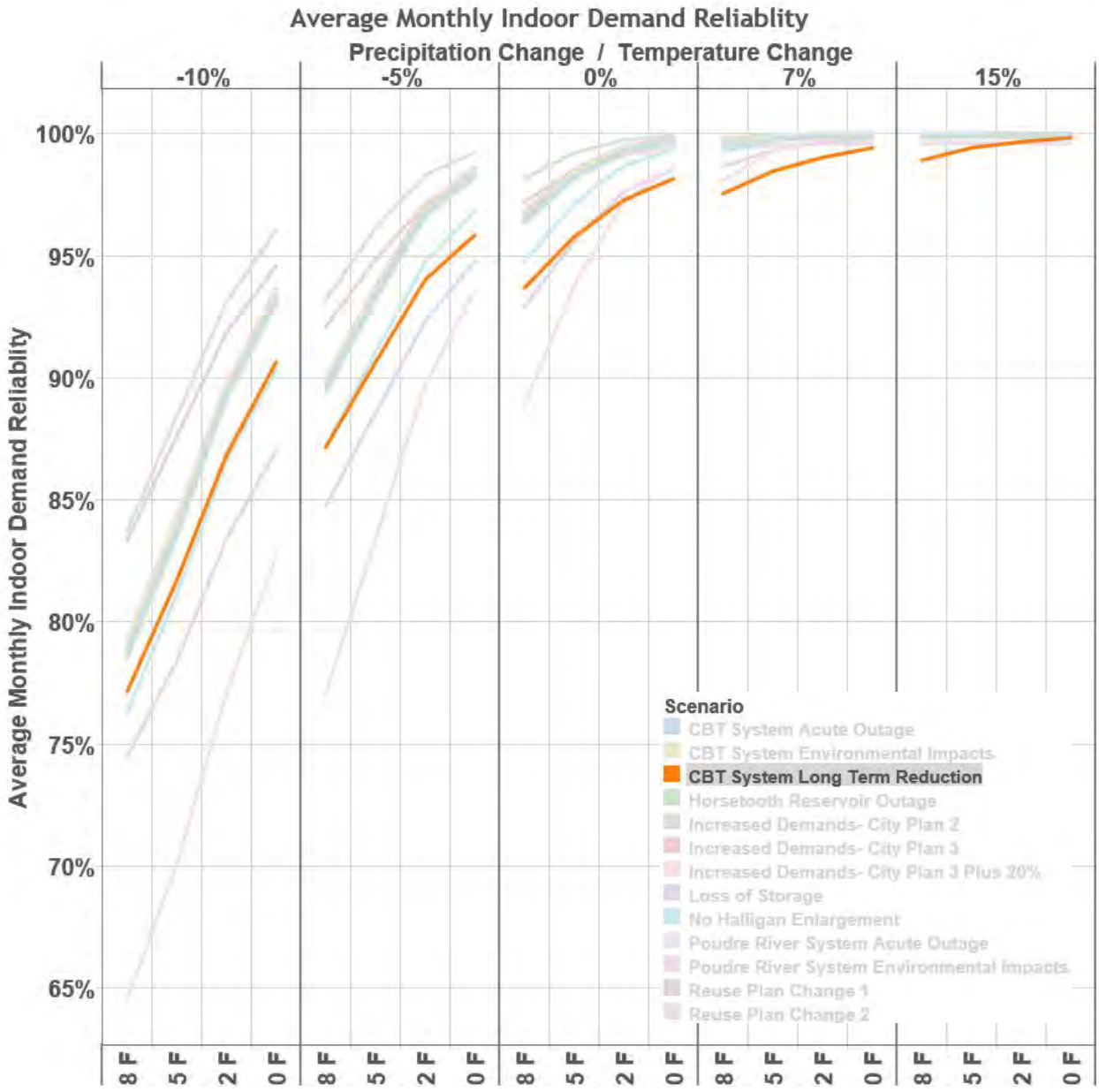

Figure 7-30 Indoor Demand Reliability Metric – C-BT Long Term Reduction Scenario
Note: Poorer performance indicated by lower reliability towards bottom of graph

7.5.5 Timing of Risk Scenario Impacts

Impacts of the risk scenarios are not evenly distributed throughout the year. Because demands vary seasonally and peak in the summer months, most risk scenarios affect the ability to meet the current water supply planning policy criteria in the fall and winter months when storage is depleted and streamflow yields have declined. To demonstrate this seasonal distribution of risk, histograms were prepared for the average number of months in which demand shortages occurred in simulations for the Loss of Storage Scenario (a long-term risk scenario) and the Poudre River System- Acute Outage Scenario (a short-term risk scenario) for City Plan 3 demand and selected climate conditions.

Figure 7-31 shows the average distribution of the occurrence of demand shortages for selected climates under the Poudre River System Acute Outage Scenario. The figure reflects the count of demand shortages only; SRF shortages are not reflected in the figure. More detailed descriptions of the risk scenarios can be found in Appendix F. The three climates selected are wetter with no temperature increase (T=0 and P=+7%), current climate conditions (T=0 and P=0) and the most severe hot and dry climate (T=8 and P=-10%). Under wetter conditions, when the system is not stressed by climate, most shortages occur in the summer months of July, August and September. Comparing the wetter climate to the current conditions climate, August and September still stand out with the most shortages, but more shortages appear in all months relatively uniformly. In the most severe climate, only months of peak streamflow yield experience few shortages. This shows that climate has the largest effect on shortages in the fall and winter months, while the short-term risk itself causes shortages in the summer months even under a wet climate.

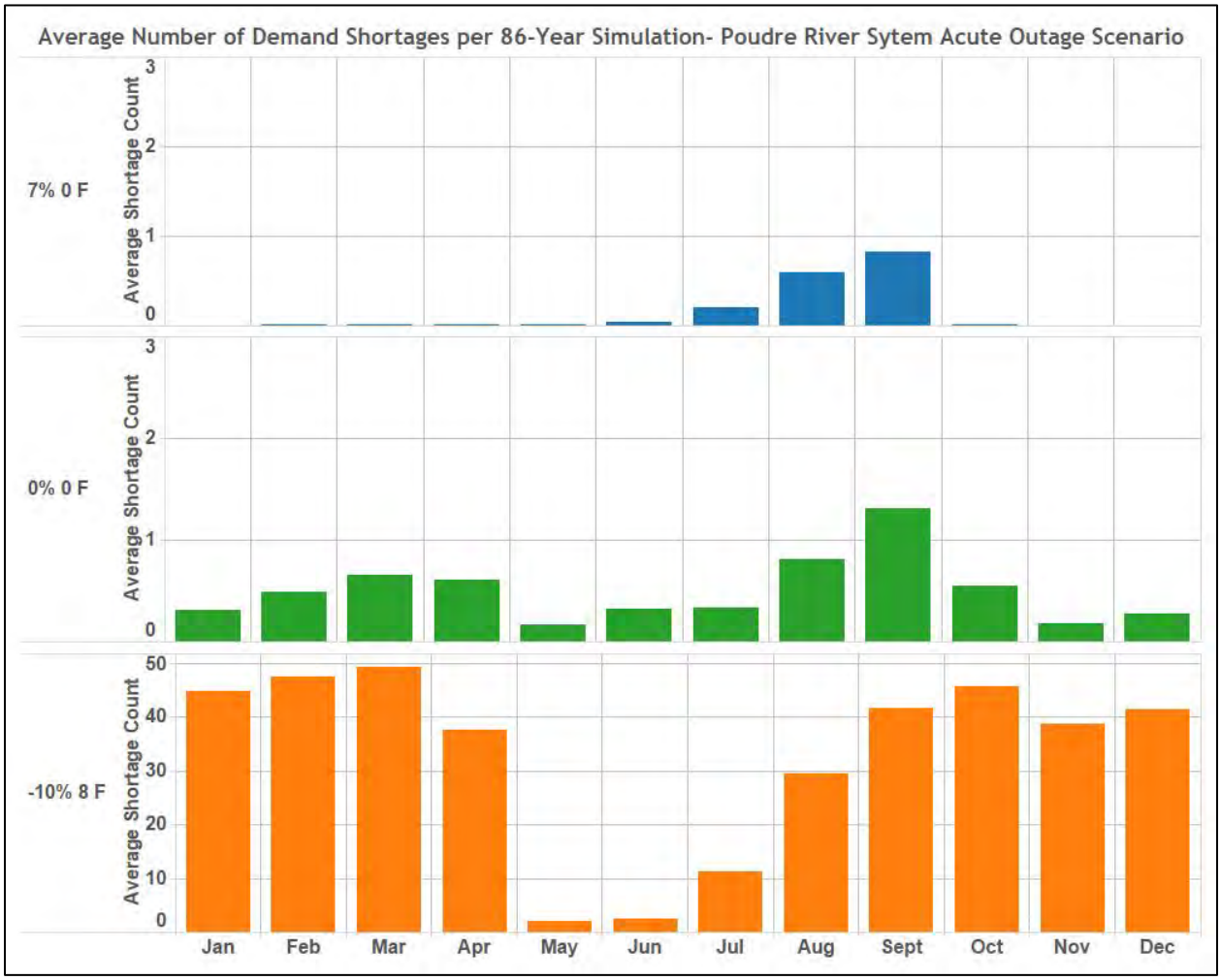

Figure 7-31 Average Monthly Distribution of Demand Shortages for Poudre River Acute Outage Scenario Under Selected Climates

Figure 7-32 shows the average distribution of the occurrence of demand shortages for selected climates under the Loss of Storage Scenario for the same three climates described above. The figure reflects the count of demand shortages only; SRF shortages are not reflected in the figure. The monthly distribution pattern is similar for the three climate conditions, with the direct runoff months of May and June being the only months when shortages rarely occur. More severe climates increase the number of shortages during the rest of the year but do not shift the seasonal occurrence of those shortages. This shows the extent of impact of not having sufficient storage to capture spring runoff for use until the next spring runoff occurs and show how that impact is more significant in warmer, drier climate conditions.

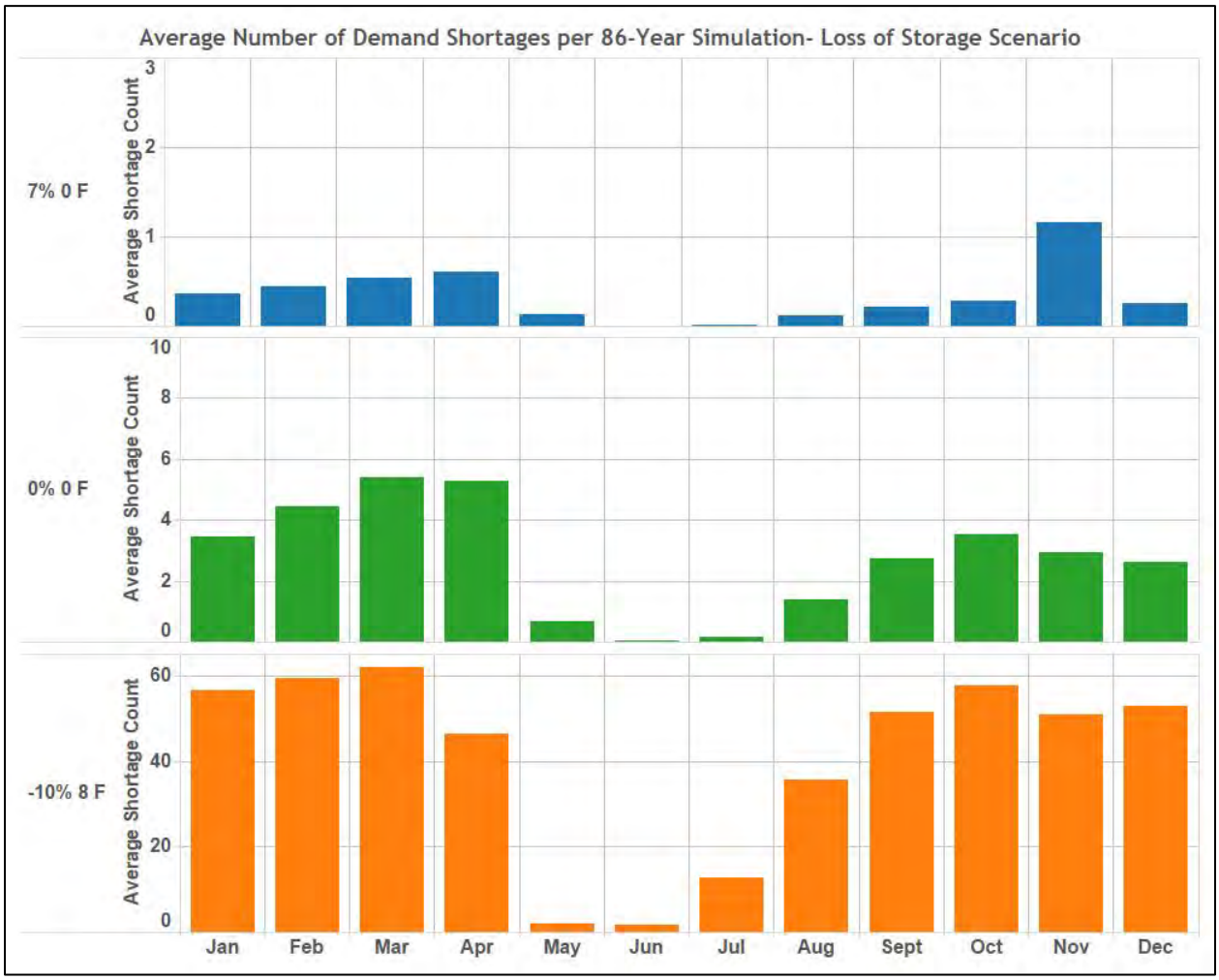

Figure 7-32 Average Monthly Distribution of Demand Shortages for Loss of Storage Scenario Under Selected Climates

7.5.6 Summary of Findings for Risk Scenarios

This section summarizes the primary findings from the analysis of the risk scenarios simulated for the WSVS.

- Climate is a critical driver for FCU system performance. Regardless of the scenario, future climate will have a dramatic effect on FCU system performance and the ability of FCU to meet all criteria of its current water supply planning policy. A hotter, drier climate would severely stress the current FCU water resources system with or without the occurrence of other system risks. It would reduce supply, increase demand, shift runoff earlier making existing reservoir storage less effective and trigger other potential environmental effects. In general, climate has a more significant effect on system performance than increased demand over the range of climate conditions and future demands simulated in the WSVS. The more severe climates may also have a more significant impact than any of the assumed risk scenarios at current climate conditions. As shown in **Figure 7-16**, the number of years with annual demand shortages ranges from 1 to 10 across all the risk scenarios at the current climate (T=0, P=0%); in contrast, the number of years with annual demand shortages ranges from 54 to 75 for the hottest, driest climate condition (T=8, P=-10%) and from 0 to 2 for the coolest, wettest climate condition (T=0, P=+15%). Thus, future climate conditions may be more impactful to FCU's ability to meet its water supply planning policy criteria than the occurrence of any particular infrastructure outage or environmental condition simulated in the WSVS risk scenarios.

- Water demands higher than those forecast in the City Plan 3 scenario represent a significant vulnerability to the current FCU system. This points out the importance of FCU maintaining its water conservation program and working with City Planning Department to closely monitor population and development density trends to see how they are tracking with City Plan assumptions. An increase in 2070 demands by 20% significantly increases shortages and incidence of failures to meet the water supply policy requiring 20% of average annual demand in storage at all times.

- The top risk scenarios representing vulnerabilities to the FCU system are:

    - **Elimination of the Reuse Plan**. Risks affecting viability of the reuse plan would reduce FCU's ability to make maximum use of its reusable water supplies, putting additional stress on local Poudre River water supplies and water from storage such that the system would be more susceptible to impacts of droughts and other reductions in supply.

    - **Loss of C-BT carryover storage and proposed Halligan Reservoir enlargement.** FCU has limited reservoir storage, so loss of these storage options would make it impossible for FCU to meet its current water supply planning policy criteria under most future climate and demand conditions. Storage is particularly important in meeting demands late in the year after runoff has declined, so loss of storage would increase the threat of fall and winter shortages.

- **Long-term reductions in C-BT imports due to shortages in the Colorado River system**. C-BT imports from the Colorado River Basin are a critical source of supply for FCU. A substantial reduction in the C-BT quota for 10 years would pose a significant threat to FCU's ability to meet its current water supply planning policy criteria. This risk is the most impactful to meeting indoor demands at wetter climates, indicating that even under less severe climate futures FCU is still vulnerable to long-term reductions in C-BT imports.

Based on the ranking of risks and uncertainties in Section 5.2 and 5.3, many of the most critical long-term or chronic risks were found to be unlikely; however, their impact was estimated to be significant. The WSVS risk scenario simulations validated that assumption.

The risk scenario simulations demonstrated the fundamental difference between long-term or chronic risks and short-term or acute risks. All the most impactful risks based on the metrics used in the WSVS are long-term risks. This is biased by the metrics themselves which, with the exception of the annual demand shortage metric, are always calculated over the entire 86-year simulation period. Thus, long-term risks that adversely affect system performance over the entire simulation period or for many years within the simulation period affect metric values more than short-term risks that occur for only a few months or years. Short-term risks such as an outage of the Poudre River pipelines or C-BT facilities can have extreme impacts on system performance for a short period but are masked by climate shifts that cause significant long-term impacts to performance. The effects of long-term risks are not as easily masked by the shifts in climate, as their impacts are also significant over several years or the entire simulation.

Figure 7-33 highlights the average annual shortage volume metric and **Figure 7-34** highlights the storage reserve metric for the five short-term risks simulated for the WSVS. These figures show that most of the short-term risk scenarios have very similar performance when measured by the WSVS metrics. This is particularly true for the 20% SRF metric. The two short-term Poudre River risk scenarios show a more pronounced response to wetter climate conditions for the average annual shortage metric than the other short-term risk scenarios. The frequency of shortages due to climate influence is reduced for wetter climates, and when shortages do occur for these risk scenarios their magnitude is quite large, resulting in a high average shortage volume metric value. In this case, instances of failure to satisfy the current water supply planning policy criteria would be brief but impacts could be significant without application of appropriate mitigation strategies.

Additional investigation may be warranted to develop different metrics that are useful in comparing performance of short-term risks to each other. Strategies for addressing short-term risks in a future water resources plan may differ from strategies addressing long-term risks; e.g., they may include short-term emergency operations that would be effective over a period of weeks or months but not for multiple years. Referring to the ranking of risks and uncertainties in Section 5.2 and 5.3, many of these short-term risks received relatively high composite scores (likelihood multiplied by impact), meaning they are of high concern to FCU staff and should be further assessed.

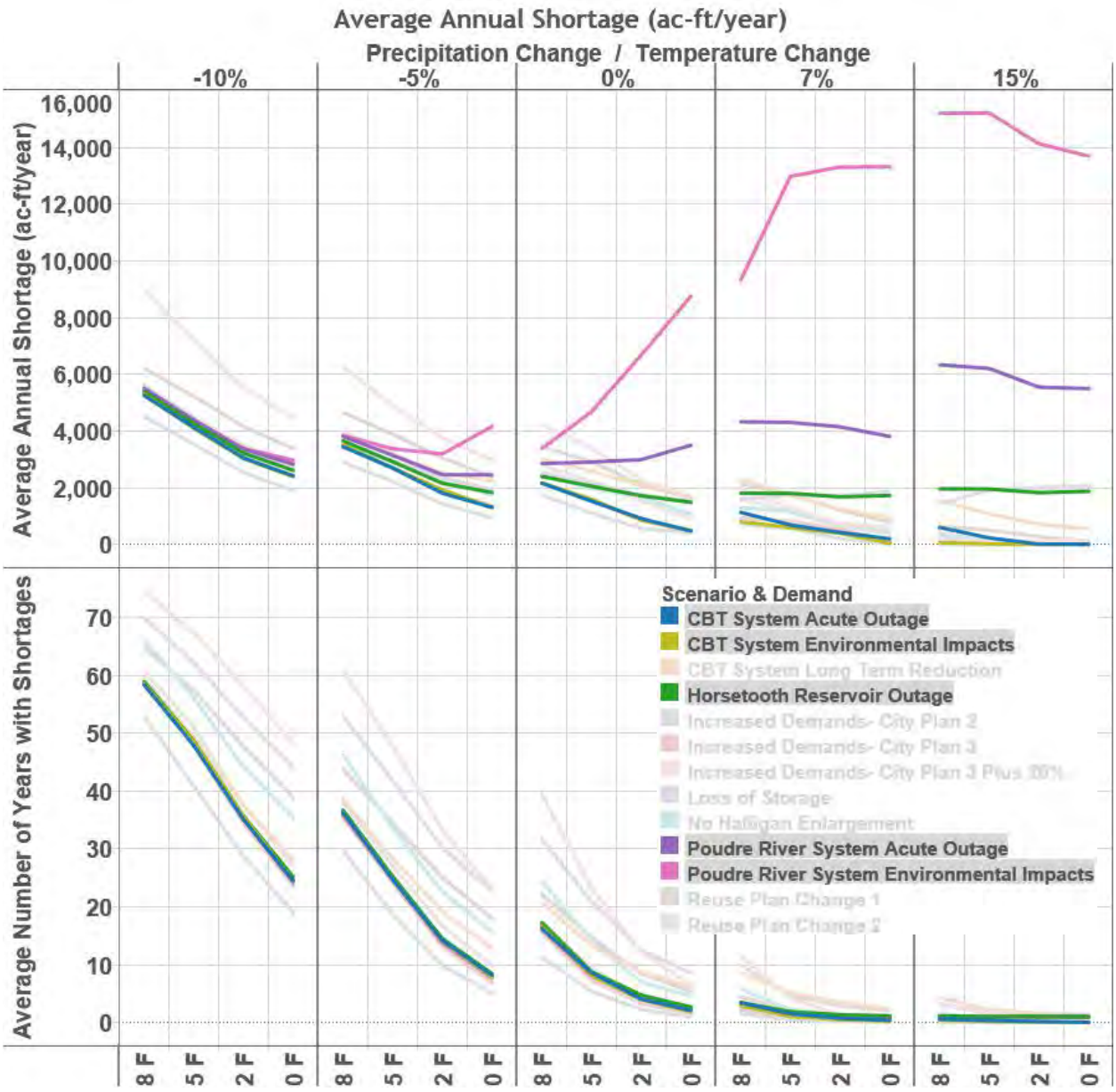

Figure 7-33 Average Annual Shortage Volume for Short Term Risks Compared to Long Term Risks

Note: Poorer performance indicated by greater shortage towards top of graph

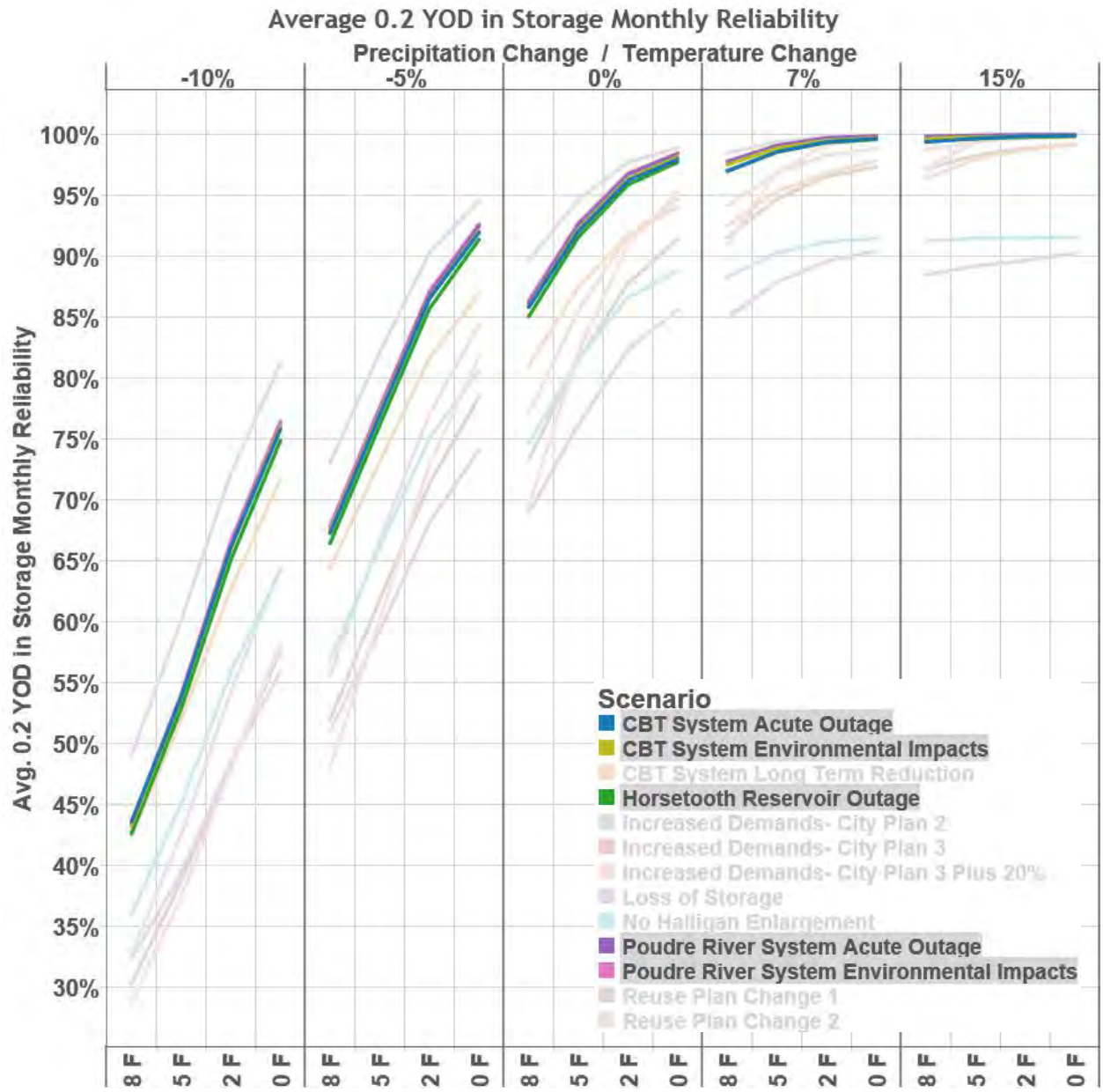

Figure 7-34 Reliability of Retaining 20% Storage Reserve for Short Term Risks Compared to Long Term Risks

Note: Poorer performance indicated by lower reliability towards bottom of graph

7.6 SUMMARY OF RISK SCENARIO RESULTS FOR SELECTED FUTURE CLIMATE CONDITION

FCU will use the results of the WSVS to update its Water Supply and Demand Management Policy. In the process of updating the policy, FCU may select a particular future climate condition or range of climate conditions to focus development of water supply alternatives. Mid-term planning could be based on a moderate climate future, such as T=5/P=0, while long-term planning may be based on a more severe climate future.

To show how the results of the WSVS could be used at that stage of water supply planning, results of the risk analysis are summarized below for the T=5/P=0 climate condition. These descriptions tie key metrics for this one possible climate condition to the current water supply planning policy.

- For the climate change risk alone (i.e., not combined with other risk scenarios), the chances of not meeting the 20% SRF would decrease from 84% of years to 67% of years when compared to current climate. Implementation of management measures such as water use restrictions would be required in about 33% of years compared to 16% of years for current climate conditions.

- For City Plan 2 and City Plan 3 demands in 2070, demand shortages would occur in about 8% of years; the 20% SRF would be met in 73% of years, and implementation of demand management or supply enhancement measures would be needed in about 27% of years. For City Plan 3 + 20% demands in 2070, shortages would occur in 27% of years; the 20% SRF target would be met in 50% of years; and implementation of demand management or supply enhancement measures would be needed in about 60% of years.

- Risk scenarios would reduce system performance such that shortages would occur in about 8% to 27% of years, depending on the risk scenario. The 20% SRF could be met between 1% and 76% of years over the range of risk scenarios. Most risk scenarios would force FCU to implement demand or supply management measures in the range of 25% to 36% of years. The Reuse Plan risk scenarios, scenarios involving loss of storage, and City Plan 3 + 20% demand scenarios cause higher risk of needing to implement management measures; water use restrictions or comparable options would be needed in 53% to 99% of years. Indoor demand shortages would occur in 6% to 21% of years across all risk scenarios, compared to 6% of years or less for the current climate across all risk scenarios.

Results indicate that even a moderate increase of 5 degrees in mean annual temperature with no change in mean annual precipitation has a significant adverse impact on the ability of FCU to meet customer demands as established in the water supply planning policy. At this climate, 2070 City Plan demands could be met in about 93% of years without implementing shortage management measures. Any of the system risks would require shortage management actions in anywhere from 29% of years to 99% of years based on the current water supply planning policy. Implementing water restrictions or other near-term strategies would probably not be enough to meet customers objectives under the current policy; new water supply projects would be needed to enhance supply.

8.0 CONCLUSIONS

The future is full of uncertainties. Fort Collins Utilities must make water supply planning decisions in the face of uncertain future water demand that is driven by complex demographic, economic and customer behavior factors; uncertain future hydrologic supply influenced by a climate that could be warmer and drier or warmer and wetter; and external risks to water supplies due to environmental influences and to infrastructure critical to the FCU water system. The WSVS provides FCU with an improved understanding of the most important risks and uncertainties to plan for in the future.

FCU's water system and water rights portfolio are well adapted to current climate conditions. With no change in average annual temperature or precipitation, the system performs well for the four metrics analyzed in this study (total demand shortage volume, reliability of maintaining a 20% storage reserve factor, reliability of not needing demand management measures like watering restrictions and reliability of meeting indoor demands).

However, once climate begins to shift towards hotter and drier conditions, the system performance begins to decline and the frequency with which FCU would have to implement demand management measures or access additional water supplies increases. Uncertain future hydrology is the most significant threat to FCU's future water supply, as global climate models have a wide range of predictions for the Poudre River and Upper Colorado River basins. Even the risk scenarios with the worst performance under current climate conditions perform better than a scenario with no system risks and an increase in temperature and decrease in precipitation. Thus, future climate conditions may be more impactful to FCU's ability to meet its water supply planning policy criteria than the occurrence of any particular infrastructure outage or environmental condition simulated in the WSVS risk scenarios.

Water demands higher than those forecast in the City Plan 3 scenario represent the next most significant vulnerability to the current FCU system. This points out the importance of FCU maintaining its water conservation program, and working with City Planning Department to closely monitor population and development density trends to see how they are tracking with City Plan assumptions. A 20% increase in the forecasted City Plan 3 demand due to increased population, large commercial users, expansion of the service territory, or other factors would stress supplies in all years and would be especially challenging in future hotter and drier climate conditions. The current FCU water supply would have to be enhanced or demand management measures would have to be implemented frequently to avoid shortages and to meet the 20% SRF goal.

Other risks found to have the largest impact on the FCU system performance are:

- Loss of storage, including no Halligan Reservoir enlargement; the FCU system is storage-limited so loss of any existing or proposed storage capacity has significant adverse effects.
- Reuse Plan changes, including elimination or 50% reduction in the amount of water incorporated in the Plan; the Reuse Plan is an efficient supply strategy that stretches current supplies, and losing all or part of it has compounding effects on FCU water supply.

- A long-term reduction in C-BT quotas due to C-BT supply or delivery infrastructure issues. C-BT supply is a critical part of FCU's water supply portfolio and reduction in that source over several years significantly impacts FCU's ability to meet its water supply planning policies.

Over the four metrics presented in this study, the above risks and risk scenarios show the poorest performance for current climate conditions and their performance is significantly reduced for the warmer and drier climates. These four risk scenarios create the greatest threats to meeting the current FCU water supply planning policy including frequent failures to meet total customer water demands, frequent failures to maintain the 20% storage reserve factor, and frequent years in which the current FCU water shortage response policy would call for implementation of water use restrictions or other emergency measures.

For most risk scenarios, shortages for climate conditions that are wetter than the current climate would occur most often in late summer and early fall. For warmer and drier climate conditions, shortages would occur throughout the year except in the peak runoff months of May and June. This shows the challenge of maintaining a resilient water resources system in the face of a warmer and drier climate with the limited amount of storage in the FCU raw water system.

Without the proposed Halligan Reservoir enlargement of 8,125 AF, FCU system performance would be significantly impacted and current water supply planning policy criteria could not be met under most future climate and demand conditions.

FCU may choose a moderate future climate condition as the focus for updating its water supply plan. If a future climate is chosen with 5-degree F warmer temperature and the same average annual precipitation, the following challenges would have to be addressed in meeting the current water supply planning policy.

- For City Plan 2 and City Plan 3 demands in 2070, demands shortages would occur in about 8% of years; the 20% SRF would be met in 73% of years, and implementation of demand management or supply enhancement measures would be needed in about 27% of years. For City Plan 3 + 20% demands in 2070, shortages would occur in 27% of years; the 20% SRF target would be met in 50% of years; and implementation of demand management or supply enhancement measures would be needed in about 60% of years.

- Most risk scenarios would force FCU to implement demand or supply management measures in the range of 25% to 36% of years. The Reuse Plan risk scenarios, scenarios involving loss of storage, and City Plan 3 + 20% demand scenarios cause higher risk of potentially needing to implement management measures; water use restrictions or comparable options would be needed in 53% to 99% of years.

- Indoor demand shortages would occur in 6% to 21% of years across all risk scenarios, compared to 6% of years or less for the current climate.

One approach to interpreting the WSVS results is to identify the risk scenarios that generate the greatest potential for failure to satisfy each of the current water supply planning policy criteria in 2070.

- **Total demand** (level of service target reliability = 100%). For warmer/drier climates, the most impactful risk scenarios are the City Plan + 20% demand and elimination of the Reuse Plan. For wetter climates, the most impactful risk scenarios are those that have short-term limitations on deliveries of Poudre River supplies.

- **20% storage reserve factor** (level of service target reliability = 100%). For warmer/drier climates, the most impactful risk scenarios are the City Plan + 20% demand and elimination of the Reuse Plan. For wetter climates, the most impactful risk scenarios are those that reduce storage, either through loss of C-BT carryover storage, loss of the ability to enlarge Halligan Reservoir as planned, or both. The FCU system has relatively little storage now, so loss of any current or proposed reservoir storage capacity significantly impacts the ability to meet this planning criteria.

- **Water use restrictions** (level of service target reliability = 100%; no restrictions or other emergency measures for the 1-in-50 drought). Loss of storage and elimination of the Reuse Plan are the most impactful risk scenarios in terms of creating conditions in which water use restrictions or some form of demand management or supply enhancement response would be required to prevent water shortages based on current water supply planning criteria.

- **Indoor demand shortages** (level of service target reliability = 100%). The City Plan 3 + 20% and Loss of Storage risk scenarios pose the greatest risk of not satisfying all indoor demands in 2070. For the warmest/driest climate, indoor demand reliability would be about 70% for these two risk scenarios; for current climate the indoor demand reliability for these scenarios would be about 90%; for the wettest climate the indoor demand reliability for these scenarios would be about 99.5%.

The risk scenario simulations demonstrated the fundamental difference between long-term or chronic risks and short-term or acute risks. Critical risks identified in the WSVS are long-term risks, impacting the FCU system for at least 10 years. However, many of the short-term risk scenarios may have a short-term, severe impact that was not fully captured in the metrics used in this study. The metrics are always calculated over the entire 86-year simulation period. Thus, long-term risks that adversely affect system performance over the entire simulation period or for many years within the simulation period affect metric values more than short-term risks that occur for only a few months or years. Short-term risks such as outage of the Poudre River pipelines or C-BT facilities can have extreme impacts on system performance for a short period, but this will not translate into a poor WSVS metric value when compared to the long-term risks in the study. Additional studies would be required to more closely analyze and rank the impacts of those short-term risks on the FCU water system.

FCU plans to use the results and conclusions of the WSVS as the foundation for updating its Water Supply and Demand Management Policy and its long-range water resources planning strategy. The following findings from the WSVS may be important as FCU contemplates the coming planning process.

- Climate change is the most important vulnerability faced by the FCU water supply system but it is the most difficult risk to track. Long-term trends are difficult to measure and are obscured by the

natural variability in wet and dry years. Participating in or keeping informed of state and federal climate change studies will help FCU understand the trajectory of climate change in the region.

- Water demands higher than those forecast in the City Plan 3 scenario represent a significant vulnerability to the current FCU system. This points out the importance of FCU maintaining its water conservation program and working with City Planning Department to closely monitor population and development density trends to see how they are tracking with City Plan assumptions. Increased water demand is the risk over which FCU, in collaboration with City Planning, has the most control.
- The WSVS analysis was performed without simulating the effects of demand management measures that FCU could adopt under the City's current Water Supply Shortage Response Plan. Investigating benefits of the current shortage response policy should be a key aspect of the water supply plan update.
- The WSVS highlights the importance of storage in the FCU system and the significant vulnerability posed by the inability to implement the proposed Halligan Reservoir enlargement or a similar storage project as a strategy to mitigate effects of climate change and other risks.
- The WSVS validates that FCU is highly reliant on the C-BT system and is particularly susceptible to extended periods of low quotas and loss of the carryover storage program. FCU should monitor conditions that could trigger either of those risks.
- Results of the WSVS are biased toward long-term risks, but a number of short-term risks were identified that could severely impact FCU operations for a few weeks or months. These conditions will require further study and may involve a different management strategy in future water supply planning.
- FCU now has a water supply modeling tool that can be used to conduct more detailed analyses of the WSVS risk scenarios or explore a broader range of uncertainties or operating conditions if desired. It can also be used to measure and compare the effectiveness of alternative water supply system improvements.

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TECHNICAL APPENDICES

Appendix A LEVEL OF SERVICE GOALS AND METRICS TECHNICAL MEMORANDUM

Technical Memorandum

Level of Service Goals and Metrics

Date: June 12, 2018
From: Neil Stewart, Chip Paulson, Lisa Fardal
To: Fort Collins Utilities

Stantec

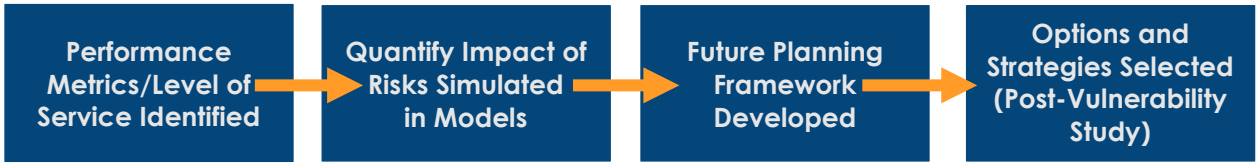
1.0 INTRODUCTION

The Fort Collins Utilities (FCU) Water Supply Vulnerability Study will explore a variety of future conditions related to climate, demands, and system risks with the goal of robustly assessing which of these future conditions present vulnerabilities for the FCU raw water system. The FCU water supply system model (FCM) will be used to simulate these many futures and is a key part of the study. As part of this process, the performance of the FCU system needs to be quantified using the FCM and then classified into satisfactory and unsatisfactory states. This will inform FCU on what future conditions create challenges for their water supply system.

There are two primary parameters needed to quantify satisfactory and unsatisfactory water supply system performance:

- *Performance Metrics* are specific measures characterizing the key features of a water supply system that are definable, measureable, representative, and unique. Examples of performance metrics could be maintaining a minimum volume of water in storage in July, years without customer restrictions, or use of Colorado-Big Thompson (CBT) supplies.
- *Level of Service (LOS)* goals are thresholds used to separate key performance metrics into satisfactory and unsatisfactory states. Examples of level of service goals could be triggering customer watering restrictions 5% of the time, or maintaining a volume of water equivalent to 1 year of demand in storage in 90% of Aprils.

The figure below shows how these performance metrics and level of service goals will be used in the Water Supply Vulnerability Study. First, they will be used to assess the impact of risks and uncertainties detailed in the *Risk Identification Technical Memorandum*. The outcome of that step will be identification of the risks and uncertainties to which the FCU system is most vulnerable. Then, these key risks and uncertainties will be used to develop future scenarios for use in the future planning framework. This future planning framework will then be used in a post-Vulnerability Study effort to evaluate options and develop future water supply strategies.



Ultimately, these performance metrics and LOS goals will be used to justify the conclusions of the Water Supply Vulnerability Study as well as the recommended options and strategies to FCU leadership and the public. Therefore, it is critical they capture how FCU assesses their own performance internally, as well as how external stakeholders and customers asses FCU's performance. This technical memorandum proposes the performance metrics and LOS goals for FCU's water supply system for these purposes.

2.0 BACKGROUND

The FCU Water Supply Vulnerability Study is a risk-based process using simulations of the FCU water resources system to evaluate system performance. In this type of plan, the definition of successful performance of the system is not pre-set (e.g. full demands are always met), but rather the model is allowed to operate the system freely and the results are used to inform what level of risk FCU is willing to take on in the future. In order to understand this risk, performance metrics and level of service goals must be established.

Prior water supply plans for FCU and throughout the water industry justified recommendations using the concept of firm yield, which assumes demands are met 100% of the time for a single future condition (e.g., one set of hydrology and one demand forecast). By moving away from firm yield and employing a suite of performance metrics, a risk-based approach can be used to develop recommendations around different hydrologic conditions, water demand, infrastructure reliability, and other factors. It also allows for multiple portfolios of water projects to be investigated to find those that are most effective across the widest variety of possible future conditions. In essence, this approach better answers the question "What level of performance can or should we afford?" by exploring the tradeoff between performance and cost of water supply improvements.

2.1 DEFINITIONS

As previously stated, there are two components to measuring system performance: performance metrics and LOS goals. Performance metrics are specific measures characterizing performance of key water supply system features (e.g. total storage, flow through a pipeline, yields from a watershed). Performance metrics are definable, measureable, representative, and unique within the FCM. Most importantly, performance metrics reflect how FCU staff measures and assesses water supply system performance.

Performance metrics are traditionally presented using the terms reliability, resilience, and vulnerability (RRV) but can also be calculated using statistical measures such as the mean, median, maximum, or minimum. The formal definitions of reliability, resilience, and vulnerability are:

- *Reliability* is the probability that the water supply system feature is in a satisfactory state, answering the question "how often".
- *Resilience* is the probability that a time period when the water supply system feature is in an unsatisfactory state is followed by a time period when the water supply system feature is in the satisfactory state, answering the question "how long".
- *Vulnerability* is the severity or magnitude of the unsatisfactory state for the water supply system feature, answering the question "how severe".

LOS goals separate values of key performance metrics into satisfactory and unsatisfactory states, ultimately justifying conclusions and/or recommendations from a water supply study. LOS goals are most effective when they reflect how water supply system performance is communicated to management and are in alignment with governing policy.

2.2 EXISTING MEASURES OF PERFORMANCE

Prior to this analysis, any current measures of water supply system performance adopted by Fort Collins Utilities were identified. The Water Supply and Demand Management Policy Report 2012 Update listed governing policy for various aspects of the FCU water system such as climate, water supply, conservation, and water quality. Of these, one was applicable to water supply reliability. This existing water supply reliability criterion has three components:

1. FCU will meet a planning level demand of 150 gpcd;
2. during at least a 1-in-50 year drought;
3. while maintaining 20% of annual demand in storage.

These components represent a current level of service goal, as futures that do not meet this condition are considered unsatisfactory. FCU has set policies around other aspects of water system operation as well, such as water use efficiency, water quality, and regional cooperation that could be considered when developing LOS goals and performance metrics.

3.0 PERFORMANCE METRICS

Performance metrics were identified during a workshop conducted with FCU staff and the consulting team. **Table 3.1** lists the identified performance metrics for the FCU water supply system that will be used for the Water Supply Vulnerability Study.

Table 3.1 - Identified performance metrics

	ID	Performance Metric	Description
Meeting Customer Demands	1	Minimum Met Annual Demand	The minimum annual demand met in acre-ft/year across a simulation
	2	Meeting Indoor Demands	The RRV of meeting indoor demands across a simulation
	3	Meeting Reduced Demands	The RRV of meeting demands after they have been reduced by restrictions
	4	Annual Response Level 1 Restrictions	The R&R of when customers are in Response Level 1 restrictions across a simulation
	5	Annual Response Level 2 Restrictions	The R&R of when customers are in Response Level 2 restrictions across a simulation
	6	Annual Response Level 3 Restrictions	The R&R of when customers are in Response Level 3 restrictions across a simulation
	7	Annual Response Level 4 Restrictions	The R&R of when customers are in Response Level 4 restrictions across a simulation
Maintaining Supply in Storage	8	0.1-Year of Demand in System Storage	The RRV of maintaining 0.1-Year of Demand in Storage at all times during a simulation
	9	0.2-Year of Demand in System Storage	The RRV of maintaining 0.2-Year of Demand in Storage at all times during a simulation
	10	0.3-Year of Demand in System Storage	The RRV of maintaining 0.3-Year of Demand in Storage at all times during a simulation
	11	0.4 Year of Demand in System Storage	The RRV of maintaining 0.4-Year of Demand in Storage at all times during a simulation
	12	0.5 Year of Demand in System Storage	The RRV of maintaining 0.5-Year of Demand in Storage at all times during a simulation
	13	0.6 Year of Demand in System Storage	The RRV of maintaining 0.6-Year of Demand in Storage at all times during a simulation
	14	0.7 Year of Demand in System Storage	The RRV of maintaining 0.7-Year of Demand in Storage at all times during a simulation
	15	0.8 Year of Demand in System Storage	The RRV of maintaining 0.8-Year of Demand in Storage at all times during a simulation
	16	0.9 Year of Demand in System Storage	The RRV of maintaining 0.9-Year of Demand in Storage at all times during a simulation
	17	1.0 Year of Demand in System Storage	The RRV of maintaining 1.0-Year of Demand in Storage at all times during a simulation
	18	Minimum Storage – YOD	Minimum YOD storage volume during a simulation
	19	Minimum Storage – acre-feet	Minimum acre-foot storage volume during a simulation
Operational	20	Lost Water Due to Water Quality Requirement	Statistical quantifications (average, max, count) of annual volume of water lost due to water quality blending requirements
	21	Lost Water Due to Insufficient Storage	Statistical quantifications (average, max, count) of annual volume of useable water lost due to insufficient storage capacity
	22	Meeting Reusable Demands	The RRV of meeting reusable demands

R&R is Reliability and Resilience

RRV is Reliability, Resilience, and Vulnerability

Seven performance metrics were identified that capture the ability of the water supply system to meet customer demands. FCU has an adopted Water Supply Shortage Response Plan that specifies how FCU will restrict customer water use during periods of water shortage, typically observed during droughts. This Water Supply Shortage Response Plan specifies four response levels, summarized in **Table 3.2**, that are determined based on water supply shortage. Water supply shortage, for this purpose, is the difference between forecasted demand and forecasted supply prior to runoff season. A performance metric was specified for the reliability and resilience of each of these response levels. The RRV of meeting demands after they have been reduced by restrictions will also be a performance metric. The RRV of always meeting FCU indoor demands is another demand-based performance metric, as inability to meet all indoor customer demands represents a critical system failure. Finally, the minimum met annual demand was identified as a performance metric as FCU governing policy specifies a minimum gallons per-capita-day demand that must be met by the water supply system.

Table 3.2 - Water Supply Shortage Response Plan elements

Response Level One	Enacted when water supply shortage is less than 10%. Outdoor irrigation allowed only two days per week.
Response Level Two	Enacted when water supply shortage is between 11% and 20%. Outdoor irrigation allowed only one day per week.
Response Level Three	Enacted when water supply shortage is between 21% and 30%. Outdoor irrigation allowed only one day per week with a 2-hour time limit on watering.
Response Level Four	Enacted when water supply shortage is greater than 30%. No outdoor irrigation allowed

Twelve performance metrics were identified related to water supply system storage. These performance metrics quantify the RRV of maintaining a certain volume of water in storage at all times, with storage volumes represented as percentages of years of annual demand (YOD). Quantifying the RRV of maintaining increasing volumes of storage in the water supply system is important as storage is the primary way FCU can reduce the risk of major customer impacts during emergency conditions (e.g. natural disasters, unplanned outages, wildfires). Storage volumes from 10% to 100% of annual demand in 10% increments will be quantified using RRV performance metrics. Additionally, the minimum storage across a simulation (reported out both in acre-feet values and YOD) will be tracked to ensure governing policy is met.

Three performance metrics were identified that capture operational goals. The first quantifies statistically the volume of water lost due to water quality blending requirements. FCU's current system is operated by blending water supply sources to meet a minimum level of water quality prior to treatment. This operational requirement occasionally results in water that cannot be used because there is insufficient high-quality water to blend with and the treatment plants do not have the ability to treat water from the available sources. Another quantifies statistically the volume of water lost due to demands being less than supply and available storage being insufficient to make up the difference. The final metric quantifies the RRV that FCU's water supply system can meet the reusable demands as laid out in the Reuse Plan. If FCU is unable to meet these demands, it could result in violation of this contract and a reduction of supplies available to FCU.

Overall, 20 performance metrics were identified by FCU staff that capture a variety of features of the water supply system. These performance metrics will be calculated for every simulation completed per the process described in Section 5.0.

4.0 LEVEL OF SERVICE GOALS

The performance metrics described in Section 3.0 were evaluated to determine which are applicable as level of service goals and what the thresholds for level of service are. Seven performance metrics were included as level of service goals, which are shown in **Table 4.1**. Level of service goals were selected to align with FCU governing policy.

The selected level service goals are primarily customer-facing, such that futures that significantly impact customers will be considered unsatisfactory. Any future for which indoor demands are not always met will be unsatisfactory. FCU accepts future conditions where customers are in any type of water restriction every 1 in 10 years (90% reliability) with more impactful restraints occurring less frequently. To comply with governing policy, at least 20% of annual demand must be maintained in storage at all times for a future to be considered satisfactory. Finally, all reusable demands must be met 100% of the time[1].

Table 4.1 - Selected Level of Service Goals

ID	Performance Metric	Level of Service Goal	Justification
2	Meeting Indoor Demands	100% Reliability	Governing policy, greatest customers impact
4	Annual Response Level 1 Restrictions	1 in 10 Years (90% Reliability)	Perceived customer risk tolerance
5	Annual Response Level 2 Restrictions	1 in 25 Years (96% Reliability)	Perceived customer risk tolerance
6	Annual Response Level 3 Restrictions	1 in 100 Years (99% Reliability)	Perceived customer risk tolerance
7	Annual Response Level 4 Restrictions	1 in 500 Years (99.8% Reliability)	Perceived customer risk tolerance
9	0.2-Year of Demand in System Storage	100% Reliability	Governing policy
20	Meeting Reusable Demands[1]	100% Reliability	Reuse Plan Agreement

These LOS goals will be used in the Water Vulnerability Study to separate futures for which water supply system performance is satisfactory from those for which it is unsatisfactory. However, these LOS goals are a policy decision, and one potential water resources strategy is to change the LOS goals or thresholds to take on more risk. For example, FCU could lower the storage requirement from 0.2 to 0.1 years of demand in storage with 100% reliability, thereby improving performance (relative to the relaxed objective) but increasing the risk that sufficient water would not be available during an emergency. This question will be addressed as part of a later study.

[1] The reuseable demand level of service goal is still in development, this TM will be updated accordingly when this level of service goal is determined.

5.0 MODELING IMPLEMENTATION

The identified performance metrics from Section 3.0 will be incorporated into the FCM data management system (DMS). Each simulation completed will have the corresponding performance metrics automatically calculated, tracked, and stored in the central database. **Table 5.1** summarizes the procedure for calculating these performance metrics. With the exception of the Minimum Storage metric, all performance metrics will be calculated monthly but reported annually. An example of this, using the "0.5 YOD in System Storage" metric, the total system storage will be calculated at the end of each month during a simulation. If any months during a water year have total system storage below 0.5 YOD, then the water year will be noted as a failure. The resulting performance metric value will be the percent of simulated water years in which any month had total system storage below 0.5 YOD. The "Lost Water Due to Water Quality Requirement" performance metric will sum the lost water across a water year, then apply the corresponding statistical measure.

Table 5.1 - Implementation of Metrics in FCM and DMS

ID	Performance Metric	Calculation(s)	Representative FCM Object
1	Minimum Met Annual Demand	Minimum	CityDem, LCUsu, LCUwc
2	Meeting Indoor Demands	RRV	LCUsu, LCUwc +Pre-processing for CityDem or change in model to reflect indoor + outdoor split
3	Meeting Reduced Demands	R&R	LCUsu, LCUwc, CityDem
4	Annual Response Level 1 Restrictions	R&R	0-10% shortage (projected + shortage reserve factor, triggers for time period. What is quota today (yield/shares), snowpack today (streamflow today) – maybe look at future inflow over next 6 months.
5	Annual Response Level 2 Restrictions	R&R	Same as 4, but for 10-20% shortage
6	Annual Response Level 3 Restrictions	R&R	Same as 4, but for 20-30% shortage
7	Annual Response Level 4 Restrictions	R&R	Same as 4, but for >30% shortage
8	0.1-Year of Demand in System Storage	RRV	Carryover StoRight (only if carryover is on), Horsetooth StoRight, Halligan StoRight, JoeWright StoRight
9	0.2-Year of Demand in System Storage	RRV	
10	0.3-Year of Demand in System Storage	RRV	
11	0.4 Year of Demand in System Storage	RRV	
12	0.5 Year of Demand in System Storage	RRV	
13	0.6 Year of Demand in System Storage	RRV	
14	0.7 Year of Demand in System Storage	RRV	
15	0.8 Year of Demand in System Storage	RRV	
16	0.9 Year of Demand in System Storage	RRV	
17	1.0 Year of Demand in System Storage	RRV	
18/19	Minimum Storage (acre-feet and YOD)	Minimum	
20	Lost Water Due to Water Quality Requirement	Non-zero Average, Frequency, Maximum	Poudre Avail – HT used – Reuse Plan Reqts, limited to max of HT used + Reuse Plan. Post processing calculation
21	Lost Water Due to Insufficient Storage	Non-zero Average, Frequency, Maximum	In Development
22/23	Meeting Reusable Demands	RRV	LCUwc[2]

R&R is Reliability and Resilience

RRV is Reliability, Resilience, and Vulnerability

[2] The reuseable demand FCM implementation is still in development, this TM will be updated accordingly when this FCM implementation is determined.

6.0 SUMMARY

As part of the FCU Water Supply Vulnerability study, performance metrics and LOS goals were identified for implementation in the FCM and DMS. FCU staff identified 20 performance metrics that capture a variety of demand, storage, and operational measures. Of these 20, eight performance metrics were identified for use as LOS goals. These LOS goals and performance metrics will be used to both asses the vulnerability of the water supply system to future conditions as well as ultimately compare different potential options or strategies for addressing the vulnerabilities.

Appendix B WATER SUPPLY SYSTEM RISKS IDENTIFICATION TECHNICAL MEMORANDUM

City of Fort Collins Utilities
Water Vulnerability Study

Technical Memorandum

Water Supply System Risks Identification

Date: May 8, 2018
From: Neil Stewart, Chip Paulson, Lisa Fardal
To: Fort Collins Utilities

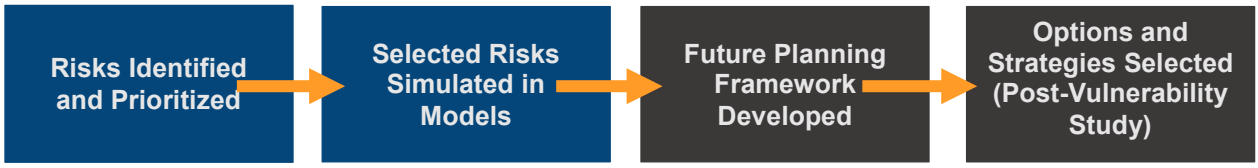
Stantec

1.0 INTRODUCTION

The Fort Collins Utilities (FCU) water supply system spans many watersheds and is comprised of a variety of infrastructure components, some owned and operated by FCU and some owned and operated by other entities. In this past, aspects of this system have been compromised by various events or conditions that impacted FCU's ability to meet customer needs. These events and conditions that have occurred before, as well as emerging ones, will continue to threaten FCU's water supply system in the future.

As part of the Fort Collins Water Vulnerability Study, a future planning framework is being developed that FCU will use to develop a robust plan to meet level of service goals in an uncertain future. This framework will include planning for events and conditions that could negatively impact Fort Collins' water supply system and its ability to meet customer needs.

Therefore, a key element of the Water Vulnerability Study is identification of future risks and uncertainties to be included in FCU's overall water supply planning process. The figure below shows how the information presented in this technical memorandum (TM) fits within the larger Water Vulnerability Study. The TM summarizes the identified risks and uncertainties, the process used to prioritize them, and how the prioritized risks were simulated in the Fort Collins water resources modeling system. Later analysis will develop the future planning framework and a separate study will be conducted to evaluate these options and strategies.



The purpose of the risk and uncertainty assessment was to look out 50 years and forecast events that could adversely affect FCU water supplies or infrastructure. The 50-year timeframe is the period adopted for the Water Vulnerability Study. It is recognized that anticipating conditions that may exist 50 years in the future is highly speculative. However, for purposes of the Water Vulnerability Study it is appropriate to investigate a broad range of possible future conditions to determine which conditions would stress the performance of the current water supply system.

The areal scope of the Water Vulnerability Study includes source water areas and infrastructure upstream of the FCU water treatment plant. In addition to local Poudre River Basin supplies, the scope includes supply derived from the Colorado-Big Thompson (C-BT) Project, operated by

the U.S. Bureau of Reclamation (Bureau) and the Northern Colorado Water Conservancy District (Northern). Therefore risks and uncertainties were identified by both FCU staff and Northern staff. These were two separate processes, as described later in this TM.

Identified risks and uncertainties were organized in the following categories that span the various aspects of the FCU water supply system:

- ***Climate and Hydrology*** risks relate to weather variability and other hydrologic factors, both short- and long-term, that can impact the potential yields from a watershed.
- ***Watershed*** risks relate to physical watershed conditions that can impact the yields available to FCU.
- ***Operational and Infrastructure*** risks relate to how FCU delivers physically and legally available water to its treatment facilities.
- ***Administrative and Legal*** risks relate to conditions, regulations, or policies that could impact the legal allocation or availability of water supplies.
- ***Demand*** risks relate to changes in required volume, timing, and quality of water that will need to be delivered to water treatment facilities to meet customer needs

These identified risks were then scored as part of the prioritization process. Individual risks were scored by assigning a 1-5 score for likelihood (possibility of the risk or uncertainty occurring) and impact (consequences to the FCU/C-BT water supply system if the risk or uncertainty were to occur) according to the definitions below. The composite score (likelihood times impact) was then used to help prioritize risks.

Score	Likelihood Definition	Impact Definition
1	***Rare*** – the risk will only occur in exceptional circumstances.	***Insignificant*** – If the risk occurs the impact to the water supply system would be negligible.
2	***Unlikely*** – the risk will occur in occasional circumstances.	***Minor*** – If the risk occurs the impact to the water supply system would be minimal.
3	***Possible*** – the risk will occur in some circumstances.	***Moderate*** – If the risk occurs there would be a noticeable impact to the water supply system.
4	***Likely*** – the risk will occur in a majority of circumstances.	***Major*** – If the risk occurs there would be substantial impact to the water supply system.
5	***Almost Certain*** – the risk will occur in almost all circumstances or is imminent.	***Extreme*** – If the risk occurs there would be extensive or catastrophic impact to the water supply system or customers.

2.0 FORT COLLINS UTILITIES' WATER SUPPLY SYSTEM RISKS

Risks and uncertainties to the FCU water supply system were identified by staff members representing a variety of groups within the organization during a half-day workshop. Workshop attendees included representatives from water supply, water treatment, demand and conservation, watershed management, legal, and water operations groups. These same staff members scored the risks as a group using the rubric described in Section 1.0 based on their perceptions and professional judgment. The adopted score was the consensus of the workshop participants. Therefore, results of the scoring process are presented as a *perceived* threat to the water supply system, as the actual impact to the water supply system will be quantified using simulation later in the Water Vulnerability Study. This section summarizes all risks and uncertainties identified and then describes how these identified risks and uncertainties were prioritized for simulation.

2.1 SUMMARY OF ALL RISKS

Identified risks and uncertainties are summarized around five categories that represent different aspects of a water supply system: Climate and Hydrology, Watershed, Operations and Infrastructure, Legal and Administrative, and Demand.

2.1.1 Climate and Hydrology Risks

Table 2.1 lists the five risks and uncertainties associated with the climate and hydrology in the watersheds contributing to the FCU water supply system. For purposes of this evaluation, climate change assumptions in the Fort Collins region and water source areas were based on general findings of past climate change studies for Colorado and the Front Range region. These studies suggest future climate will be characterized by increased temperature; however, the impact on precipitation is unclear as it may increase or decrease.

- C1 - Longer duration droughts (e.g. multiple years with below average yields or back-to-back severe droughts) are perceived as the biggest threat to FCU's water supply system as these types of droughts can occur under the current climate, but would also be exacerbated under climate change or conditions of increased climate variability as seen in paleohydrology data pre-dating the period of observed records.

- C2 - Change in runoff timing (peak runoff occurring earlier and/or over a shorter period of time) is predicted by climate change studies for Colorado, and was perceived as a high threat due to a combination of limited storage in FCU's system, capacities of diversion systems, and highly specific timing of certain decreed water rights. Less runoff would be captured when higher peaks occur because more flow would exceed the diversion structure capacity and bypass the diversion. Limited storage space makes it more difficult to meet demands late in the season during dry years when runoff has subsided earlier than historically. Finally, certain water right decrees for FCU only allow diversions within fixed periods early in the runoff season, and these decrees would yield less water in the future than they do currently if runoff begins earlier and occurs outside of the allowable diversion window.

- C3 - One anticipated impact of warmer temperatures due to climate change in the study area would be a shift in precipitation type to more rainfall and less snow. A change in precipitation type was perceived as a high threat as the “snowpack reservoir” would be reduced and FCU would be unable to compensate for that in their system due to a lack of storage.
- C4 – Another anticipated impact of climate change in the study area is a change in the frequency and magnitude of precipitation events. Precipitation events could be less frequent, but more intense when they do occur, such as the September 2013 event. This increases the risk of flooding.
- C5 - A longer growing season due to warmer temperatures was not perceived as a significant threat from a hydrology perspective because agricultural users in the Poudre River Basin already use their full decreed water rights. Additionally, research shows a warming climate may actually reduce agricultural productivity (and hence water use) due to increased heat stress on plants. An analysis conducted by FCU concluded that their system is not sensitive to changing agricultural demands.

Table 2.1 – Identified Climate and Hydrology Risks and Uncertainties

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score
C1	Longer duration droughts	Multi-year and/or more severe droughts occur in the future that are not captured in the observed record.	5	4	20
C2	Changes in runoff timing	Early higher runoff and lower late-season baseflow reduces yield from volumetric decrees that list specific diversion dates.	4	4	16
C3	Change in precipitation type	More precipitation falls as rain instead of snow during the Fall and Spring.	4	4	16
C4	Changes in frequency/ magnitude of precipitation events	Precipitation events, particularly summer rainstorms, become less frequent and more intense.	4	4	16
C5	Longer growing season	Warmer climate increases growing season in Spring and Fall, changing potential water rights calls and increasing irrigation demand.	4	2	8

2.1.2 Watershed Risks

Table 2.2 lists the seven risks and uncertainties identified that would impact the watershed aspect (i.e., source water areas) of the FCU water supply system.

- W1 - Wildfires were perceived as the most significant threat to watersheds due to their broad impacts and increased likelihood in a warmer climate. In the short term wildfires have significant water quality impacts that could render yields from a particular watershed untreatable, and could cause an increase in sediment loads that would impact diversions or other conveyance systems. In the longer-term, water quality impacts would persist and may require upgrades to water treatment plants, and hydrograph changes would be persistent until the vegetation recovers.

- W2 - Forest health degradation was also perceived as a high threat to watersheds. In the future, one of the primary causes of forest health degradation is expected to be pine beetle kill and impacts of other similar pests as warmer temperatures allow for infestations to impact broader areas of forest. Other potential causes could be warmer temperatures and more frequent droughts which would stress vegetation more significantly. Regardless of the cause, reduced forest health would cause changes to the hydrograph, increased sedimentation, and lower water quality. These impacts would occur slowly over many years; however, their impacts would be difficult to effectively mitigate. Additionally, degraded forest health would increase the risk of wildfires. The uncertainty of the impact of forest health on FCU water supplies is amplified by the fact that 90% of forests in source watersheds are managed by the Federal Government and thus, are outside Fort Collins' control.

- W3 - Development in watersheds such as expanded communities, denser development, oil and gas development, mining, and new road construction was perceived as a moderate threat to watersheds. These activities could cause both long-term impacts, such as reduced water quality due to road traffic and more septic systems, and short-term impacts, such as contamination events due to spills or vehicle accidents. The pressure for these kinds of development in the FCU contributing watersheds is currently relatively modest, largely because there is limited land available for development and most of the watershed is owned and managed by natural resource agencies as described above.

- W4 - Increased atmospheric deposition of particulates and pollutants within FCU watersheds is a possible outcome of a drier climate due to changes in vegetation land cover in the Western U.S. This trend has already been observed in Colorado's mountains. Increased atmospheric deposition was perceived as a moderate threat due to the potential for the emergence of new water quality issues in previously pristine high-alpine bodies of water and streams, such as algal blooms or long-term diminished water quality.

The remaining risks and uncertainties listed in **Table 2.2** were not perceived as significant threats to the water supply derived from the FCU source water watersheds.

Table 2.2 - Identified Watershed Risks and Uncertainties

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score
W1	Wildfires	Wildfires occur, causing a variety of impacts on water quality, runoff, and threats to infrastructure.	5	4	20
W2	Forest Health Degradation	Forested area health decreases due to beetle kill, pollution, warming climate, etc.	4	4	16
W3	Development in Watersheds	Land development in watersheds (recreation, residential, O&G, mining) increases risk of water quality contamination.	4	3	12
W4	Atmospheric Deposition	Increased levels of contaminants in bodies of water and forests lead to new water quality issues.	5	2	10
W5	Deficiencies in Federal land Management	Federally owned land, which comprises nearly all of the watersheds, is poorly managed against wildfires or to promote forest health.	2	3	6
W6	Abandoned Mine Runoff	Runoff from abandoned mines leads to decreased water quality. Few mines exist in FCU watersheds.	1	4	4
W7	Privatization of Public Lands	Lands owned by the federal government are transferred to private entities, increasing development potential.	1	4	4

2.1.3 Operations and Infrastructure Risks

Table 2.3 lists the 16 risks and uncertainties identified that would impact the operations and infrastructure aspect of the FCU water supply system.

- O1 and O2 - An outage of either the 24-inch or 27-inch raw water delivery pipelines from the Poudre River were perceived as an extreme threat to the water supply system. Without one of these pipelines, FCU would have limited capacity to convey Poudre River supply to its Soldier Canyon water treatment plant. The pipelines are in high risk zones for landslides and some sections are underneath the river, which in the event of a major flood could expose the pipelines or fill them with sediment. Some pipeline segments are extremely hard to access, making repairs costly and time-intensive.

- O3 - Algal blooms were also perceived as a significant threat to the water supply system. FCU has experienced problems with algal blooms in its source water in the past, and a warmer future climate would increase the likelihood of these events. Algae outbreaks could have a minor impact of causing maintenance issues in impacted reservoirs or river reaches, potentially affecting operations. More significantly, large algal blooms in reservoirs could have severe impacts to water quality that FCU's water treatment plant would currently be unable to treat. Therefore, in these events, FCU would be unable to use the impacted supply during high risk months (approximately June to October). Horsetooth Reservoir is the most vulnerable storage facility, supplying water to the FCU system, to this type of algal bloom impact.

- O4, O5, and O6 - Three infrastructure outages were perceived as high threats to the water supply system: Michigan Ditch, Horsetooth Reservoir Intake, and Chambers Reservoir. Without Michigan Ditch, FCU cannot convey transmountain supply to its Front Range collection system. Without the Horsetooth Reservoir intake, FCU cannot utilize its Colorado-Big Thompson (CBT) shares stored in Horsetooth Reservoir. There is currently no system redundancy for delivering FCU water from Horsetooth Reservoir. Finally, most FCU water supplies are generated above Chambers Reservoir but must pass through the reservoir before reaching FCU's diversion facilities. Chambers Reservoir is not owned by FCU and is at a higher risk of failure due to the potential for underfunded maintenance which may result in sudden operational changes that impact FCU.

The remaining risks were not perceived as significant threats. However, some of the remaining risks are low likelihood (score of 1 or 2) and high impact (score of 4 or 5). These risks, which could have significant impact if they were to occur, were further evaluated when risks were prioritized; this is discussed in Section 2.2.

Table 2.3 - Identified Operations and Infrastructure Risks and Uncertainties

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score
O1	Outage - 24 Pipeline	Short term outage due to flooding, landslides, wildfire, etc.	5	5	25
O2	Outage - 27 Pipeline	Short term outage due to flooding, landslides, wildfire, etc.	5	5	25
O3	Algal Blooms	Algal blooms in storage reservoirs and rivers increases water quality issues and potential treatment problems.	5	4	20
O4	Outage - Michigan Ditch	Short term outage due to flooding, landslides, wildfire, etc.	5	3	15
O5	Outage - Horsetooth Reservoir Outlet	Short term outage of reservoir outlet and intake to WTP; higher risk due to lack of redundancy.	3	5	15
O6	Outage - Chambers Reservoir	Short term outage due to flooding, landslides, wildfire, etc.	3	4	12
O7	Outage - Munroe Canal	Short term outage due to flooding, landslides, wildfire, etc.	3	3	9
O8	Outage - Joe Wright Reservoir	Short term outage due to flooding, landslides, wildfire, etc.	2	4	8
O9	Shared infrastructure - Chambers Reservoir	Lack of control of operations could lead to issues with delivering water.	2	4	8
O10	Outage - Meadow Creek Reservoir	Short term outage due to flooding, landslides, wildfire, etc.	3	2	6
O11	Outage - Pleasant Valley Pipeline	Short term outage due to flooding, landslides, wildfire, etc.	1	4	4
O12	Shared infrastructure - Munroe Canal	Lack of control of operations could lead to issues with delivering water.	1	4	4
O13	Shared infrastructure - Pleasant Valley Pipeline	Lack of control of operations could lead to issues with delivering water.	1	4	4
O14	Sediment Loading - Reservoirs	Loss of capacity in reservoirs due to increased sediment loads.	3	1	3
O15	Freeze/Thaw Cycles	Initial freezing stages impact water quality, ice coming down the river could impact operations.	3	1	3
O16	Shared infrastructure - Meadow Creek Reservoir	Lack of control of operations could lead to issues with delivering water.	1	1	1

2.1.4 Legal and Administrative Risks

Table 2.4 lists the eight risks and uncertainties identified that would be associated with the legal and administrative aspects of the FCU water supply system.

- A1 - New regulations, including both water quality and environmental regulations, were perceived as a significant risk. New or more stringent water quality standards or environmental permitting requirements could affect FCU water resources in several different ways. For example, new environmental regulations calling for increases or changes to environmental flows in the Poudre River watershed would need to be made up from existing water uses, which could impact the yields available to FCU. New water quality regulations could preclude use of existing water sources without additional treatment and may limit FCU's ability to blend Poudre River water with CBT water, impacting operations. More stringent permitting requirements could make it more difficult to develop new water supplies, including transfer of agricultural water rights.

- A2 - Increased demands by other water users in the Poudre River basin were perceived as a high threat to the water supply system. Regional water demands could increase either through new urban development or through changes in agricultural crop selection or irrigation practices. This risk could be manifested both as an increase in competition for new water rights and supplies as well as increasing use of existing water rights which could impact the yields available to FCU. Also, since FCU shares much of its water collection and storage infrastructure with other entities, other users may have conflicting operational objectives which may impact yields to FCU.

- A4 - Another potential future condition perceived as a significant risk to the water supply system was a change in state administration of water rights. Since water rights are based on an assumed hydrology, and that hydrology may change in response to climate variability, the way Colorado administers water rights under the prior appropriation doctrine could change. For example, assumed shrink values for conveying water through specific river reaches may increase to account for greater losses, resulting in lower yields for FCU. Also, when water rights are transferred, the adjudicated yield from those rights may be reduced by the state, impacting the yield FCU receives from future water rights.

- A9 – The Reuse Plan, which results in FCU receiving 1,900 acre-feet of firm supply, relies on the continued operation of the Rawhide Energy Station, owned and operated by Platter River Power Authority (PRPA). In the future if PRPA no longer requires Rawhide Energy Station and takes it offline, this will end the Reuse Plan and remove the corresponding 1,900 acre-feet of firm supply from FCU's water supply portfolio. Also in multi-year drought events, the yields from the Reuse Plan are reduced and or eliminated, impacting FCU's water supply portfolio.

- A3 - Since FCU receives a significant amount of yield from the CBT project and the operation of its system is designed around how Northern operates this system, changes to that operation are perceived as a risk to FCU. One possible trigger for this change would be a continuation of the recent trend of a toward more municipal CBT ownership

and less agricultural ownership. This could affect the Northern Board's process for setting the annual CBT quota, which determines how much CBT water is available to FCU and other CBT allottees. Additionally, the current Carryover Program or Regional Pool Program, which offers more flexibility to municipal CTP share owners in how they manage their water resources, could change or be eliminated by future Northern Boards. Any of these CBT changes could impact FCU operations.

The remaining risks and uncertainties in **Table 2.4** were not perceived as being a significant threat to FCU water supply system.

Table 2.4 - Identified Legal and Administrative Risks and Uncertainties

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score
A1	New Regulations - water quality and environmental	New regulations (either federal or state) impact availability of yields from existing water rights.	5	4	20
A2	Increased Basin Demands	Higher demands across the entire Poudre River basin (due to climate change/population growth) impact use of water rights.	5	3	15
A4	Changing state administration	Policies around state water administration change, impacting yields from water rights.	5	3	15
A9	Elimination or Interruption of Reuse Plan	Platte River Power Authority decommissions Rawhide Energy Station, effectively eliminating the need for the Reuse Plan. In multi-year droughts, water from the Reuse Plan is reduced or unavailable.	4	3	12
A3	Changes to Northern Water CBT Operations	Allocation of CBT water through setting of the quota, and ways in which CBT water can be managed, changes in the future.	4	3	12
A5	Water Court Risks to existing decrees	Existing water rights are challenged in court, potentially changing their availability.	5	2	10
A6	New Regulations - Endangered Species	New regulations impact availability of yields from existing water rights and ability to permit new projects. Mostly impacts new projects.	3	3	9
A7	Public Trust Doctrine	Colorado water law is fundamentally changed, eliminating the prior appropriation system.	1	5	5
A8	Yields reduced in future change cases	Less water is realized from future water rights as assumed yields are greater than actual. FCU doesn't anticipate acquiring many new water rights so risk is low.	4	1	4

2.1.5 Demand Risks

Table 2.5 lists the eight risks and uncertainties identified that are related to demands on the water supply system.

Three demand-related risks and uncertainties were perceived as being a high threat to the water supply system.

- D1 - There is currently significant development pressure in the north Front Range region driving growth in and around Fort Collins. While the current FCU service area is mostly built-out, additional growth within or expansion of that service area could increase demands and change operations.
- D2 - Over the last 15 years, per capita water use in Fort Collins has steadily declined due to a variety of factors such as increased indoor fixture efficiency, changes to outdoor landscaping and irrigation, and an effective City water conservation program. This has created a new relationship between demand increases and population growth. The same trend has been experienced throughout Colorado and the Western U.S. How long this trend will continue is unknown. Reduced per capita demand has the benefit of stretching existing water supplies, although it has adverse impacts on utility revenue. Lower per capita demands could potentially reduce the demand savings achievable from future water use restrictions during droughts or water shortage emergencies. This phenomenon is also known as demand hardening, and could affect how Fort Collins plans for future water shortages.
- D3 - New development could be considerably different than past development. Residential development could have greater density and less landscaped area if current trends persist. Significant future development could consist of redevelopment in high-income areas. This includes higher densities, mixed uses within a single building, and different outdoor space uses. This would change how future demand is tied to residential population and commercial activity, leading to greater uncertainty in predicting the impact of population and economic growth on water use.

Three uncertainties tied to how climate change may impact demands were also perceived as being moderately impactful to the water supply system.

- D6, D8, and D9 - Overall temperature increases would increase peak summer demands and extend high demand periods further into the spring and fall. This could be coupled with increased precipitation in the form of rain, which may also change demand patterns. These demand increases would occur both for FCU and for other water providers in the region, stressing water supplies. Finally, if summer precipitation events become less frequent but more intense, this may lead to an overall increase in demand as customers need to irrigate more frequently.

The remaining risks and uncertainties in **Table 2.5** were not perceived as being a significant threat to FCU's water supply system.

Table 2.5 - Identified Demand Risks and Uncertainties

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score
D1	Service area growth and Regionalization	Ft. Collins expands its service area or enters into agreements to provide water to regional entities.	3	5	15
D2	Water use changes	Decrease in per capita use continues and how water is used (e.g. indoor vs. outdoor) changes.	5	3	15
D3	Development Uncertainty	The composition of development in service area (e.g. density, type, outdoor area) is different that past.	5	3	15
D6	Hotter summer changes irrigation	A warmer climate increases the length of the irrigation season and hotter days increase demand during the summer.	4	3	12
D8	Change in precipitation type	More precipitation falls as rain instead of snow during the Fall and Spring.	4	3	12
D9	Changes in frequency/ magnitude of precipitation events	Precipitation events become less frequent and more intense.	4	3	12
D4	Landscape Changes	Changes in outdoor landscaping (e.g. xeriscape) change demands from past.	3	3	9
D5	Decreased water restriction effectiveness	Watering restrictions become less effective at temporarily reducing demands.	3	3	9
D7	New Large Users	A new, non-regional water user is brought on in the service area.	3	2	6
D10	Changes to Existing Obligations	Existing large water contracts change or end.	3	1	3

2.2 PRIORITIZED RISKS

Figure 2.1 plots all risks and uncertainties identified by FCU as a circle on a grid corresponding to their likelihood and impact scores, with the impact score as columns and the likelihood score as rows. The color of the circle corresponds to the category the risk or uncertainty originates from and the label is the ID of the risk or uncertainty. In total, 46 risks and uncertainties were identified by FCU.

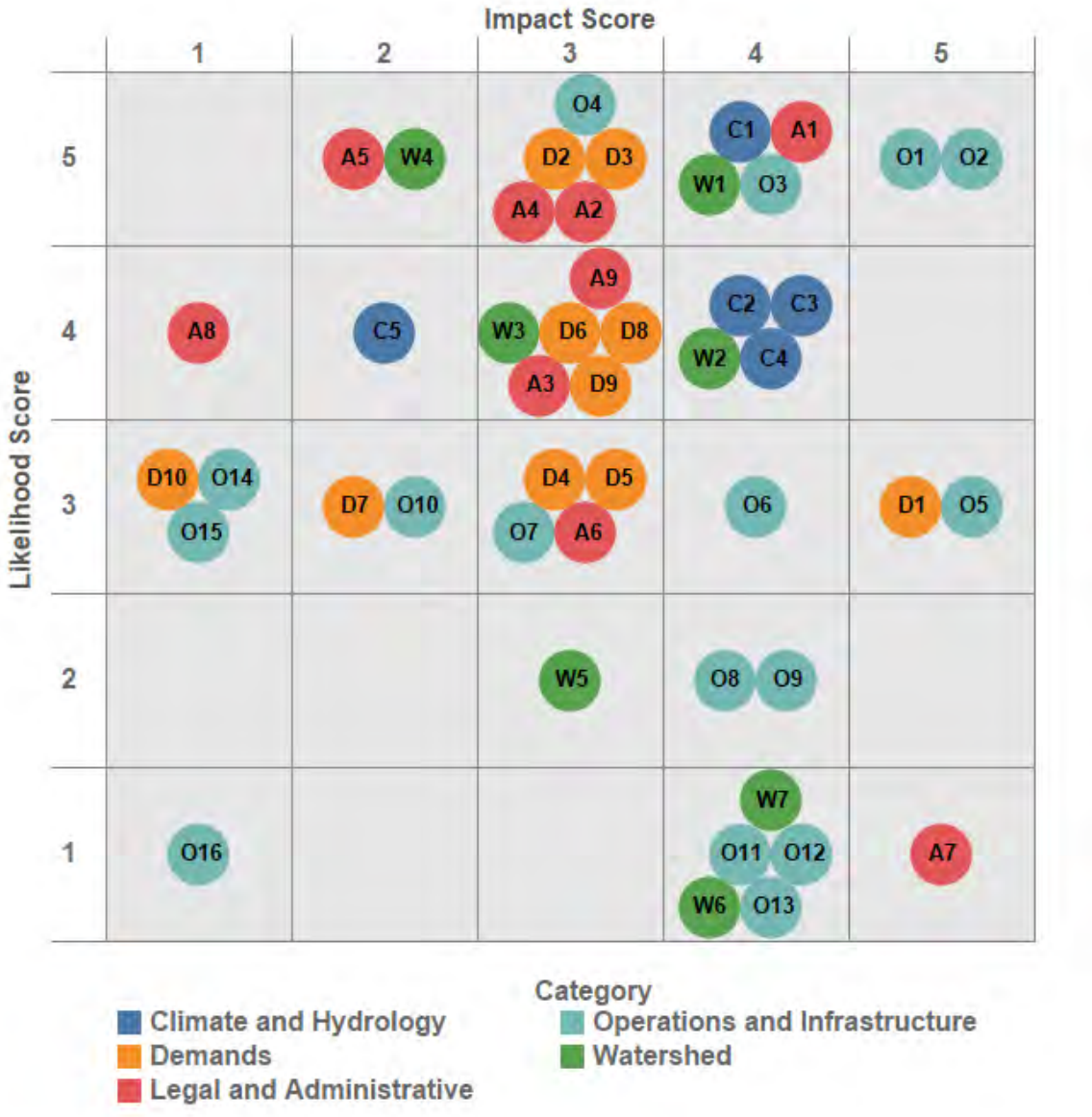
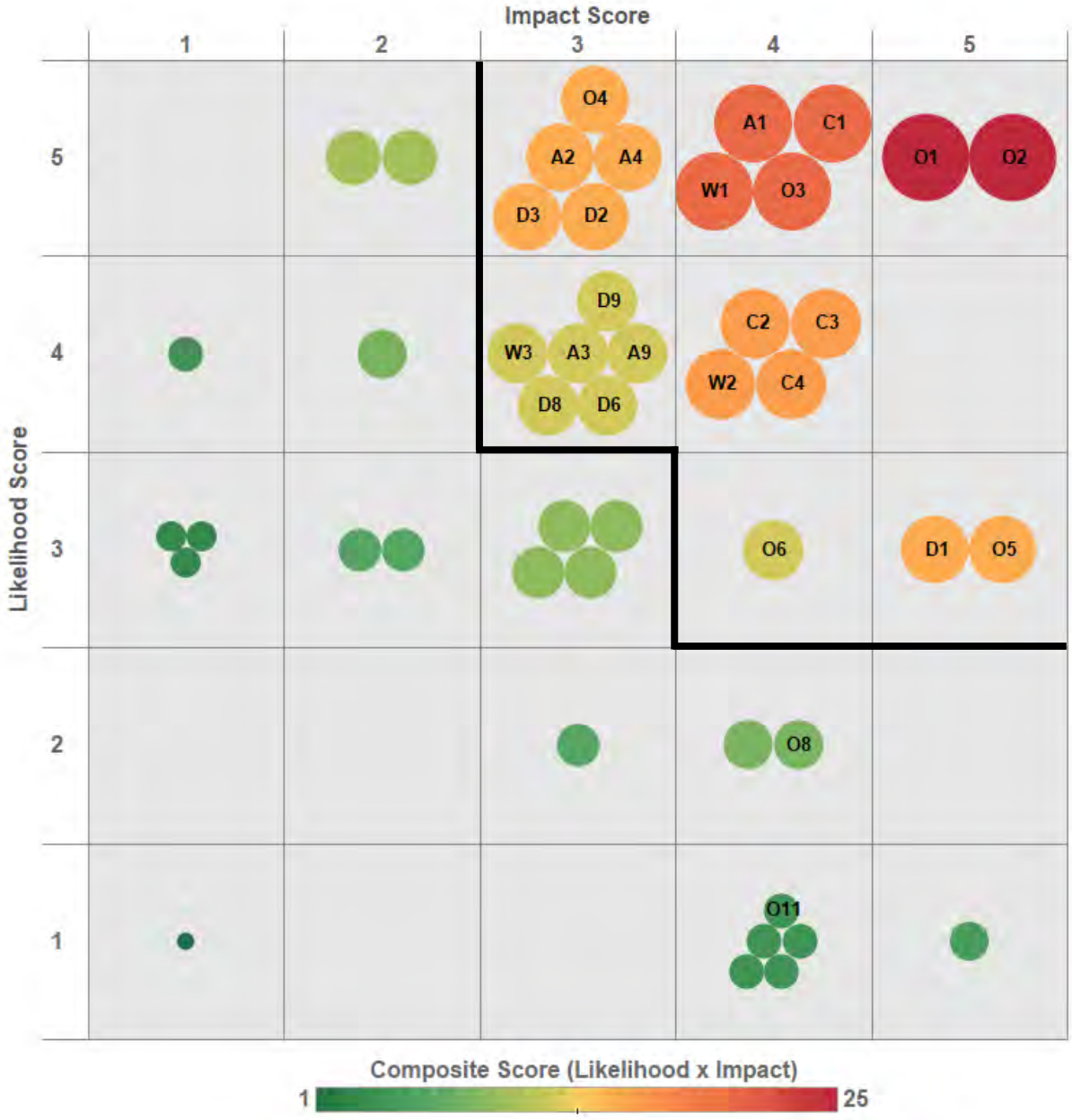


Figure 2.1 – Risks and uncertainties identified by FCU

As part of the future planning framework development, the key identified risks and uncertainties will be simulated to quantify their potential impact on FCU water supply system. However, not every risk and uncertainty can be, or needs to be simulated. Therefore, the previously identified risks and uncertainties were prioritized, identifying those that would be simulated to quantify impacts.

The first step to prioritize risks was to select all risks with a composite score of 12 or above (out of a possible 25). FCU felt these risks were impactful enough to warrant their further examination and potential simulation. Next, all risks that received an impact score of 4 or 5 where further examined (regardless of their composite score) as these risks could be significantly impactful even if their likelihood of occurring was low. Of these highly impactful risks, an outage of Joe Wright Reservoir (O8) and an outage of the Pleasant Valley Pipeline (O11) were identified for further analysis.

Figure 2.2 highlights prioritized risks and uncertainties. The color and size of the circles correspond to their composite scores, with larger and redder circles as the risks and uncertainties with greater perceived significance to FCU's water supply system. Labeled risks and uncertainties are those that were prioritized for further analysis, with the black line separating the region with composite scores of 12 and above from the region with scores less than 12. Note the two low likelihood/high impact risks selected that fall outside this boundary.



Note: larger and redder circles indicate a higher composite score. Prioritized risk IDs are labeled with the black line separating the composite scores used for prioritizing

Figure 2.2 – Summary of likelihood and impact scores of identified risks and uncertainties.

The prioritized risks and uncertainties identified above were summarized around five major threat groups that span the various categories: climate change, demands, critical outages, enhanced environmental stressors, and shared infrastructure (i.e. risks or uncertainties due to lack of ownership by FCU in infrastructure). **Table 2.6** lists all the key risks and uncertainties prioritized for simulation and their threat group.

Table 2.6 - List of Key Risks and Uncertainties Prioritized for Simulation

ID	Risk or Uncertainty Name	Threat Group	Likelihood Score	Impact Score	Composite Score
O1	Outage - 24 Pipeline	CO	5	5	25
O2	Outage - 27 Pipeline	CO	5	5	25
O3	Algal Blooms	EES	5	4	20
C1	Longer duration droughts	CC	5	4	20
A1	New Regulations	EES	5	4	20
W1	Wildfires	EES	5	4	20
C3	Change in precipitation type - Hydrology	CC	4	4	16
C4	Changes in frequency/ magnitude of precip events - Hydrology	CC	4	4	16
C2	Changes in runoff timing	CC	4	4	16
W2	Forest Health Degradation	EES	4	4	16
A4	Changing state administration	CC	5	3	15
D3	Development Uncertainty	D	5	3	15
A2	Increased Basin Demands	D	5	3	15
O5	Outage - Horsetooth Reservoir Intake	CO	3	5	15
O4	Outage - Michigan Ditch	CO	5	3	15
D2	Water Use Changes	D	5	3	15
D1	Service area growth and Regionalization	D	3	5	15
A9	Elimination or Interruption of Reuse Plan	SI	4	3	12
D8	Change in precipitation type - Demands	CC	4	3	12
D9	Changes in frequency/ magnitude of precip events - Demands	CC	4	3	12
A3	Changes to Northern Water CBT Operations	SI	4	3	12
W3	Development in Watersheds	EES	4	3	12
D6	Hotter summer changes irrigation	D	4	3	12
O6	Outage - Chambers Reservoir	CO	3	4	12
O8	Outage - Joe Wright Reservoir	CO	2	4	8
O11	Outage - Pleasant Valley Pipeline	CO	1	4	4

Key: CC = Climate Change, CO = Critical Outages, D = Demands, EES = Enhanced Environmental Stressors, SI = Shared Infrastructure

Figure 2.3 summarizes these threats, averaging the likelihood and impact scores across the individual risks and uncertainties for each threat group, with the size of circle and number corresponding to the number of risks and uncertainties within the threat group. The threats associated with climate change, demands, and enhanced environmental stressors are perceived as being highly likely with a significant impact. The critical outage threats are perceived as being moderately likely with a severe impact on the system.

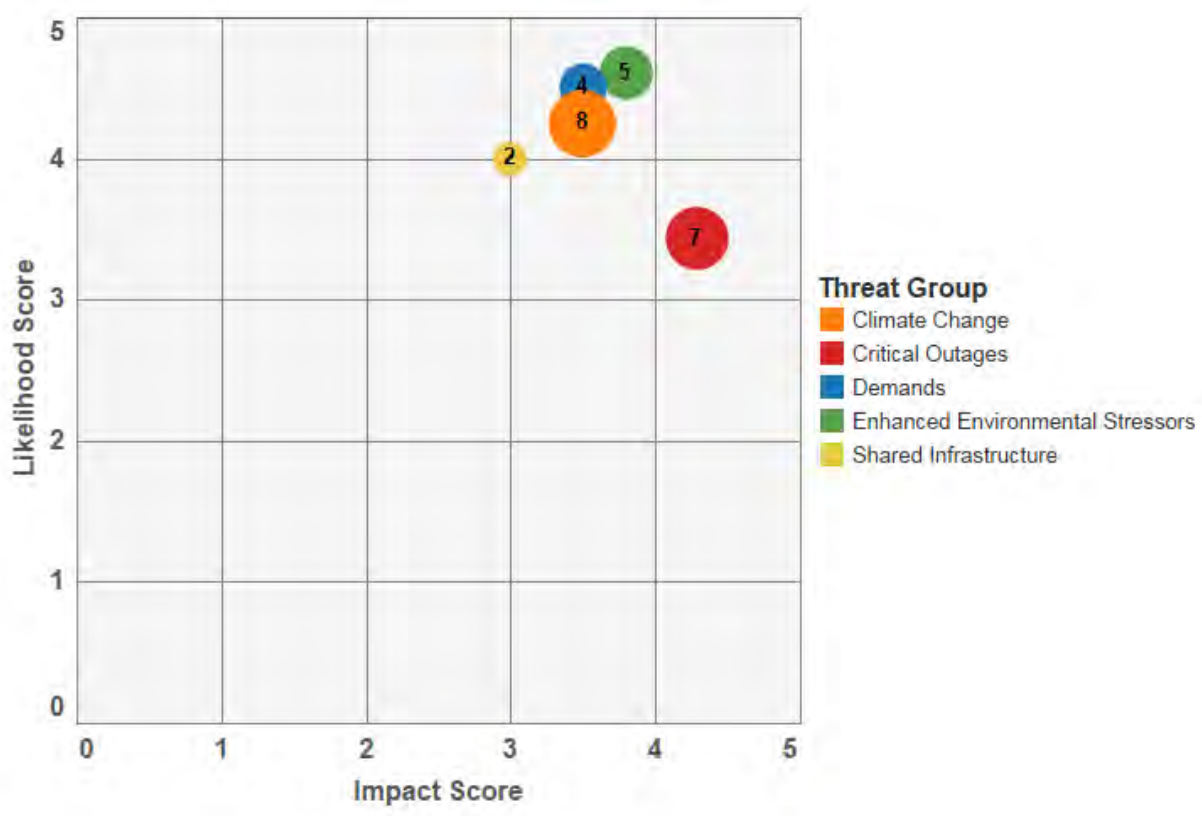


Figure 2.3 – Summary of prioritized risks and uncertainties within each threat group

3.0 C-BT PROJECT WATER SUPPLY SYSTEM RISKS

A significant component of the FCU water supply system is water received from the C-BT Project, owned and operated by Reclamation and Northern. Therefore, as part of the Water Vulnerability Study, risks and uncertainties to the C-BT system were identified by Northern.

Risks and uncertainties to the C-BT Project were identified by staff members from Northern during a half-day workshop. Staff from Northern represented at the workshop included experts in water supply, watershed management, water quality, and operations. FCU staff also participated in the workshop. While the primary goal was to generate risks around the C-BT system that would impact FCU, Northern generated risks across their entire C-BT collection and storage system. These same staff members then scored the identified risks using the rubric described in Section 1.0 based on their perceptions and professional judgment. Therefore, scoring is presented as a *perceived* threat to the water supply system; the actual impact to the water supply system will be quantified for selected key risks using the FCU water resources simulation models.

The scope of the Northern risk and uncertainty evaluation included the C-BT source watersheds, collection system, and storage reservoirs. Risks to the delivery and distribution system were only considered insofar as they could affect deliveries to FCU. As with the Fort Collins risk assessment process, the planning horizon was 50 years.

This section summarizes all risks and uncertainties identified in the Northern workshop and then describes how these identified risks and uncertainties were prioritized for simulation.

3.1 SUMMARY OF ALL RISKS

Identified risks and uncertainties are summarized around five categories that represent different aspects of a water supply system: Climate and Hydrology, Watershed, Operations and Infrastructure, Legal and Administrative, and Demand.

3.1.1 Climate and Hydrology Risks

Table 3.1 lists the six risks and uncertainties associated with the climate and hydrology in the watersheds contributing to the FCU water supply system. For purposes of this evaluation, climate change assumptions in the C-BT source areas were based on general findings of past climate change studies for Colorado and the Front Range region. These studies suggest future climate will be characterized by increased temperature, however the impact on precipitation is unclear as it may increase or decrease.

- CN1 - Longer duration droughts due to increased climate variability or climate change were perceived as a significant threat to the C-BT Project. With respect to the C-BT Project supply, during the first few years of a drought, quota allocations would be set high since allottees use C-BT as a supplemental water supply. If a drought persisted longer than about three years, the C-BT system would become supply-limited and quotas would be set based on the supply available and not the need within the region. It is these types of droughts that last three or more years that would be most impactful to the C-BT system. While not in the observed record, these types of droughts could occur under the current climate, but would also be more frequent and serve under climate change.

- CN2 - An increase in frequency of extremely dry years (e.g., 2002 or 2012) was perceived as a high threat to the C-BT Project. The threat is more pronounced for the Windy Gap system as the C-BT system has sufficient storage to manage through a severe single-year drought. However, if these severe droughts become more frequent, without sufficient recovery, the C-BT system would be impacted.

- CN3 - Reduction in runoff volume due to a warmer, drier climate is perceived as a moderate threat. For example, in 2002 and 2012, warm spring temperatures quickly reduced snowpack without contributing to runoff. With a warmer overall climate projected, those types of spring conditions may be more common. An overall reduction in runoff would eventually translate to less supply available for the C-BT system.

The remaining risks in **Table 3.1** are perceived as less impactful to the C-BT Project water supply system.

Table 3.1 - Identified Northern Water Climate and Hydrology Risks and Uncertainties

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score
CN1	Longer Duration Droughts	Long-term droughts that have longer durations than occurred in past.	4	5	20
CN2	Increased frequency of extreme dry years	Years like 2002 and 2012 become more frequent	4	4	16
CN3	Changes in runoff volume	Long-term reductions in runoff volume due to hotter, drier climate reduce overall yield	3	4	12
CN4	Changes in runoff timing	Runoff volumes shift earlier in the Spring/Summer with peak runoff occurring earlier. Northern has sufficient storage to capture this and its water rights are not specific in time.	5	2	10
CN5	Increased Evaporation in Reservoirs	Temperature increase results in increased evaporation losses from reservoirs. Overall this would be minimal.	5	2	10
CN6	More precipitation as rain	More precipitation falls as rain instead of snow. The impacts on yields and runoff are uncertain due to complex watershed processes.	5	2	10

3.1.2 Watershed Risks

Table 3.2 lists the nine risks and uncertainties identified that would impact the watershed aspect (i.e. source water areas) of the C-BT Project system.

- WN1 - Changes in wildfire characteristics are perceived as a significant threat to the C-BT system. The likelihood of wildfires in the forested areas that comprise the C-BT watersheds is increasing due to a warmer climate, lack of a recent wildfires, and insufficient forest management in some places. If wildfires were to occur, they could burn longer across a wider area and could also burn hotter, increasing the occurrence of hydrophobic soils. This would amplify many of the negative impacts from wildfires such as decreased water quality, major shifts in the hydrograph, and increased sediment loads. The way in which these secondary impacts affect the C-BT system specifically were considered in separate risks.

- WN2 - A wildfire upstream of Grand Lake and Shadow Mountain Reservoir is perceived as being a highly impactful risk to the C-BT system. Because of the forest characteristics in this area, a fire would result in significant short term and potentially longer term impacts to the operations of Grand Lake and Shadow Mountain Reservoir such as increased sedimentation and decreased water quality. However, these impacts could be mitigated to reduce their impact. The long-term impacts would be changes to the hydrograph and sedimentation issues, which would need to be mitigated after major rainfall events.

- WN3 - Forest health degradation in the C-BT source water watersheds is also perceived as being a highly impactful risk. Factors that could affect forest health were described in Section 2.1.2. The majority of all tributary watersheds to C-BT facilities consist of forested areas managed by federal resource agencies, so Northern is dependent on their forest management programs to maintain the health of its source water areas.

- WN4 - Wildfires on the East Slope of the Continental Divide, specifically in the Big Thompson watershed, are perceived as a moderately impactful risk. Transmountain water is conveyed through a section of the Big Thompson River. If a wildfire in the Big Thompson watershed were to occur, the Big Thompson River may be unable to convey C-BT project water due to water quality issues. However, Northern does have alternative delivery methods that would mitigate the impact of this risk. Additionally, this may impact the ability of allottees to use C-BT Project water due to water quality issues. For example, in the summer and early fall of 2017, there were times when the City of Loveland was unable to utilize its native water rights or C-BT water because of water quality issues in the Big Thompson River as well as an outage on the C-BT system.

- WN5 - Increased sediment loading (resulting from fires, flooding, etc.) in reservoirs and open conveyance systems is perceived as a moderately impactful risk. Shadow Mountain Reservoir is the facility with the most potential to be impacted by sedimentation, especially from a water quality perspective due to its very shallow depth. Other Northern reservoir and conveyance facilities could be more easily managed after major sedimentation events, however there would be short-term operational impacts.

The remaining risks and uncertainties in **Table 3.2** are perceived as being less impactful to the C-BT Project collection water system.

Table 3.2 - Identified C-BT Project Watershed Risks and Uncertainties

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score
WN1	Changes in wildfire characteristics	Increase in extent and severity of wildfires in high elevation forests degrades water quality, increases sediment loads and changes runoff characteristics	5	4	20
WN2	Wildfires - Upstream of Grand Lake/Shadow Mountain	Increased occurrence of wildfire leads to short term reduced capacity and ability to use Grand Lake/Shadow Mountain Reservoir. Long term channel and sediment changes.	4	4	16
WN3	Watershed forest health degradation	Poorer forest health leads to increase in wildfire risk, water quality impacts, hydrology impacts and increased sediment load.	5	3	15
WN4	Wildfires - East Slope	Increased occurrence of wildfires in Big Thompson River basin degrades water quality and may prevent ability to use Big Thompson River to move C-BT water. Watershed above Lake Estes has lower wildfire impact risk but higher likelihood.	4	3	12
WN5	Increased sediment loading	Increased sediment loading from several causes reduces reservoir or conveyance capacity and affects water quality.	4	3	12
WN6	Flooding	Major flooding events cause mostly short term impacts during which water cannot be used due to compromised water quality.	5	2	10
WN7	Development in Fraser Valley	Residential development increases water quality risks due to urban runoff, return flows and more septic systems.	4	1	4
WN8	Wildfires - East Slope Reservoirs	Wildfires in East Slope reservoir watersheds (e.g., Horsetooth Reservoir watershed) affects water quality, sediment loading and runoff characteristics for drainage into the reservoirs.	4	1	4
WN9	Development above Lake Granby	Residential development increases water quality risks in Lake Granby and Tri-Lakes system.	3	1	3

3.1.3 Operations and Infrastructure Risks

Table 3.3 lists the 22 risks and uncertainties identified that would impact the operations and infrastructure aspect of the C-BT Project water system.

- ON1 - The Green Mountain Reservoir Replacement Pool is operated for Northern to make releases to the Colorado River system in order to offset out-of-priority diversions by the C-BT collection system. These out-of-priority diversions are important to maximizing the yields and benefits of the C-BT Project. If the size of the Green Mountain Reservoir Replacement Pool is inadequate under future hydrologic conditions because of changing hydrographs and river calls, Northern may not be able to use this replacement pool to divert out-of-priority water as efficiently as it has in the past. This would diminish its ability to mitigate a variety of future risks to its water diversions.

- ON2, ON3, ON4 - Three infrastructure outages are perceived as being moderately impactful to C-BT Project supply system. An outage of Unit Number 3 of the Flatiron Facility would restrict pumping into Carter Lake and limit the ability of Northern to deliver C-BT water to southern allottees. An outage of the Power Arm facility would also prevent moving water into Carter Lake and limit the ability of Northern to deliver C-BT water to southern allottees. Finally, an outage of the Southern Water Supply Project, which could occur due to failures or problems with any of the associated pipelines or canals, would prevent water being delivered to southern allottees. None of these three conditions would impact deliveries of C-BT or Windy Gap water to FCU.

The remaining identified risks or uncertainties in **Table 3.3** are perceived as being less impactful to the C-BT Project water system. Many of these can be easily mitigated if they were to occur or there is sufficient redundancy in the system, diminishing their impact. There are several highly impactful risks that will be evaluated further (see Section 3.2), however Northern has a robust asset management and maintenance program that makes the likelihood of these risks very low.

Table 3.3 - Identified C-BT Project Operations and Maintenance Risks and Uncertainties

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score
ON1	Green Mountain Replacement Pool Inadequacy	With changing hydrology, the 52,000 acre-ft replacement pool may be inadequate to mitigate against a variety of future risks This could reduce Northern's ability to divert out-of-priority water.	4	4	16
ON2	Unit No3 of Flatiron Facility Outage	Failure of Unit 3 in the Flatiron Pump Station prevents pumping water into Carter Lake	4	3	12
ON3	Power Arm Outage	Failure of Power Arm prevents moving water into Carter Lake	4	3	12
ON4	Southern Water Supply Project Outage	Failure of Southern Water Supply Project prevents delivering water to southern allottees	3	4	12
ON5	EPA Transfer Rule	New EPA policy on transbasin diversions makes all existing and future C-BT/Windy Gap subject to discharge requirements	2	5	10
ON6	East Slope Water Rights Uncertainty	Runoff timing changes or increased basin demands impact Northern's yields from East Slope rights and change operation of reservoirs.	3	3	9
ON7	Power Transmission Lines Outages	Wildfire or other emergency causes outage in transmission lines providing power to C-BT/Windy Gap pump stations.	3	3	9
ON8	Algal Blooms	Increased nutrients and temperatures cause algal blooms in reservoirs, impacting suitability of water supply for potable uses	4	2	8
ON9	Aquatic Plants	Increased nutrients and invasive plants grow in reservoirs and canals, impacting operations and potentially increasing treatment requirements	4	2	8
ON10	Invasive Species - Mussels	Mussels clog inlet/outlet pipelines which combined with lack of redundancy may cause short term outages.	2	4	8
ON11	Grand Lake Clarity	Managing to meet clarity requirements leads to less operational flexibility in the system.	4	2	8
ON12	Conveyance Systems to Horsetooth Outage	Variety of events could cause outages or reduced in deliveries in conveyance system components to Horsetooth Reservoir	2	4	8

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ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score
ON13	Power Generation vs. Water Delivery Operations	Power generation may be given preference over delivering water in C-BT operations	2	4	8
ON14	Grand River Ditch Breach	Failure of the ditch brings sediment into Shadow Mountain/Grand Lake that causes operational changes.	2	3	6
ON15	Conveyance Systems from Carter Lake Outage	Variety of events could cause outages or reduced deliveries from Carter Lake	2	3	6
ON16	Boulder Reservoir Shared Operations	Increased constraints due to Boulder operations impacts ability to deliver water to southern allottees.	2	3	6
ON17	Farr Pump Plant Outage	Pump station failure prevents moving water from Lake Granby to Grand Lake and Adams Tunnel.	1	5	5
ON18	Adams Tunnel Outage	Tunnel failure prevents moving all C-BT/Windy Gap water to East Slope.	1	5	5
ON19	Lake Granby Dam/Dike System Outage	Reduced capacity due to safety reduction or other outage issue limits ability to move water to Grand Lake and Adams Tunnel	1	5	5
ON20	Windy Gap Plant Outage	Pump station failure prevents transfer of Windy Gap water into the C-BT delivery system	1	4	4
ON21	Power Arm and Dille Tunnel Failure (Concurrent)	Concurrent failure of both conveyance facilities would prevent delivering water to Horsetooth Reservoir.	1	4	4
ON22	Willow Creek Pump Plant Outage	Pump station failure prevents pumping C-BT water into Lake Granby and reduces system yield	1	3	3

3.1.4 Legal and Administrative Risks

Table 3.4 lists the four risks and uncertainties identified that would impact the legal and administrative aspect of the C-BT Project water system.

- AN1 - New environmental regulations or changes to existing regulations are perceived as being a moderate threat to the C-BT Project water system. These could result in additional water being required for environmental purposes, which could reduce the C-BT yield and hence the quota set for allottees. Additionally, new infrastructure or improvements to existing infrastructure would be more difficult to permit if new species were added to federal and state lists of protected species or mitigation requirements were expanded.

- AN2 - Colorado River Hydrologic Uncertainty / Major Outage of C-BT Project. Colorado River flows for 2000-2017 represent a significant drought event when compared to both relatively recent recorded data and flow records reconstructed from tree-ring records that go back over one thousand years. The 10 year rolling average of actual flows in the Colorado River below Lake Powell is currently approximately 91 million acre feet. It is not possible to predict if or when actual flows in the Colorado River below Lake Powell will fall below 75 million acre feet on a 10 year rolling average, how long actual flows in the Colorado River below Lake Powell could be below 75 million acre feet on a 10 year rolling average, or whether and how such flows would, under the Colorado River Compact or Upper Colorado River Compact, affect Colorado-Big Thompson Project diversions. Given these uncertainties, the modeled scenarios include a scenario with no diversions by the C-BT Project and a scenario with an extended period of reduced diversions by the C-BT Project, which is represented in the Green Mountain Pool scenario. These scenarios are intended to assess the impact of outages or reduced diversions caused by reduced flows in the Colorado River that are not dependent on currently unknown future hydrology or legal requirements.

The remaining risks and uncertainties in **Table 3.4** are perceived as being less impactful than those described above.

Table 3.4 - Identified C-BT Project Legal and Administrative Risks and Uncertainties

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score
AN1	Environmental Regulations (changes, new, compliance)	New regulations or changes in federal permitting compliance may lead to more water used for environmental mitigation/flows.	3	4	12
AN2	Colorado River Hydrologic Uncertainty / Major Outage of C-BT Project	Possible changes in C-BT operations based on hydrologic uncertainties and a large C-BT Project outage.	2	5	10
AN3	Windy Gap renegotiation	When current 40-year contract limit expires, a renegotiated contract gives less yield (due to increased shrink for example)	5	2	10
AN4	Federal law requires modification of Project Operations.	Federal law requires changes in how the C-BT Project is operated (e.g. for endangered species), reducing C-BT/Windy Gap yield	2	4	8

3.1.5 Demand Risks

Table 3.5 lists the five risks and uncertainties identified that would impact demand aspect of the C-BT Project water system.

Northern is a raw water supplier with a fixed amount of supply available to allocate each year. In that sense its operations are not directly driven by changes in the demands of its allottees. While allottee demands may indirectly impact Northern, the district has a fixed number of units and its quota system allows it to control the amount of water distributed annually to its allottees. Therefore, none of the demand risks or uncertainties are perceived as being significantly impactful to the C-BT Project water system.

Table 3.5 - Identified Northern Water Demand Risks and Uncertainties

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score
DN1	Longer Growing Season	Hotter, drier climate lengthens the growing season for agricultural and M&I allottees, increasing their demands and changing when they need C-BT/Windy Gap water	5	2	10
DN2	Changes in C-BT Users	Continued shift in C-BT ownership to M&I users, who would want quotas set differently than agricultural users.	5	1	5
DN3	Uncertainty of Setting Quota	Change in ownership and Board membership changes the process by which quota is set. May be narrower range to satisfy M&I allottees.	3	1	3
DN4	Increase in quota use	Quotas are not set as high, but as time goes on actual water use is closer to the quota amount.	4	1	4
DN5	Northern Water Management Program Changes	Changes to the Annual Carryover Storage program or Regional Pool program occur, making water management for M&I allottees less flexible.	3	1	3

3.2 PRIORITIZED RISKS

Figure 3.1 plots all risks and uncertainties identified by Northern as a circle on a grid corresponding to their likelihood and impact scores, with the impact score as columns and the likelihood score as rows. The color of the circle corresponds to the category the risk or uncertainty originates from and the label is the ID of the risk or uncertainty. In total, 45 risks and uncertainties were identified by Northern.

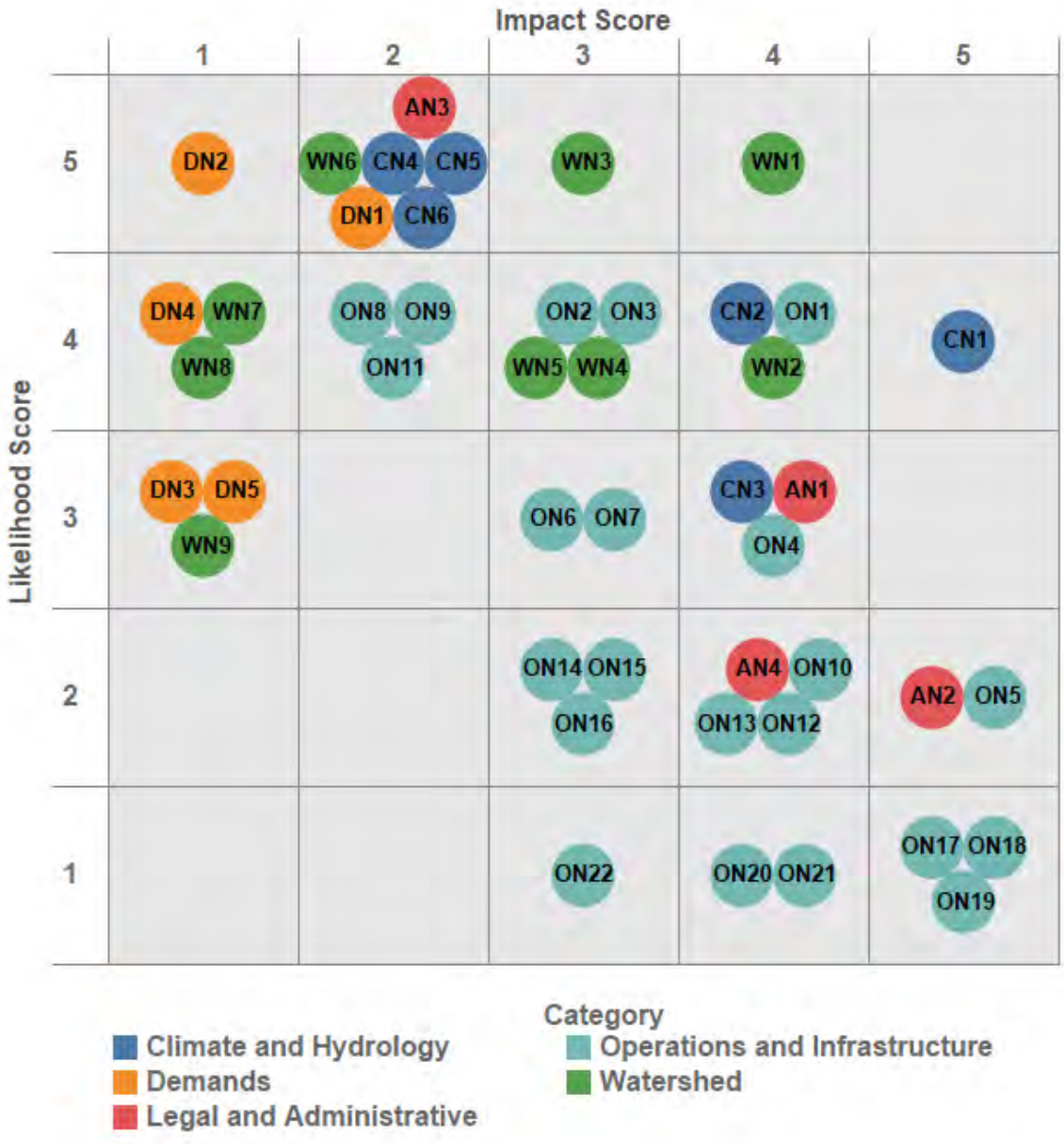

Figure 3.1 - Risks and uncertainties identified by Northern.

As part of the larger FCU Water Vulnerability Study, the risks and uncertainties identified by Northern need to be translated to C-BT quota impacts because C-BT deliveries comprise a significant portion of FCU water supply. The annual C-BT yield based on the quota is an important input to the FCU water resources model. The process used by the Northern Board to set the annual C-BT quota is based on a number of factors including supplemental regional need, hydrology, amount of water in storage, and past Board experience. Northern has a model that estimates a C-BT quota depending on West Slope and East Slope hydrology and operations of their major reservoirs. This model will be used to estimate the effect of risks and uncertainties on the C-BT quota. However, not every risk and uncertainty needs to be simulated. Therefore, the previously identified risks and uncertainties were prioritized, identifying those that would be simulated in the C-BT quota model.

Similar to the process used by FCU, the first step to prioritize risks was to include all risks with a composite score of 12 or above (out of a possible 25). Northern and FCU felt these risks were impactful enough to warrant further examination and potential simulation. Additionally, all risks that received an impact score of 4 or 5 were further examined (regardless of their composite score) as these risks could be significantly impactful even if their likelihood of occurring was low. Of these highly impactful risks, those prioritized were:

- Conveyance system to Horsetooth Reservoir Outage (ON12)
- Adams Tunnel Outage (ON18)
- Farr Pump Plant Outage (ON17)
- Lake Granby Dam/Dike System Outage (ON19)
- Colorado River Hydrologic Uncertainty / Major Outage of C-BT Project (AN2)
- Windy Gap Plant Outage (ON20)

Note: larger and redder circles indicate a higher composite score. Prioritized risk IDs are labeled with the black line separating the composite scores used for prioritizing

Figure 3.2 plots all identified risks and uncertainties as a circle on a grid corresponding to their likelihood and impact scores, with the impact score as columns and the likelihood score as rows. The color and size of the circles correspond to their composite scores, with larger and redder circles indicating the risks and uncertainties perceived as being more impactful to the C-BT Project water system. Labeled risks and uncertainties are those that were prioritized for further analysis, with the black line separating the region with composite scores of 12 and above from the region with scores less than 12.

Note: larger and redder circles indicate a higher composite score. Prioritized risk IDs are labeled with the black line separating the composite scores used for prioritizing

Figure 3.2 - Summary of likelihood and impact scores of Northern Water identified risks and uncertainties.

The prioritized risks and uncertainties identified above were then summarized around the same five major threat groups used by FCU: climate change, demands, critical outages, enhanced environmental stressors, and shared infrastructure. **Table 3.6** lists the key risks and uncertainties prioritized for simulation and their threat group.

Table 3.6 - List of Northern Water Prioritized Risks and Uncertainties

ID	Name	Threat Group	Likelihood Score	Impact Score	Composite Score
CN1	Longer Duration Droughts	CC	4	5	20
WN1	Changes in wildfire characteristics	EES	5	4	20
CN2	Increased frequency of extreme dry years	CC	4	4	16
ON1	Green Mountain Replacement Pool Inadequacy	D	4	4	16
WN2	Wildfires - Upstream of Grand Lake/Shadow Mountain	EES	4	4	16
WN3	Watershed forest health degradation	EES	5	3	15
AN1	Environmental Regulations (changes, new, compliance)	EES	3	4	12
CN3	Changes in runoff volume	CC	3	4	12
ON3	Power Arm Outage	CO	4	3	12
ON4	Southern Water Supply Project Outage	CO	3	4	12
ON2	Unit No3 of Flatiron Facility Outage	CO	4	3	12
WN5	Increased sediment loading	EES	4	3	12
WN4	Wildfires - East Slope	EES	4	3	12
AN2	Colorado River Hydrologic Uncertainty / Major Outage of C-BT Project	CC/CO	2	5	10
ON12	Conveyance Systems to Horsetooth Outage	CO	2	4	8
ON18	Adams Tunnel Outage	CO	1	5	5
ON17	Farr Pump Plant Outage	CO	1	5	5
ON19	Lake Granby Dam/Dike System Outage	CO	1	5	5
ON20	Windy Gap Plant Outage	CO	1	4	4

Key: CC = Climate Change, CO = Critical Outages, D = Demands, EES = Enhanced Environmental Stressors, SI = Shared Infrastructure

Figure 3.3 summarizes these threats, averaging the likelihood and impact scores across the individual risks and uncertainties for each threat, with the size of circle and number corresponding to the number of risks and uncertainties within the threat group. Shared infrastructure risks were not identified as threats. Critical outages are perceived to be unlikely to occur, but are significantly impactful if they do. Climate change is perceived as being both likely to occur and significantly impactful.

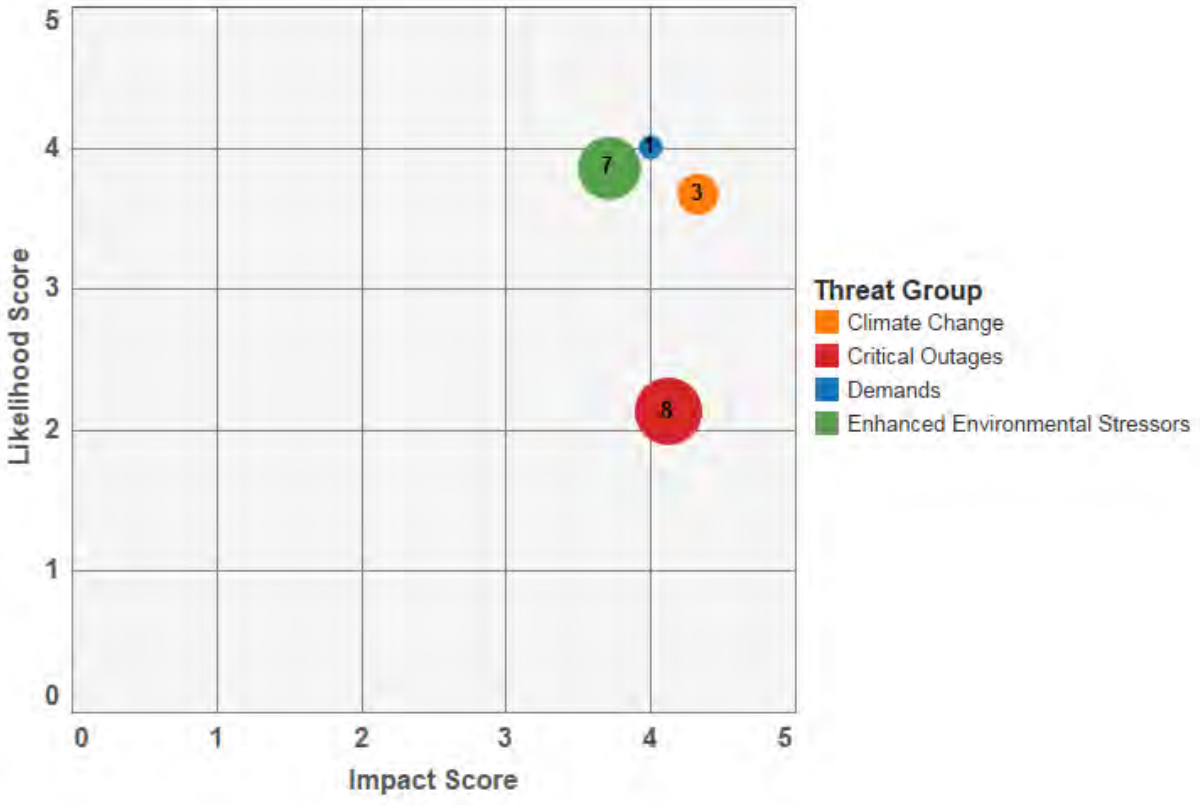

Figure 3.3 - Summary of Northern Water prioritized risks and uncertainties within each threat group

4.0 SIMULATION APPROACH FOR SELECTED RISKS

To develop the future planning framework for the Fort Collins Water Vulnerability Study, the impacts of the identified risks and uncertainties on the water supply system need to be quantified. The Fort Collins and Northern water resources models will be used to simulate these impacts, providing objective information about which risks and uncertainties are a significant threat.

Therefore, a simulation approach for the prioritized risks and uncertainties identified by FCU for its water supply system in Section 2 and the prioritized risks and uncertainties identified by Northern for the C-BT Project in Section 3 was developed. This approach is described in this section.

4.1 GENERAL SIMULATION APPROACH

The risk and uncertainty simulation process requires a reasonable estimate of the water supply feature being impacted by each key risk/uncertainty, the duration of the impact, and determination of the models that should be used to simulate its effects. Some risks or uncertainties, though prioritized, will not be explicitly simulated in the models though their specific impacts will be qualitatively described.

There are three models that represent FCU's water supply system, described below. How the simulation approach will be specifically applied to each model is described in more detail in Section 4.2, Section 4.3, and Section 4.4. Risks related to the Reuse Plan are not finalized at this time but will be added to the documentation when they are.

- The Fort Collins System Model (FCM) simulates the operation of infrastructure used to deliver yields from sources to FCU's water treatment plant.
- The Poudre Basin Network (PBN) model simulates the water allocation and storage for water users in the Poudre River basin.
- The C-BT Quota model (CBTQ) simulates the anticipated quota for C-BT allottees based on hydrology, operations of the major reservoirs in the C-BT system, and other factors.

Table 4.1 presents the proposed simulation approach for the prioritized risks and uncertainties related to the FCU water supply system described in Section 2.2. For risks with a simulation approach that is applied for a fixed period of time (e.g., June-October, 5 years), the simulated year that risk occurs will be fixed (e.g. year 10 of the simulation) across all three models. Because different hydrology are being developed for these models, risks occurring the same simulated year will occur across a variety of hydrologic conditions (e.g. short droughts, multi-year droughts, wet periods, drought recovery).

Table 4.1 – Simulation approach for FCU water supply system risks and uncertainties

ID	Risk or Uncertainty Name	Model for Simulation	Simulation Approach
O1	Outage – 24" Pipeline	FCM	100% outage between October and March, when impact would be most severe to operations. Will be combined with 27" Pipeline Outage in model.
O2	Outage – 27" Pipeline	FCM	100% outage between October and March, when impact would be most severe to operations. Will be combined with 24" Pipeline Outage in model.
O3	Algal Blooms	FCM	C-BT water use will be reduced by a fixed percent between June-October.
C1	Longer duration droughts	All	Incorporated into new stochastic hydrology
A1	New Regulations- Water quality and environmental	Not Simulated	
W1	Wildfires	FCM	Outage of non-C-BT supply between June-September, followed by 10-year, 20% reduction in non C-BT-supply.
C3	Change in precipitation type - Hydrology	All	Incorporated into new stochastic hydrology
C4	Changes in frequency/magnitude of precipitation events - Hydrology	All	Incorporated into new stochastic hydrology
C2	Changes in runoff timing	All	Incorporated into new stochastic hydrology
W2	Forest Health Degradation	Not Simulated	
A4	Changing state water rights administration	Not Simulated	
D3	Development Uncertainty	FCM/PBN	Captured in demand scenario modeling
A2	Increased Basin Demands	Not Simulated	A separate sensitivity analysis around this was completed by FCU and found no significant impact on water availability.
O5	Outage - Horsetooth Reservoir Outlet	FCM	Horsetooth empties in October, then 100% storage capacity reduction for 9 months, though water can still flow through the reservoir.
O4	Outage - Michigan Ditch	FCM	100% reduction for 24 months
D2	Water Use Changes	FCM	Captured in demand scenario modeling

ID	Risk or Uncertainty Name	Model for Simulation	Simulation Approach
D1	Service area growth and regionalization	FCM	Apply a percent increase to demands in new demand model based on how much demands may increase.
D8	Change in precipitation type - Demands	FCM	Captured in demand scenario modeling
D9	Changes in frequency/magnitude of precipitation events - Demands	FCM	Captured in demand scenario modeling
A3	Changes to Northern Water C-BT Operations	FCM/PBN	Simulate various quota assumption scenarios (e.g. fixed 50% quota). Scenarios to be developed.
W3	Development in Watersheds	Not Simulated	
D6	Hotter summer changes irrigation	FCM	Captured in demand scenario modeling
O6	Outage - Chambers Reservoir	Not Simulated	
O8	Outage - Joe Wright Reservoir	FCM	100% reduction in capacity for 24 months starting in November. All inflows bypassed.
O11	Outage - Pleasant Valley Pipeline	FCM	100% reduction from April-October
A9	Elimination or Interruption of Reuse Plan	FCM	In development

Table 4.2 presents the simulation approach for the prioritized risks and uncertainties related to the C-BT water supply system described in Section 3.2.

Table 4.2 - Simulation approach for the C-BT Project water system risks and uncertainties

ID	Name	Model for Simulation	Simulation Approach
CN1	Longer Duration Droughts	CBTQ	Incorporated into new hydrology.
WN1	Changes in wildfire characteristics	Not Simulated	
CN2	Increased frequency of extreme dry years	CBTQ	Incorporated into new stochastic hydrology.
ON1	Green Mountain Replacement Pool Inadequacy	CBTQ	Reduce inflows into model to account for loss of out-of-priority diversions.
WN2	Wildfires - Upstream of Grand Lake/Shadow Mountain	Not simulated	Potential quota changes captured in other risks.
WN3	Watershed forest health degradation	Not simulated	
AN1	Environmental Regulations (changes, new, compliance)	CBTQ	Reduce inflows into model to account for loss due to increased environmental flows.
CN3	Changes in runoff volume	CBTQ	Incorporated into new stochastic hydrology.
ON3	Power Arm Outage	Not simulated	Doesn't impact quota setting or deliveries of C-BT supply to FCU
ON4	Southern Water Supply Project Outage	Not simulated	Doesn't impact quota setting or deliveries of C-BT supply to FCU

ON2	Unit No3 of Flatiron Facility Outage	Not simulated	Doesn't impact quota setting or deliveries of C-BT supply to FCU
WN5	Increased sediment loading	Not Simulated	Shadow Mountain Reservoir is mostly a pass through reservoir, so may not be greatly affected by reduced capacity.
WN4	Wildfires - East Slope	CBTQ	Reduction in Big Thompson-captured inflows. No delivery of C-BT water to certain water users (e.g. Greeley) through Big Thompson River.
ON12	Conveyance Systems to Horsetooth Outage	FCM	Doesn't impact quota setting. 100% reduction in C-BT delivery to Horsetooth Reservoir from January – June. Existing water in Horsetooth Reservoir still useable.
ON18	Adams Tunnel Outage	FCM/PBN	100% reduction in West Slope yields for a single year. Anticipated quota scenario will be developed.
ON17	Farr Pump Plant Outage	FCM/PBN	60% reduction in West Slope yields for a single year. Anticipated quota scenario will be developed.
ON19	Lake Granby Dam/Dike System Outage	FCM/PBN	100% reduction in West Slope yields for a single year. Anticipated quota scenario will be developed.
AN2	Colorado River Hydrologic Uncertainty / Major Outage of C-BT Project	CBTQ	A reactive response that is a 100% reduction in West Slope inflows for 5 years.
ON20	Windy Gap Plant Outage	CBTQ	100% reduction in West Slope yields for a single year.

4.2 FORT COLLINS SYSTEM MODEL

Many of the risks presented in Table 4.1 will be simulated by adjusting specific links and/or nodes in the FCM model. Others will be captured by altering the demand inputs or the hydrology inputs to the model.

Table 4.4 details how the risk will be initiated, how long the risk will last and which nodes or links will be adjusted in the FCM model to simulate the modeled risks. Table 4.5 lists the risks that are not modeled by adjusting a link or node setting, but rather by altering the demand inputs or hydrology inputs to the FCM model.

Table 4.3- Simulation method for risks and uncertainties affecting the Fort Collins System Model

ID	Risk or Uncertainty Name	Risk Initiation	Reduction Factor	Duration (timesteps)	FCM Nodes/Links
O1	Outage – 24" Pipeline	Random, starting in October	100	12	Pipecap link will be split into three links (multilink). Only one of the three links will be affected.
O2	Outage – 27" Pipeline	Random, starting in October	100	12	Pipecap link will be split into three links (multilink). Only one of the three links will be affected.
O3	Algal Blooms	Annual Canyon Mountain Naturalized Flow. Bin into three bins based off current hydrology. Select a random year from within the dry bin.	Blending construct	5	Simulated in new blending construct
W1	Wildfires	Hydrology-based	Year 1: 100% Years 2-10: 25%	Year 1: June-September Years 2-10: April-October	Pipecap link will be split into three links (multilink). Which link or links will be affected?
O5	Outage - Horsetooth Reservoir Outlet	Random, starting in October	100	9	Horsetooth_StoRight node target and capacity
O4	Outage - Michigan Ditch	Random, starting in June	100	24	MD link
O8	Outage - Joe Wright Reservoir	Random, starting in November	100	24	JoeWright_StoRight node
O11	Outage - Pleasant Valley Pipeline	Random, starting in April	100	12	Pipecap link will be split into three links (multilink). Which link or links will be affected?
A9	Reuse Plan Gone				Developed as part of Reuse Plan simulation
A9	Reuse Plan Interrupted				Developed as part of Reuse Plan simulation
ON12	Conveyance Systems to Horsetooth Outage	Random, starting in April	100	January-June	cbtin link

Table 4.4- Summary of risks and uncertainties reflected in demand or hydrology inputs to the Fort Collins System Model

ID	Risk or Uncertainty Name	Simulation Approach
C1	Longer duration droughts	Incorporated into new stochastic hydrology
C2	Changes in runoff timing	Incorporated into new stochastic hydrology
C3	Change in precipitation type - Hydrology	Incorporated into new stochastic hydrology
C4	Changes in frequency/magnitude of precipitation events - Hydrology	Incorporated into new stochastic hydrology
D1	Service area growth and regionalization	Apply a percent increase to demands in new demand model based on how much demands may increase.
D2	Water Use Changes	Captured in demand scenario modeling
D3	Development Uncertainty	Captured in demand scenario modeling
D6	Hotter summer changes irrigation	Captured in demand scenario modeling
D8	Change in precipitation type - Demands	Captured in demand scenario modeling
D9	Changes in frequency/magnitude of precipitation events - Demands	Captured in demand scenario modeling

4.3 POUDRE BASIN NETWORK MODEL

PBN model output serves as hydrology input to the FCM model, so only hydrology-based risks will be simulated in the PBN model. By altering PBN inputs based on the risks, the PBN output will reflect the simulated risks, which will be used as input to the FCM model. Table 4.6 lists the risks that are simulated in the PBN model.

Table 4.5- Summary of risks and uncertainties reflected in hydrology inputs to the PBN Model

ID	Risk or Uncertainty Name	Simulation Approach
C1	Longer duration droughts	Incorporated into new stochastic hydrology
C2	Changes in runoff timing	Incorporated into new stochastic hydrology
C3	Change in precipitation type - Hydrology	Incorporated into new stochastic hydrology
C4	Changes in frequency/magnitude of precipitation events - Hydrology	Incorporated into new stochastic hydrology

4.4 NORTHERN WATER QUOTA MODEL

The CBTQ model output will be used as input to both the PBN model and the FCM model. The risks identified by Northern in Table 4.2 will alter how the quota is set; and thus, will need be simulated in the CBTQ model. The quotas produced will be used as inputs to the PBN and FCM models, and will reflect the simulated risk.

Table 4.7 details how specific model objects in the CBTQ model are adjusted to simulate the identified risks. Table 4.8 lists the risks that are modeled by altering the hydrologic inputs to the CBTQ model.

Table 4.6- Simulation method for risks and uncertainties affecting the CBTQ Model

ID	Risk or Uncertainty Name	Duration	CBTQ Model Objects	Model Object Setting
WN4	Wildfires - East Slope	3 years	Timeseries Sheet: column “East Slope Wildfires”	1 in year of the fire and following 2 years
			Model Control Sheet: Cell B49	100
ON20	Windy Gap Plant Outage	1 year	Timeseries Sheet: column “Windy Gap Pump Outage”	1 in year(s) of pump outage

Because of the operation of the C-BT Project by which allottees are delivered water via a quota that is set each year, risks and uncertainties interact with the C-BT and FCU water supply systems differently. Some risks and uncertainties impact how the quota is set while others impact how the water committed under the quota is delivered. The CBTQ model captures how risks and uncertainties to hydrology and reservoirs would impact how the quota is set. However risks and uncertainties that impact how the water committed under the quota is delivered are not captured in the CBTQ model. Therefore for the Water Vulnerability Study, quota scenarios, in addition to those simulated in the CBTQ model, will be developed for risks and uncertainties that are not captured in the CBTQ model and applied to the PBN and FCM models. **Table 4.3** summarizes the quota scenarios developed and the risks and uncertainties they capture.

Table 4.7 - Quota Scenarios for the FCM and PBN Models

Scenario Name	Description	Risks and Uncertainties Captured
Adams Tunnel Outage	Quota is set to 25% in the three years following the outage for all Horsetooth storage levels.	Adams Tunnel Outage (ON18)
Farr Pump Plant Outage	Quota is set to 39% in the three years following the outage for all Horsetooth storage levels.	Farr Pump Plant Outage (ON17)
Lake Granby Dam/Dike System	Quota is set to 40% in the three years following the outage for all Horsetooth storage levels.	Lake Granby Dam/Dike System Outage (ON9)

Table 4.8- Summary of risks and uncertainties reflected in hydrology inputs to the CBTQ Model

ID	Risk or Uncertainty Name	Simulation Approach
CN1	Longer Duration Droughts	Incorporated into new hydrology.
CN2	Increased frequency of extreme dry years	Incorporated into new stochastic hydrology.
CN3	Changes in runoff volume	Incorporated into new stochastic hydrology.
ON1	Green Mountain Replacement Pool Inadequacy	Incorporated into new hydrology
AN1	Environmental Regulations (changes, new, compliance)	Incorporated into new hydrology
AN2	Colorado River Hydrologic Uncertainty / Major Outage of C-BT Project- Reactive Response	Incorporated into new hydrology

5.0 SUMMARY AND CONCLUSIONS

As part of the Fort Collins Water Vulnerability Study, a future planning framework to evaluate the need for new water supply strategies is being developed. A key part of this framework will be incorporating risks and uncertainties that could negatively impact FCU's ability to deliver water to its customers. Therefore, risks and uncertainties to the FCU water supply system were identified and prioritized. Because FCU gets a significant portion of its supply from the C-BT Project, risks and uncertainties to the C-BT project were also identified by Northern.

In total, 46 risks and uncertainties were identified for the FCU water supply system and 53 risks and uncertainties were identified for the C-BT system. Each of these were assigned a likelihood score and an impact score by staff from each agency based on their professional judgment. These risks and uncertainties were then prioritized for simulation using the composite score (likelihood score x risk score). 25 risks and uncertainties related to the FCU water supply system were prioritized for simulation and 24 risks and uncertainties related to the C-BT system were prioritized for simulation.

For each of these key prioritized risks and uncertainties, a simulation approach was developed to capture their potential impact in one of models used to simulate the FCU water supply system and the C-BT annual quota. These individual risks and uncertainties will then be combined into various scenarios and simulated in the water resources models, using performance metrics and level of service goals to determine which risks and uncertainties should be included in the future planning framework.

APPENDIX A – FORT COLLINS UTILITIES RISK AND UNCERTAINTY TABLES

A.1 Climate and Hydrology

The following table presents the climate and hydrology risks and uncertainties identified by FCU and their associated scores and additional notes.

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score	Notes
C1	Longer duration droughts	Multi-year and/or more severe droughts occur in the future that are not captured in the observed record.	5	4	20	Could be caused by natural climate variability or climate change. Longer periods of low streamflow and reduced yields from water rights.
C2	Changes in runoff timing	Early higher runoff and lower late-season baseflow reduces yield from volumetric decrees that list specific diversion dates.	4	4	16	Earlier runoff is already occurring compared to historical averages. Fort Collins system is vulnerable due to limited storage. Water rights have highly specific timing of decreed water which may reduce yields if there is changes in runoff timing.
C3	Change in precipitation type	More precipitation falls as rain instead of snow during the Fall and Spring.	4	4	16	This is occurring now relative to historical averages. Reduces benefits of "snowpack reservoir." Fort Collins system is vulnerable due to limited storage.
C4	Changes in frequency/ magnitude of precipitation events	Precipitation events, particularly summer rainstorms, become less frequent and more intense.	4	4	16	More intense storms could cause flooding, damaging infrastructure. More storms like September 2013.
C5	Longer growing season	Warmer climate increases growing season in Spring and Fall, changing potential water rights calls and increasing irrigation demand.	4	2	8	Increased agricultural diversions in Spring and Fall could affect yield from Fort Collins rights. However, many ag users already use most of their decreed supply and there is research that shows that longer growing seasons may reduce water-intensive crops.

A.2 Watershed

The following table presents the watershed risks and uncertainties identified by FCU and their associated scores and additional notes.

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score	Notes
W1	Wildfires	Wildfires occur, causing a variety of impacts on water quality, runoff, and threats to infrastructure.	5	4	20	Climate change leading to hotter, drier climate would increase risk of wildfire. High Park Fire demonstrated wildfire threat. Water quality has short term and long term effects that make Poudre River water untreatable. Wildfire itself and sediment loads from runoff after the fire could affect diversions and conveyance systems in the FCU system.
W2	Forest Health Degradation	Forested area health decreases due to beetle kill, pollution, warming climate, etc.	4	4	16	Declining forest health could affect streamflow magnitude and timing (higher peak, earlier runoff) and degrade water quality. Also, increases risk of wildfire.
W3	Development in Watersheds	Land development in watersheds (recreation, residential, O&G, mining) increases risk of water quality contamination.	4	3	12	Long-term water quality degradation due to increased road traffic and septic systems and increased risk of acute contamination events due to spills or vehicle accidents.
W4	Atmospheric Deposition	Increased levels of contaminants in bodies of water and forests lead to new water quality issues	5	2	10	Deposition of nutrients in pristine high-altitude bodies of water increases risk of algal blooms or other water quality issues that could impact water quality and availability.
W5	Deficiencies in Federal land Management	Federally owned land, which comprises nearly all of the watersheds, is poorly managed against wildfires or to promote forest health	2	3	6	Over 90% of Fort Collins water supply yield is derived from land owned and managed by the Federal government. Challenges with proactive forest management increase frequency and/or severity of wildfires. Limited rehabilitation of forests after a wildfire increase risk to water quality contamination, sedimentation, and runoff timing changes.
W6	Abandoned Mine Runoff	Runoff from abandoned mines leads to decreased water quality in FCU watersheds.	1	4	4	Abandoned mines could release metals and other toxic chemicals. Few mines in the Fort Collins source watersheds so low likelihood of problems.
W7	Privatization of Public Lands	Lands owned by the federal government are transferred to private entities, increasing development potential	1	4	4	More area for development and more development intensity would increase risk of impacts of development as described above.

A.3 Operations and Infrastructure

The following table presents the operations and infrastructure risks and uncertainties identified by FCU and their associated scores and notes

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score	Notes
O1	Outage - 24 Pipeline	Short term outage due to flooding, landslides, wildfire, etc.	5	5	25	Inability to convey Poudre River supply to WTP without pipeline. High risk of landslides, full alignment uncertain, in river stretches increases risk of filling with sediment if it fails. Sections very difficult to access.
O2	Outage - 27 Pipeline	Short term outage due to flooding, landslides, wildfire, etc.	5	5	25	Inability to convey Poudre River supply to WTP. High risk of landslides, hard to access in event of failure.
O3	Algal Blooms	Algal blooms in storage reservoirs and rivers increases water quality issues and potential treatment problems	5	4	20	Due to variety of factors, increased risk of algal blooms in Fort Collins storage facilities. Current WTP unable to treat water with algal contaminants; could potentially significantly restrict available water in late summer/fall months.
O4	Outage - Michigan Ditch	Short term outage due to flooding, landslides, wildfire, etc.	5	3	15	Inability to convey transmountain supply to WTP. Variety of factors could lead to outage.
O5	Outage - Horsetooth Reservoir Outlet	Short term outage of reservoir outlet and intake to WTP; higher risk due to lack of redundancy	3	5	15	Inability to convey CBT supply from Horsetooth Reservoir to WTP. Outage of the Horsetooth Reservoir intake recently occurred, validating this risk.
O6	Outage - Chambers Reservoir	Short term outage due to flooding, landslides, wildfire, etc.	3	4	12	Maintenance is underfunded, increasing risk of failures. Fort Collins has minimal influence or control over reservoir.
O7	Outage - Munroe Canal	Short term outage due to flooding, landslides, wildfire, etc.	3	3	9	Inability to convey NPIC shares to City WTP.
O8	Outage - Joe Wright Reservoir	Short term outage due to flooding, landslides, wildfire, etc.	2	4	8	Inability to access water from storage in Joe Wright Reservoir. There is currently an active landslide in reservoir footprint. Fort Collins owns minimal land around reservoir, increasing risk due to wildfires and their impacts.
O9	Shared infrastructure - Chambers Reservoir	Lack of control of operations could lead to issues with delivering water	2	4	8	City cannot control movement of its water to its system, so may not have access to supply when needed

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score	Notes
O10	Outage - Meadow Creek Reservoir	Short term outage due to flooding, landslides, wildfire, etc.	3	2	6	Impact could be significantly higher if outage occurs during drought event as it was Fort Collins sole source of water during 2002 drought.
O11	Outage - Pleasant Valley Pipeline	Short term outage due to flooding, landslides, wildfire, etc.	1	4	4	Inability to use PVP to convey Poudre River supply to WTP. Shared ownership with Northern, low exposure risk.
O12	Shared infrastructure - Munroe Canal	Lack of control of operations could lead to issues with delivering water	1	4	4	City cannot control movement of its water to its system due to NPIC decisions, so may not have access to supply when needed
O13	Shared infrastructure - Pleasant Valley Pipeline	Lack of control of operations could lead to issues with delivering water	1	4	4	City cannot control movement of its water to its system due to the PVP participant decisions (Greeley, TriDistricts), so may not have access to supply when needed.
O14	Sediment Loading - Reservoirs	Loss of capacity in reservoirs due to increased sediment loads	3	1	3	Long term reduction in available storage.
O15	Freeze/Thaw Cycles	Initial freezing stages impact water quality, ice coming down the river could impact operations	3	1	3	More frequent degraded water quality. Potential damage to diversion structures could limit ability to access Poudre River supply.
O16	Shared infrastructure - Meadow Creek Reservoir	Lack of control of operations could lead to issues with delivering water	1	1	1	City cannot control movement of its water to its system due to decisions by others, so may not have access to supply when needed.

A.4 Legal and Administrative

The following table presents the legal and administrative risks and uncertainties identified by FCU and their associated scores and additional notes.

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score	Notes
A1	New Regulations - Water Quality	New regulations (either federal or state) impact availability of yields from existing water rights	5	4	20	Existing supplies may not meet standards without additional treatment. Could affect ability to blend Poudre water and CBT water.
A2	Increased Basin Demands	Higher demands across the entire Poudre River basin (due to climate change/population growth) impact use of water rights	5	3	15	Could increase annual demands and extend irrigation period. Magnitude of impact is uncertain without modeling of system performance.
A3	Changes to Northern Water CBT Operations	Allocation of CBT water through setting of the quota, and ways in which CBT water can be managed, changes in the future	4	3	12	Northern Water sets annual quota. Method of setting quota could change, especially with transition to more municipal ownership.
A4	Changing state administration	Policies around state water administration change, impacting yields from water rights	5	3	15	Policy changes could affect shrink applied to conveyance, water rights transfers, etc. in ways that would reduce yield from the City's existing rights or reduce yield from future acquisitions.
A5	Water Court Risks to existing decrees	Existing water rights are challenged in court, potentially changing their availability	5	2	10	More of a concern in the future as competition for scare water resources increases.
A6	New Regulations - Endangered Species	New regulations impact availability of yields from existing water rights and ability to permit new projects	3	3	9	Primary concern would be ability to permit new water projects.
A7	Public Trust Doctrine	Colorado water law is fundamentally changed, eliminating the prior appropriation system	1	5	5	Yield from all current City water rights and rights of other water users in the basin would suddenly be uncertain.
A8	Yields reduced in future change cases	Less water is realized from future water rights as assumed yields are greater than actual. FCU doesn't anticipate acquiring new water rights so risk is low.	4	1	4	Fort Collins has already done most of their change cases and expects a minimal amount in the future.
A9	Elimination or Interruption of Reuse Plan	Platte River Power Authority decommissions Rawhide Energy Station, effectively eliminating the need for the Reuse Plan. In multi-year droughts, water from the Reuse Plan is reduced or unavailable.	4	3	12	Current response to Reuse Plan being developed by FCU.

A.5 Demands

The following table presents the demand risks and uncertainties identified by FCU and their associated scores and additional notes.

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score	Notes
D1	Service area growth and Regionalization	Ft. Collins expands its service area or enters into agreements to provide water to regional entities.	3	5	15	Increased water demands must be met and service connections extended.
D2	Water use changes	Decrease in per capita use continues and how water is used (e.g. indoor vs. outdoor) changes	5	3	15	Continuation of recent trends in less per capita residential use and less outdoor use relative to indoor use.
D3	Development Uncertainty	The composition of development in service area (e.g. density, type, outdoor area) is different that past.	5	3	15	Increased density is anticipated with redevelopment in some areas and higher land values.
D6	Hotter summer changes irrigation	A warmer climate increases the length of the irrigation season and hotter days increase demand during the summer.	4	3	12	Affects City demand and demand by other users in the basin.
D8	Change in precipitation type	More precipitation falls as rain instead of snow during the Fall and Spring.	4	3	12	Affects irrigation demand in City service area and in region.
D9	Changes in frequency/ magnitude of precipitation events	Precipitation events become less frequent and more intense	4	3	12	Higher summer rainfall could affect demand patterns.
D4	Landscape Changes	Changes in outdoor landscaping (e.g. xeriscape) change demands from past	3	3	9	Reduction in outdoor use and irrigation season demand.
D5	Decreased water restriction effectiveness	Watering restrictions become less effective at temporarily reducing demands.	3	3	9	Demand hardening with less outdoor demand and other non-critical demands.
D7	New Large Users	A new, non-regional water user is brought on in the service area.	3	2	6	New commercial or industrial user similar to AB or HP.
D10	Changes to Existing Obligations	Existing large water contracts change or end	3	1	3	Major industrial user moves out of town, or converts to raw water rather than potable water.

APPENDIX B – NORTHERN WATER RISK AND UNCERTAINTY TABLES

B.1 Climate and Hydrology

The following table presents the climate and hydrology risks and uncertainties identified by Northern and their associated scores and additional notes

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score	Notes
CN1	Longer Duration Droughts	Long-term droughts that have longer durations than occurred in past.	4	5	20	Quotas would be set high for first few years to meet allottee requests, but in later dry years they would be lower than requested based on limited water availability. The third year of a drought will be hardest to meet with quota system. Anticipated that allottees will adjust their own water use to account for long duration drought.
CN2	Increased frequency of extreme dry years	Years like 2002 and 2011 become more frequent	4	4	16	Single extreme dry years will be more impactful on Windy Gap than C-BT. System can absorb 1-2 years of these types of drought years without impacting quotas due to large amount of storage in C-BT.
CN3	Changes in runoff volume	Long-term reductions in runoff volume due to hotter, drier climate reduce overall yield. Northern has sufficient storage to capture this and its water rights are not specific in time.	3	4	12	Historical examples in 2002 and 2012 had lower runoff due to sublimation of snowpack in a hot Spring. Climate models suggest hotter future in Upper Colorado River basin.
CN4	Changes in runoff timing	Runoff volumes shift earlier in the Spring/Summer with peak runoff occurring earlier.	5	2	10	This situation is already occurring compared to historical records. C-BT and Windy Gap West Slope water rights are not dependent on timing of runoff. However, East Slope water rights may yield less water due to earlier filling of storage facilities.
CN5	Increased Evaporation in Reservoirs	Temperature increase results in increased evaporation losses from reservoirs.	5	2	10	Most facilities are at higher altitudes with low evaporation losses, so even large percentage increases in evaporation rate would not result in significant reductions in yield.
CN6	More precipitation as rain	More precipitation falls as rain instead of snow. The impacts on yields and runoff are uncertain due to complex watershed processes.	5	2	10	Willow Creek Reservoir on West Slope is at risk of spilling due to flashy rain events.

B.2 Watersheds

The following table presents the watershed risks and uncertainties identified by Northern and their associated scores and additional notes.

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score	Notes
WN1	Changes in wildfire characteristics	Increase in extent and severity of wildfires in high elevation forests degrades water quality, increases sediment loads and changes runoff characteristics	5	4	20	Lake Granby more vulnerable to O&M impacts; Grand Lake and Shadow Mountain Reservoir more vulnerable to WQ impacts. Lack of recent fire in area increases potential negative impacts. Hot burns creating hydrophobic soils are most problematic.
WN2	Wildfires - Upstream of Grand Lake/Shadow Mountain	Increased occurrence of wildfire leads to short term reduced capacity and ability to use Grand Lake/Shadow Mountain Reservoir. Long term channel and sediment changes.	4	4	16	Increased sediment loads, water quality issues, debris flows.
WN3	Watershed forest health degradation	Poorer forest health leads to increase in wildfire risk, water quality impacts, hydrology impacts and increased sediment load.	5	3	15	Already occurring due to hotter climate and bark beetle infestation. Degraded forest affects runoff quality, generates more sediment, and increases total volume and accelerates timing of runoff.
WN4	Wildfires - East Slope	Increased occurrence of wildfires in Big Thompson River basin degrades water quality and may prevent ability to use Big T to move C-BT water. Watershed above Lake Estes has lower wildfire impact risk but higher likelihood.	4	3	12	Loveland in 2017 wasn't able to utilize their C-BT water due to water quality issues in Big Thompson. Some impacts can be bypassed using Power Arm.
WN5	Increased sediment loading	Increased sediment loading from several causes reduces reservoir or conveyance capacity and affects water quality.	4	3	12	Shadow Mountain has highest water quality risk. East Slope facilities have lower risk and can be more easily mitigated. Sediment accumulation impacts water deliveries from reservoirs less than canals.
WN6	Flooding	Major flooding events cause mostly short term impacts during which water cannot be used due to compromised water quality.	5	2	10	September 2013 is a recent example of impacts. Most facilities are robust against flooding and have redundancy in the system.
WN7	Development in Fraser Valley	Residential development increases water quality risks due to urban runoff, return flows and more septic systems.	4	1	4	Potential for urban development in Fraser Valley is greater than around Lake Granby, Shadow Mountain and Grand Lake. Fraser River is tributary to Upper Colorado upstream of the C-BT and Windy Gap pumping plants that pump water into Granby and ultimately Adams Tunnel.
WN8	Wildfires - East Slope Reservoirs	Wildfires in East Slope reservoir watersheds (e.g., Horsetooth Reservoir watershed) affects water quality, sediment loading and runoff characteristics for drainage into the reservoirs.	4	1	4	Past events in the Horsetooth Reservoir watershed and others have had low impact on water quality or sediment due to ability to implement mitigation measures.
WN9	Development above Lake Granby	Residential development increases water quality risks in Lake Granby and Tri-Lakes system.	3	1	3	Minimal space is available for new development to occur, which reduces impact of risk.

B.3 Operations and Infrastructure

The following table presents the operations and infrastructure risks and uncertainties identified by Northern and their associated scores and notes.

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score	Notes
ON1	Green Mountain Replacement Pool Inadequacy	With changing hydrology the 52,000 acre-ft replacement pool may be inadequate to mitigate against a variety of future risks.	4	4	16	Due to hydrologic uncertainty in the Colorado River, the efficiency of the 52,000 acre-ft pool to replace C-BT system out of priority depletions could be affected. Key element of Northern's West Slope operations.
ON2	Unit No3 of Flatiron Facility Outage	Failure of Unit 3 in the Flatiron Pump Station prevents pumping water into Carter Lake	4	3	12	
ON3	Power Arm Outage	Failure of Power Arm prevents moving water into Carter Lake	4	3	12	
ON4	Southern Water Supply Project Outage	Failure of Southern Water Supply Project prevents delivering water to southern allottees	3	4	12	This affects distribution pipes and canals but not C-BT or Windy Gap yield.
ON5	EPA Transfer Rule	New EPA policy on transbasin diversions makes all existing and future C-BT/Windy Gap subject to discharge requirements	2	5	10	Would require new/increased treatment to meet discharge standards and could reduce yields of water quality requirements could not be met.
ON6	East Slope Water Rights Uncertainty	Runoff timing changes or increased basin demands impact Northern's yields from East Slope rights and change operation of reservoirs.	3	3	9	
ON7	Power Transmission Lines Outages	Wildfire or other emergency causes outage in transmission lines providing power to C-BT/Windy Gap pump stations.	3	3	9	Would take affected pump stations offline for a short period of time (< 1 year)
ON8	Algal Blooms	Increased nutrients and temperatures cause algal blooms in reservoirs, impacting suitability of water supply for potable uses	4	2	8	Potential effects include cyanobacteria and taste/odor issues.
ON9	Aquatic Plants	Increased nutrients and invasive plants grow in reservoirs and canals, impacting operations and potentially increasing treatment requirements	4	2	8	Potential effects include increased treatment requirements, decreased canal capacity, changes in operations. Requires drawdowns of reservoirs for maintenance, restricting operations.
ON10	Invasive Species - Mussels	Mussels clog inlet/outlet pipelines which combined with lack of redundancy may cause short term outages.	2	4	8	Once species invade they cannot be removed. Water providers in other parts of state have successfully managed or mitigated this issue.
ON11	Grand Lake Clarity	Managing to meet clarity requirements leads to less operational flexibility in the system.	4	2	8	May lead to fewer days of diverting through Adams Tunnel, increasing spills from West Slope reservoirs and lowering overall yield.

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score	Notes
ON12	Conveyance Systems to Horsetooth Outage	Variety of events could cause outages or reduced in deliveries in conveyance system components to Horsetooth Reservoir	2	4	8	
ON13	Power Generation vs. Water Delivery Operations	Power generation may be given preference over delivering water in C-BT operations	2	4	8	Current priority is for water delivery with incidental power generation, but that could change in the future.
ON14	Grand River Ditch Breach	Failure of the ditch brings sediment into Shadow Mountain/Grand Lake that causes operational changes.	2	3	6	Linked to Grand Lake Clarity issues.
ON15	Conveyance Systems from Carter Lake Outage	Variety of events could cause outages or reduced deliveries from Carter Lake	2	3	6	This is a delivery system problem. No effect on C-BT/Windy Gap yield.
ON16	Boulder Reservoir Shared Operations	Increased constraints due to Boulder operations impacts ability to deliver water to southern allottees.	2	3	6	
ON17	Farr Pump Plant Outage	Pump station failure prevents moving water from Lake Granby to Grand Lake and Adams Tunnel.	1	5	5	
ON18	Adams Tunnel Outage	Tunnel failure prevents moving all C-BT/Windy Gap water to East Slope.	1	5	5	The Adams Tunnel is the only way for NCWCD to access their West Slope Supplies. However, it is well maintained and unlikely to experience and outage (other than planned). If an outage were to occur this would be catastrophic with no alternative.
ON19	Lake Granby Dam/Dike System Outage	Reduced capacity due to safety reduction or other outage issue limits ability to move water to Grand Lake and Adams Tunnel	1	5	5	
ON20	Windy Gap Plant Outage	Pump station failure prevents transfer of Windy Gap water into the C-BT system	1	4	4	
ON21	Power Arm and Dille Tunnel Failure (Concurrent)	Concurrent failure of both conveyance facilities would prevent delivering water to Horsetooth.	1	4	4	Would need to occur in combination to completely prevent delivering water to Horsetooth Reservoir.
ON22	Willow Creek Pump Plant Outage	Pump station failure prevents pumping C-BT water into Lake Granby and reduce system yield	1	3	3	

B.1 Legal and Administrative

The following table presents the legal and administrative risks and uncertainties identified by Northern and their associated scores and notes

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score	Notes
AN1	Environmental Regulations (changes, new, compliance)	New regulations or changes in federal permitting compliance may lead to more water used for environmental mitigation/flows.	3	4	12	Combination of Federal Permitting Compliance (NEPA, ESA Section 7, USACE 404) and New Endangered Species risks. Critical habitat for listed threatened/endangered species designated within watersheds. This could lead to additional water being unavailable to meet environmental flow needs--or for replacement infrastructure to be inaccessible.
AN2	Colorado River Hydrologic Uncertainty / Major Outage of C-BT Project	Possible changes in C-BT operations based on hydrologic uncertainties and a large C-BT Project outage	2	5	10	Combination of several possible conditions resulting in decreased deliveries from C-BT Project water to allottees. These scenarios are intended to assess the impact of outages of major C-BT delivery systems or reduced diversions caused by reduced flows in the Colorado River that are not dependent on currently unknown future hydrology or legal requirements.
AN3	Windy Gap renegotiation	When current 40-year contract limit expires, a renegotiated contract gives less yield (due to increased shrink for example)	5	2	10	
AN4	Federal law requires modification of Project Operations	Federal law requires changes in how the C-BT Project is operated (e.g. for endangered species, power), reducing C-BT/Windy Gap yield	2	4	8	

B.1 Demands

The following table presents the demand risks and uncertainties identified by Northern and their associated scores and additional notes.

ID	Risk or Uncertainty Name	Description	Likelihood Score	Impact Score	Composite Score	Notes
DN1	Longer Growing Season	Hotter, drier climate lengthens the growing season for agricultural and M&I allottees, increasing their demands and changing when they need C-BT/Windy Gap water	5	2	10	This is already occurring. Allottees not directly connected can only take water from April 1 - November 1. That's a policy that could be changed. May change how quotas are used and increase overall basin demand.
DN2	Changes in C-BT Users	Continued shift in C-BT ownership to M&I users, who would want quotas set differently than agricultural users.	5	1	5	M&I allottees emphasize use as a reliable water supply which would lead to increased carryover in system and desire for overall lower quota. Ag allottees emphasize higher use in drier years as a supplemental water supply as originally intended.
DN3	Uncertainty of Setting Quota	Change in ownership and Board membership changes the process by which quota is set. May be narrower range to satisfy M&I allottees.	3	1	3	May need to explore different quota policies since the nature and direction of changes is uncertain.
DN4	Increase in quota use	Quotas are not set as high, but as time goes on actual water use is closer to the quota amount.	4	1	4	This is already occurring.
DN5	Northern Water Management Program Changes	Changes to the Annual Carryover Storage program or Regional Pool program occur, making water management for M&I allottees less flexible.	3	1	3	Would only occur due to West Slope interests or Federal operations change. M&I allottees prefer more flexibility so any changes are likely to have minimal effect.

Appendix C WATER DEMAND FORECASTING TOOL TECHNICAL MEMORANDUM

City of Fort Collins Utilities
Water Vulnerability Study

Technical Memorandum

Demand Estimation Documentation

Date: March 8, 2019 (Revised May 13, 2019)

From: Zelalem Mekonnen, Jason Polly and Enrique Triana
RTI International

To: City of Fort Collins Utilities

1 Introduction

This technical memorandum documents the main aspects of the demand estimation tool developed as part of the Water Supply Vulnerability Study for the City of Fort Collins Utilities (FCU). The development of the demand estimation tool incorporates the variables and computation algorithm used in the demand model, which was developed by FCU staff with data provided by RTI. The demand model consists of individual linear regression models developed for the main water customer users, i.e., single family and duplex, multifamily, commercial small, commercial medium and commercial large. The models were developed with processed water use from 2001-2016, which corresponds to the set of available years with complete water user data. The underlying data for the tool is derived from spatial processing of GIS layers and groupings of the variables by areas and sectors matching the demand models.

2 Data Processing Summary

2.1 Raw Data Source

Raw water use data from 2001 to 2016 provided by FCU was processed spatially using GIS premise (customer) points overlaid with parcels, and linking it to features associated with both the parcels and the premises, for example, building characteristics, irrigated areas, service areas, water districts. The spatial process resulted in a GIS summary table—the "Master Table"—that is imported into the water use database and is used by the demand estimation tool.

2.2 Water Use Database

The water use data was compiled into a water use database for this project. The water use database is maintained on the FCU server and it was used for data processing and data storage, as well as to develop the demand estimation tool. Table 1 provides general information about the database. This database includes imports of the raw use data, imports of the GIS Master Table, and preferences and scenarios of the demand models.

Table 1 – Water Use Database Information

SQL SERVER	10.100.0.87\DEV16
DATABASE NAME	FCU_WaterUseProcessing

2.3 GIS Master Table

The Master Table combines the spatial characteristics related to water use and demand estimation variables at a parcel resolution. It was developed to support the demand estimation tool and provides improved flexibility in calculating the elements of the demand. This table is composed of rows that represent polygons with unique water use characteristics.

2.3.1 Master Table Development

The Master Table refers to a single table resulting from a series of spatial and tabular process steps. The process was designed to relate water demand information to City of Fort Collins parcels. The development of the Master Table was performed in a GIS environment as most data inputs were spatial in nature and were not available within a pre-existing relational database.

2.3.1.1 Background

To construct the Master Table, RTI acquired pre-existing GIS layers from the City of Fort Collins. A demand model GIS database was developed to store raw data and resulting outputs. A GIS model was developed to process the raw data and produce the processed Master Table with related information.

2.3.1.2 Data Inputs

Table 2 lists the raw data used as base GIS layers.

Table 2 – Input Raw GIS Layers

LAYER ID	LAYER DESCRIPTION
1	Buildings
2	City Limits
3	Fort Collins Service Area
4	Growth Management Area (GMA)
5	Hydro
6	Natural Areas
7	Parcels
8	Water Districts
9	Zoning
10	Future Land Use Zoning
11	Meters
12	Traffic Analysis Zones (NRFMPO TAZ)

2.3.1.3 Development Framework

The framework used for developing the Master Table involved ESRI ArcGIS desktop software version 10.5. Within the software, an ESRI geodatabase was designed and populated with the raw data inputs. Feature datasets were used to separate data by source and type. ModelBuilder was then used to develop geoprocessing steps needed to relate layers under specific environments.

2.3.1.4 Model Steps and Results

Within ModelBuilder, a series of geoprocessing steps was constructed as outlined in Table 3.

Table 3 – High-Level Overview of Processing Steps Used in the Model

STEP ORDER	DESCRIPTION
1	Join Zoning to Parcels
2	Select Parcels by GMA
3	Dissolve on Shape
4	Add Unique Parcel ID
5	Tabulate Building Area for Parcel
6	Tabulate Meter Count for Parcel
7	Join Density Assumption Min/Max Values
8	Join Meter Premise ID
9	Join Future Land Use
10	Join Water Body Area
11	Join NFRMPO TAZ Populations
12	Calculate Demand DU
13	Calculate Demand Population
14	Join Fort Collins SA
15	Join City Limits
16	Join GMA

The final output GIS layer contains related information based off each tabular and spatial step. The polygons represented in the Master Table and the Growth Management Area (GMA) boundary are shown in Figure 1. The final GIS layer attribute table, or Master Table, was imported into the water use database in the ***MasterTableGISExport*** table. The Master Table plays an important role in the demand estimation method providing information about current densities in planning zones for future predictions of water use in undeveloped areas. Also, the Master Table allows grouping of current use and estimated water use by planning zones and areas of the city, such as FCU service areas, city limits, and GMA. Some of the main assumptions in the Master Table data and processing are:

- The planning zones are taken from the current data and areas without current planning zone classification are assigned with the future planning zone estimate.
- The GIS layers are current and complete.

The attribute table was then exported to be used within the demand analysis.

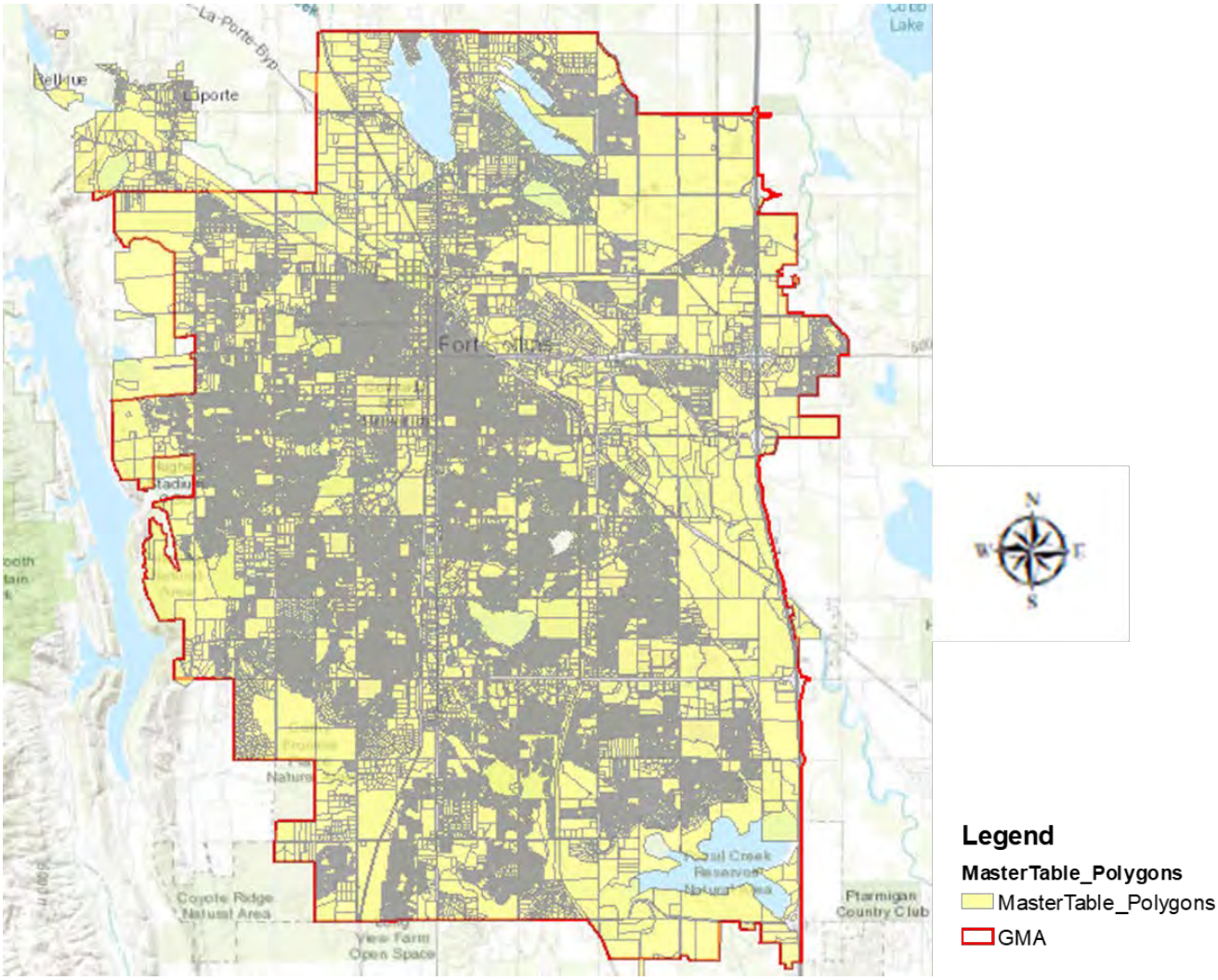

Figure 1 - Master Table Polygon Extent

Table 4 lists the fields and the different sources for each polygon in the Master Table.[1] Although not all the fields included in the current Master Table are used in the demand estimation model, the information in the table was left there for future reference and analyses.

[1] Polygons in the Master Table refer to parcel polygons from the city and county, identified by a unique parcel number.

Table 4 – Master Table Fields

FIELD	SOURCE	UNITS (if applicable)	DESCRIPTION
ZONE	City Current and Future Zoning	Zone Type	Spatial join of zone layers to parcel (current method for this field, only uses the current city zoning layer) values are null for nonzoned locations. Null values are filled with future zones from the Planning Department.
PARCEL_ID	Unique Parcel ID (RTI)	ID	RTI calculates a unique parcel ID for general tracking.
AREA	City Building	Sq ft	Area of building (footprint) within parcel using City building layer.
PERCENTAGE	Building Percentage	Percentage	Percentage of parcel covered by building (footprint).
PNT_COUNT	Count of premises, per parcel	Count	Tabular summary of premises within a parcel. Note, parcels with no premise are set to 1.
ZONE_DISTR	Source 2017 re-development worksheet		A residual field from the planning density table (used for join on zone type), not of use.
VACANT_AC	Source 2017 re-development worksheet		A residual field from the planning density table (used for join on zone type), not of use.
REDEV_ACRE	Source 2017 re-development worksheet		A residual field from the planning density table (used for join on zone type), not of use.
RES_LUM	Source 2017 re-development worksheet		Residential Land Use Mix – represents the percent of area in the zone that is residential. This parameter is used in the calculation of DEMAND_DU in the Master Table.
NONRES_LUM	Source 2017 re-development worksheet		A residual field from the planning density table (used for join on zone type), not of use.
AVG_DEN_DU	Source 2017 re-development worksheet		A field from the planning density table (used for join on zone type). Provides density values per zone.
AVG_DEN__F	Source 2017 re-development worksheet		A residual field from the planning density table (used for join on zone type), not of use.
DWEL_UNIT_	Source 2017 re-development worksheet		A residual field from the planning density table (used for join on zone type), not of use.
DWEL_UNIT1	Source 2017 re-development worksheet		A residual field from the planning density table (used for join on zone type), not of use.
NONCAP	Source 2017 re-development worksheet		A residual field from the planning density table (used for join on zone type), not of use.
NONCAP_SQ_	Source 2017 re-development worksheet		A residual field from the planning density table (used for join on zone type), not of use.
SDP	Premise (Meters) GIS layer		Spatial join (Premise-Parcel) using City (Meter/Premise) layer.
PREMISE	Premise (Meters) GIS layer	ID	Spatial join (Premise-Parcel) using City (Meter/Premise) layer.
SERVICETYP	Premise (Meters) GIS layer		Spatial join (Premise-Parcel) using City (Meter/Premise) layer.
SERVICECOD	Premise (Meters) GIS layer		Spatial join (Premise-Parcel) using City (Meter/Premise) layer.

FIELD	SOURCE	UNITS (if applicable)	DESCRIPTION
ADDRESS	Premise (Meters) GIS layer		Spatial join (Premise-Parcel) using City (Meter/Premise) layer.
CUSTOMERCO	Premise (Meters) GIS layer		Spatial join (Premise-Parcel) using City (Meter/Premise) layer.
STATUS	Premise (Meters) GIS layer		Spatial join (Premise-Parcel) using City (Meter/Premise) layer.
GMA	City GMA Layer		Spatial join (GMA-Parcel) (Null if outside) using City GMA layer.
SERVICEARE[2]	City Service Layer		Spatial join (Service Area-Parcel) (Null if outside) uses City Service Layer).
CLIMITS	City Limits Layer		Spatial join (City Limits-Parcel) (Null if outside) uses City Limits Layer.
PARCEL_ACR		acres	GIS area calculation (Parcel).
DEMAND_DU	Dwelling Unit Calculation		Used for checking the number of dwelling units for demand calculation ([Acres] * [Res_LUM]) * [Avg_Den_du_a].
DEMAND_POP	Population Calculation	Count	(([Acres] * [Res_LUM]) * [Avg_Den_du_a] * 2.37) / [PNT_COUNT].
HYDRO	Water Bodies GIS Layer		Spatial join, identifies parcels with a water body.
F_LU	City Future Zoning GIS Layer	Zone Type	Spatial join on future layers to parcel (Current method for this field, only uses the future zoning layer).
EMPDEN_12	NFRMPO_TAZ_12to40		Employment density (Assumed SqMi).
EMPDEN_15	NFRMPO_TAZ_12to40		Employment density (Assumed SqMi).
EMPDEN_20	NFRMPO_TAZ_12to40		Employment density (Assumed SqMi).
EMPDEN_25	NFRMPO_TAZ_12to40		Employment density (Assumed SqMi).
EMPDEN_30	NFRMPO_TAZ_12to40		Employment density (Assumed SqMi).
EMPDEN_35	NFRMPO_TAZ_12to40		Employment density (Assumed SqMi).
EMPDEN_40	NFRMPO_TAZ_12to40		Employment density (Assumed SqMi).
IRR_ACRES	WV2 imagery and LiDAR data	acres	Outdoor irrigation classification.

2.4 Water Use Processing

2.4.1 Water Use Process

The customer water use data used for the Vulnerability Study was provided by FCU, and initially processed by a group at Colorado State University (CSU) as part of a parallel effort. The residential single-family, multi-family, and commercial datasets for the FCU service area were provided in three different batches and imported into the ***RawWaterUseResidential***, ***RawWaterUseMultiFam***, and

[2] This attribute in the current Master Table was generated from the original service area map and was not updated with a revised service area provided in 2018. This attribute is used to group the parcels by utility service area and will need to be updated in the future with revised service area map.

RawWaterUseCommercial tables of the database. The modeling management system includes a processing algorithm with a user interface (Figure 2).

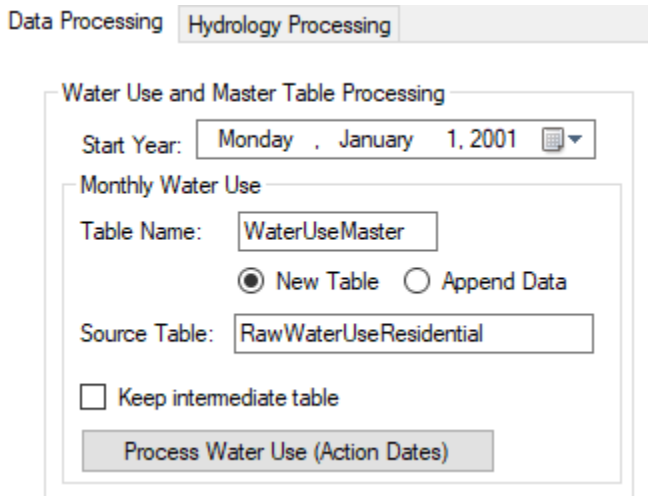

Figure 2 – Water Use Processing Algorithm User Interface

Each entry of the raw water use data includes an action date and days of service (DOS). Missing action dates were filled using the CSU-processed dataset. The water use meter readings for a customer, or premise, are typically around a month apart. However, in some cases, the reading includes multiple months in the DOS. RTI developed an algorithm to process the water use data to generate an approximation of the monthly water use per premise. The algorithm was implemented using SQL queries and VB.NET code. The main steps of the water use processing algorithm are:

1) For each record of water use in the imported data, the '***previous date'*** is calculated as the action date minus the DOS.

2) Average water use per day is computed by dividing the consumption in gallons (i.e., **Consumption** field in the raw data table) by the DOS.

3) The number of days in the action month (i.e., the number of days from the beginning of the month to the action date), is multiplied by the average water use per day found in step 2 to calculate the partial water use in the action month.

4) Water use from the previous month or months to the action month, included in the DOS, are computed based on the average daily consumption calculated in step 2 and the number of days from the 'previous date' to the end of the month, or months if more than one is included in the DOS.

5) The monthly water use is estimated by aggregating the water use estimates for each portion of the month between readings.

The results of the water use data processing are stored in the water use database in the ***WaterUseMaster*** table. Some multifamily complexes are coded as single commercial users in the water use dataset; therefore, the processing of the water use data included recoding the rate code of multi-family premises that have a rate code as commercial in the raw water use dataset. The list of commercial premises that were converted to multifamily rate code (i.e., W260) for the demand

calculation are included in Appendix 1. This change was performed in the ***WaterUseMaster*** table. The list of premises was compiled and provided by FCU and includes information about the type of use (e.g., irrigation, club, indoors). Note that the revenue from the raw water use data is also processed into the ***WaterUseMaster*** table, summarized by month.

2.4.2 Commercial Customer Groups

The size of the taps associated with the rate code were used to group the commercial water use as Commercial Small (CM_Sm), Commercial Medium (CM_Md), or Commercial Large (CM_Lg). Table 5 shows the rate codes for commercial taps with the corresponding group.

Table 5 – Rate Code Groups for Commercial Premises

UTVSRAT_CODE	UTVSRAT_DESC	COMMERCIAL GROUP
W524	Commercial 3"	CM_Lg
W525	Commercial 4"	CM_Lg
W528[3]	Commercial 10"	CM_Lg
W534	Commercial 3" Outside	CM_Lg
W535	Commercial 4" Outside	CM_Lg
W544	Commercial 3"-Compound	CM_Lg
W545	Commercial 4"-Compound	CM_Lg
W554	Commercial 3" Outside-Compound	CM_Lg
W555	Commercial 4" Outside-Compound	CM_Lg
W624	City FC account 3"	CM_Lg
W625	City FC account 4"	CM_Lg
W644	City FC account 3" Compound	CM_Lg
W645	City FC account 4" Compound	CM_Lg
W626	City FC account 6"	CM_Lg68
W627	City FC account 8"	CM_Lg68
W556	Commercial 6" Outside-Compound	CM_Lg68
W557	Commercial 8" Outside-Compound	CM_Lg68
W546	Commercial 6"-Compound	CM_Lg68
W547	Commercial 8"-Compound	CM_Lg68
W536	Commercial 6" Outside	CM_Lg68
W537	Commercial 8" Outside	CM_Lg68
W526	Commercial 6"	CM_Lg68
W527	Commercial 8"	CM_Lg68
W522	Commercial 1 1/2"	CM_Md
W523	Commercial 2"	CM_Md
W532	Commercial 1 1/2" Outside	CM_Md
W533	Commercial 2" Outside	CM_Md
W542	Commercial 1 1/2"-Compound	CM_Md
W543	Commercial 2"-Compound	CM_Md
W552	Commercial 1 1/2" Outside-Compound	CM_Md
W553	Commercial 2" Outside-Compound	CM_Md
W622	City FC account 1 1/2"	CM_Md

[3] This rate code included in the CM_Lg was not included in the analysis because there are no water use records with this rate code.

UTVSRAT_CODE	UTVSRAT_DESC	COMMERCIAL GROUP
W623	City FC account 2"	CM_Md
W633	City FC account 2" outside	CM_Md
W640	City FC account 3/4" Compound	CM_Sm
W550	Commercial 3/4" Outside-Compound	CM_Sm
W551	Commercial 1" Outside-Compound	CM_Sm
W620	City FC account 3/4"	CM_Sm
W621	City FC account 1"	CM_Sm
W630	City FC account 3/4" outside	CM_Sm
W530	Commercial 3/4" Outside	CM_Sm
W531	Commercial 1" Outside	CM_Sm
W540	Commercial 3/4"-Compound	CM_Sm
W541	Commercial 1"-Compound	CM_Sm
W520	Commercial 3/4"	CM_Sm
W521	Commercial 1"	CM_Sm

3 Demand Estimation Approach

This section describes the main elements for estimating future water demand for the Vulnerability Study. This section is organized following the sections of the graphical user interface (GUI) for the demand estimation tool. Figure 3 shows the GUI of the demand estimation tool.

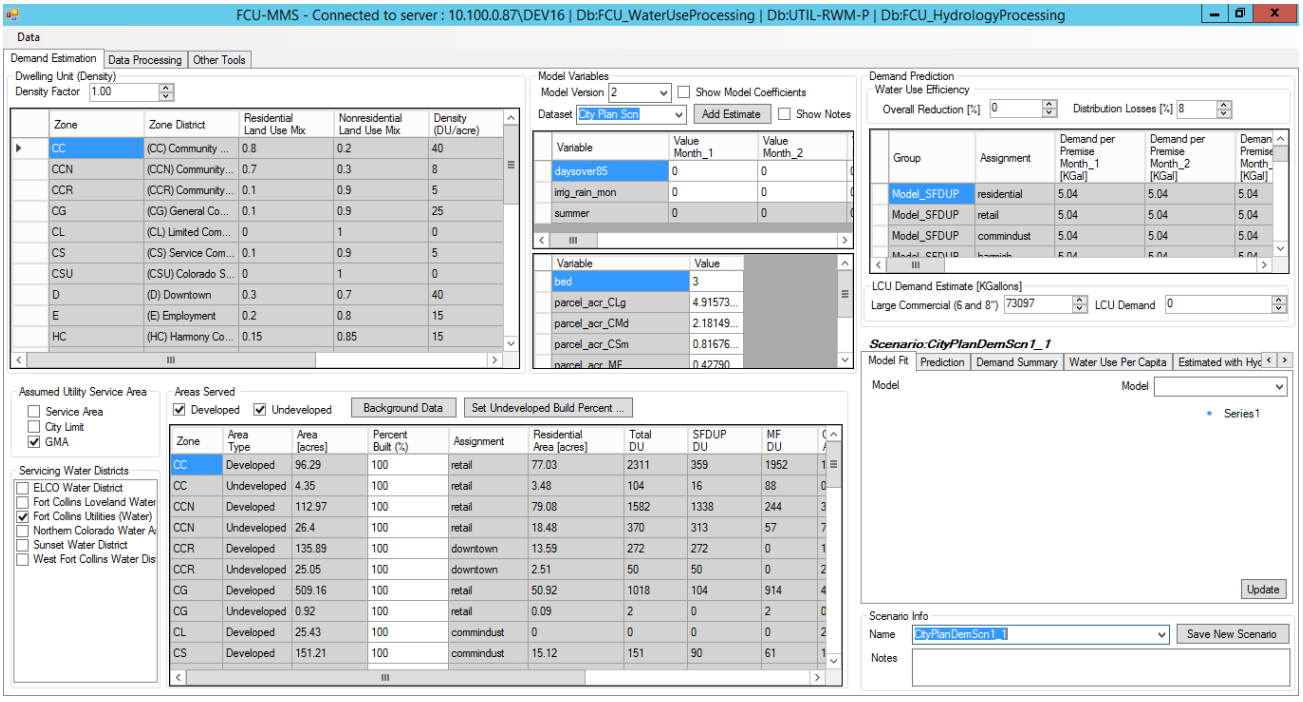

Figure 3 – Main Window of the GUI for the Demand Estimation Tool

In this section, this icon identifies user inputs and knobs implemented for the demand estimation.

The GUI displays read-only fields with gray background and fields with white background are user inputs that are saved as part of the demand scenarios.

3.1 Demand Models

Monthly demand models were developed by FCU using the processed water use data and customer groupings described in Section 2. A set of five models were developed to predict the average water use per premise per month, one model for each of the five water user types. The models estimate water use for single-family and duplex (***SFDUP***) customers, multi-family (***MULTIFAMILY***) customers, commercial small (***CM_SMALL***) customers, commercial medium (***CM_MED***) customers, and commercial large (***CM_LARGE***) customers. The models were developed using multi-regression linear equations and the independent variables were selected based on the expected influence on the water demand and the statistical significance in the regression equation. Table 6 lists the independent variables used in the demand models and provides a brief description of each variable.

Table 6 – List and Description of Variables Used in the Demand Models

VARIABLE NAME	DESCRIPTION
(INTERCEPT)	Equation constant
BED	Number of bedrooms
COMMINDUST	Equals 1 if primarily an industrial or commercial zone
DAYSOVER85	Numbers of days in the month with the max temp over 85
DOWNTOWN	Equals 1 if primarily a downtown zone
HARMISH	Equals 1 if primarily a harmony corridor or employment zone
IRRIG_RAIN_MON	Total rain in the month, only for May through September, equals zero for the other months
PARCEL_ACR_CLG	Parcel size, acres for large commercial
PARCEL_ACR_CMD	Parcel size, acres for medium commercial
PARCEL_ACR_CSM	Parcel size, acres for small commercial
PARCEL_ACR_MF	Parcel size, acres for multi-family parcels
PARCEL_ACR_SMDUP	Parcel size, acres for single family and duplex parcels
RESIDENTIAL	Equals 1 if primarily a residential zone
RETAIL	Equals 1 if primarily a retail zone
SUMMER	Equals 1 if May through Sept
UNEMPRATE	Unemployment rate (monthly)
UNITS	Numbers of units

Table 7 shows a matrix of coefficients for each model and associated independent variable. The cells without a coefficient indicate that the variable is not being used in the corresponding equation.

Table 7 – Multi-Regression Coefficients for Each Variable for Each Demand Model

VARIABLE NAME	MODEL_SFDUP	MODEL_MULTIFAMILY	MODEL_CM_SMALL	MODEL_CM_MED	MODEL_CM_LARGE
(INTERCEPT)	3.339288	-2.48736	-4.55557	16.8763	494.2393
BED	0.649969	--	--	--	--
COMMINDUST	--	--	17.53072	18.07031	0
DAYSOVER85	0.27546	0.314547	0.510495	2.750474	12.36749
DOWNTOWN	--	--	14.10856	7.944732	-477.687
HARMISH	--	--	24.15817	62.20441	-148.861
IRRIG_RAIN_MON	-0.59813	-0.75359	-1.12143	-6.04083	-24.7921
PARCEL_ACR_CLG	--	--	--	--	2.546953
PARCEL_ACR_CMD	--	--	--	5.583365	--
PARCEL_ACR_CSM	--	--	3.819985	--	--
PARCEL_ACR_MF	--	16.72416	--	--	--
PARCEL_ACR_SMDUP	0.168519	--	--	--	--
RESIDENTIAL	--	--	26.85123	60.74893	-189.977
RETAIL	--	--	25.25629	44.90526	-254.067
SUMMER	5.332035	11.26788	15.46997	66.94185	185.1742
UNEMPRATE	-0.05027	0.023827	-0.48881	-1.50572	-8.93112
UNITS	--	2.925005	--	--	--

3.2 Future Premises Estimation

The approach uses the density of dwelling units per acre per planning zone as the basis to estimate the number of premises by zone.

3.2.1 Dwelling Units Density

3.2.1.1 Dwelling Units per Zone

The densities provided by the Fort Collins Planning Department include assumptions on the city's projected infill and vertical growth per zone. Therefore, by using these densities, the user is considering a future growth characteristic.

The Planning Department also provides a residential and non-residential percentage for each zone. The estimation of dwelling units (DUs) is based on the estimated area per zone and the '***Residential Land Use Mix***' value provided by the Planning Department. Premises are associated with water user accounts. Single family residential units are usually associated with a single premise, duplex units could have multiple premises but for this analysis those are assumed to have a single premise. Typically, multifamily complexes have multiple DUs and fewer number of associated premises, with some premises (accounts) used for club houses and pools.

Density Factor The user can use the ***Density Factor*** to evenly reduce or increase all the densities simultaneously to simulate sensitivities around the base future density conditions for the demand estimation. A ***Density Factor*** of 1 is equivalent to the future densities provided by the Planning Department. This factor is applied to the base densities to create the '***Active Density***' value for each zone, which is used in the demand estimation.

Active Density This variable allows the user to set the density for each planning zone to be used in the calculation of DUs. These values are affected by the ***Density Factor***; however, these results can be overwritten by user inputs. Note that user values will be overwritten if the Density Factor is changed.

The density (i.e., DUs per acre) and the residential area, determined by the residential and non-residential percentages provided by the Planning Department, are used to calculate the number of DUs per zone ('***Total DU***').

3.2.1.2 Multi-Family Percentage

The multi-family (MF) percentage of the residential DUs ('***MF Percent***') is calculated from the Master Table, using the planning zones and rate codes for residential groups. This calculation is performed for the polygons that are flagged as built, which are premises where the ***Buildable*** field is NULL or 0. Table 8 shows the rate codes used for the single-family/duplex (SF_DU) group and the MF group.

Table 8 – Rate Code and Groups for Residential Premises

RATE CODE	DESCRIPTION	GROUP
W220	Single-family metered	SF_DU
W221	Single-family flat rate	SF_DU
W230	Single-family metered outside	SF_DU
W240	Duplex metered	SF_DU
W241	Duplex flat	SF_DU
W250	Duplex metered outside	SF_DU
W260	Multi-family metered	MF
W262	Master meter	MF
W270	Multi-family metered outside	MF
W272	Master meter outside	MF
W280	Multi-family metered-compound	MF

The number of DUs for multi-family premises is calculated using a representative number of units (DWs) per premise, which is seven units per premise, base on the average of units per multifamily account calculated from the water use data. This average is used in the demand model to estimate the number of premises for the number of multifamily DUs in each zone. For each planning zone, the ***MF Percent*** is computed as the percentage of DUs (i.e., number of premises times the average number of DUs per premise) in each zone with MF rate codes divided by the total number of residential DUs in the zone, calculated as the number of single-family DUs plus the number of multi-family DUs.

3.2.2 Assumed Utility Service Area

There are three service area options available in the demand estimation tool,: (1) FCU service area, (2) city limit, and (3) GMA. These options are used to filter the parcels that are included in the calculation of the served areas for estimating DUs. The groups are defined in the Master Table (see Section 2) and are used to estimate the areas for each planning zone.

The water districts that serve the City and the GMA ('***Servicing Water Districts***') are listed under this option and can be used to further filter the parcels to be included in the demand estimation. Figure 4 shows the spatial extent of the FCU service area, the city limit, the GMA, and the water districts

that supply water within the GMA. Of note, the FCU Service Area attribute in the current Master Table was generated from the original service area map and was not updated with a revised service area provided in 2018 (Fort Collins Utilities Water). This attribute is used to group the parcels by utility service area and will need to be updated in the future with revised service area map.

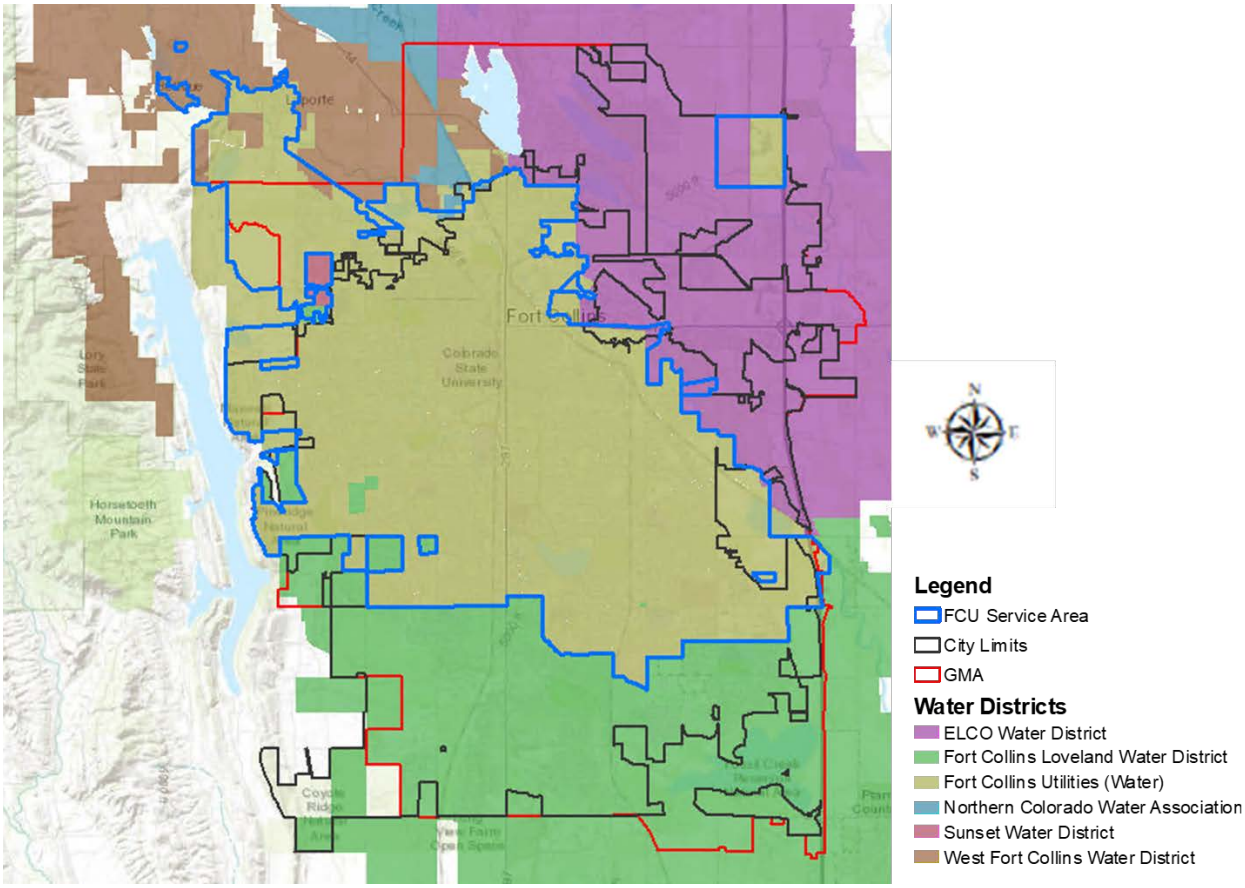

Figure 4 – Spatial Extent of the Service Area, the City Limit, the GMA, and the Water Districts

3.2.3 Areas Served

The Areas Served section includes a breakdown of areas and premises per planning zone and area type, which indicate if the area is currently developed or undeveloped. The areas displayed in this table include the parcels that correspond to the filters in the assumed utility service areas and the water districts served.

The ***Undeveloped*** area type corresponds to the polygons flagged as buildable lands in the Master Table, which are based on the buildable land map from the Planning Department. Figure 5 shows the general location of the buildable areas in the GMA. The ***Developed*** areas are assumed to be the polygons that are not in the buildable areas.

Percent Built

The '***Percent Built***' represents the percentage of the area per zone and area type that is considered for the demand calculations. This parameter is set by the user and allows simulating scenarios prior to build-out conditions, assuming only a fraction of the area selected is served at that time.

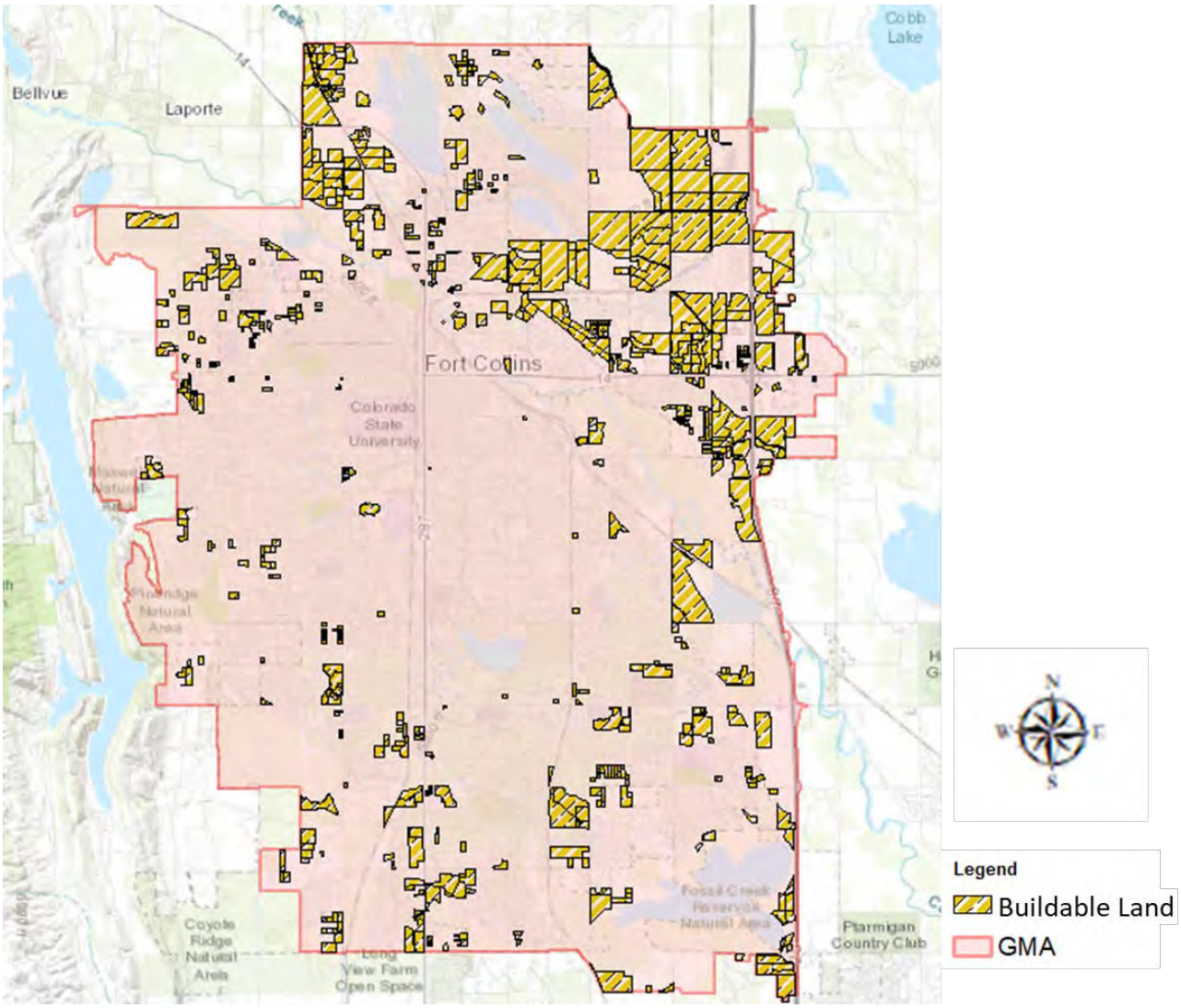

Figure 5 – Parcels Flagged as Buildable in the GMA

The served areas are computed from the Master Table using all the polygons in each zone and grouping them as developed or undeveloped. This calculation includes the spatial filters for water districts and utility service areas, as well as the Percent Built factor. The undeveloped area ('***Area [Acres]***') is computed based on the parcels identified in the buildable layer and the developed areas ('***Area [Acres]***') are calculated from the Master Table for the remaining polygons in the parcel layer in each zone and area type.

The '**Assignment**' is a grouping of the commercial users created to improve the prediction of the demand per premise by the commercial customer models. Each planning zone is put into one Assignment group. Table 9 shows the Assignment corresponding for each planning zone included in the model.

Table 9 – Assignment Group for Planning Zones

ZONE	ZONE_DISTR	ASSIGNMENT
CC	Community Commercial	retail
CCN	Community Commercial - North College	retail
CCR	Community Commercial - Poudre River	downtown
CG	General Commercial	retail
CL	Limited Commercial	commindust
CS	Service Commercial	commindust
D	Downtown	downtown
E	Employment	harmish
HC	Harmony Corridor	harmish
HMN	High Density Mixed-Use Neighborhood	residential
I	Industrial	commindust
LMN	Low Density Mixed-Use Neighborhood	residential
MMN	Medium Density Mixed-Use Neighborhood	residential
NC	Neighborhood Commercial	retail
NCB	Neighborhood Conservation Buffer	downtown
NCL	Neighborhood Conservation Low Density	residential
NCM	Neighborhood Conservation Medium Density	residential
POL	Public Open Lands	nocomm
RC	River Conservation	nocomm
RDR	River Downtown Redevelopment	downtown
RF	Residential Foothills	nocomm
RL	Low Density Residential	residential
RUL	Rural Lands	nocomm
T	Transition	nocomm
UE	Urban Estate	nocomm

3.2.4 Premises per Group

3.2.4.1 Served Area

The demand estimation tool uses the assumed served area to estimate the number of premises and consequently the water demand.

3.2.4.2 Residential Premises

Single-family houses and duplexes are assumed to have a single unit per premise. As is the case with all the regression models, the multi-family water use model predicts water use per premise. Therefore, the number of multi-family units per zone is used to estimate the number of multi-family premises, using the average number of multi-family units per premise for the dataset, which is 7.

3.2.4.3 Commercial Premises

The served area is used to calculate the number of commercial premises, multiplying a calculated density factor, from observed data, by the commercial premises per acre. The current area served per zone is computed from the Master Table using the sum of the parcel polygon areas that have an assigned premise number (i.e., indicating water use in the parcel).[4]

The commercial premises were grouped into small (CM_Sm), medium (CM_Md), and large (CM_Lg and CM_Lg68) taps. Table 5 (Section 2.4.2) shows the rate codes assigned to each commercial group. The number of small, medium, and large commercial premises in each zone is based on the current density of commercial premises for each zone based on the water use data. The current density of commercial premises is computed by dividing the number of commercial premises in each zone by the current area served. The current density of commercial premises per area in each zone is used to estimate the number of commercial premises for each commercial group for each zone, using the total area assumed served in each zone ('***Area [acres]***'), including the user input for ***Percent Built*** for each zone/area type. Using the total area in each zone is consistent with the commercial density values, which are computed based on the total area rather than the commercial area in the zone. The results of this calculation are the number of premises assumed for each zone/area type combination in columns ***Commercial SM Premises***, ***Commercial MD Premises***, and ***Commercial LG Premises***, respectively for each commercial group.

3.3 Annual Demand Estimation per Premise

The annual demand estimate is calculated using the values inputted for the ***Model Variables***. The demand estimation tool stores the coefficients for the regression models in the database. Each model version is identified with a number and is loaded to the GUI when the tool is initialized into the ***Model Version*** box. The model version used for the Vulnerability Study is 2 and was developed by FCU.

Dataset These are groups of input variables stored in the database for each model version. The available datasets are loaded into the GUI when a model version is selected. New can be added to the database by altering the variables of interest, further described below, renaming the dataset in the Dataset box and selecting the **'Add Estimate'** button.

Monthly Values The demand estimation tool requires the user to specify monthly values for the weather variables (***'daysover85'*** and ***'irrig_rain_mon'***). The summer flag (***'summer'***) is a binary variable used to identify the summer months for the demand models. The variable ***daysover85*** corresponds to the number of days with maximum temperate above 85˚F. The variable ***irrig_rain_mon*** corresponds to the total rainfall in the month in inches.

Annual Values These variables are constant for each month calculation, so single values are provided by the user. These variables include the average number of bedrooms per premise (***bed***)[5], the average parcel acreage for each group

[4] For this document, developed polygons are defined as those that are not flagged as buildable from the Planning Department layer; however, not all the developed polygons have a premise, or water use, associated with them, so the area served only contains the parcels with an associated premise.

[5] Data from the County Assessors Data provided by FCU.

(***parcel_acr_CLg, parcel_acr_CMd, parcel_acr_CSm, parcel_acr_MF and parcel_acr_SMDUP***), the unemployment rate (***unemprate***)[6], and average number of units per premise (***units***). A description of each variable is available in the GUI by selecting the ***Show Model Coefficients*** option.

Each model version includes a set of five regression models that independently predict the water use per premise in each customer group ('***Group***') (i.e., single-family/duplex, multi-family, commercial small, commercial medium, and commercial large). Water use in each ***Group*** is calculated for each ***Assignment***, using the monthly, annual, and assignment flag variables. The total water use for each Group/Assignment combination is calculated by summing the premises calculated in the planning zones for each assignment. The calculation of water use per premise for all the groups is affected by a reduction factor, which could be used to represent conservation program effects or general reduction of water consumption not captured by the model independent variables.

Overall Reduction [%]	This is a factor applied to the water use per premise to all the groups simultaneously.

In some specific cases, the simulated water use per premise is truncated to a minimum value to simulate the winter water use when numerically the model regression produces unrealistic low numbers. The two minimum indoor water uses implemented in the demand estimation algorithm are for the commercial small with non-commercial ***Assignment*** and for commercial large with downtown ***Assignment***, which are 3.481 thousand gallons and 40.391 thousand gallons, respectively. These values correspond to the median of the observed water use for those groups and assignments.

3.3.1 Additional Utility Demands

Demands that are not predicted by the five regression models are added as single values by the user.

Large Commercial (6&8")	This user-defined variable represents the total annual demand in thousand gallons of large taps of 6" and 8" not otherwise captured by the LCU Demand.
LCU Demand	This variable represents the annual total demand from Large Commercial User (LCU) contracts in thousand gallons.

These additional demands are assumed to be evenly distributed throughout the year, consistent with the way they have been modeled in previous studies.

3.3.2 Utility Demand Estimation

The annual utility demand is computed by adding the individual demand estimated for each Group/Assignment combination plus the large commercial (6&8") taps and the LCU additional demands. The demand at the water treatment plant is estimated assuming a distribution system losses factor. A typical value for this factor is 8 percent, which is an estimate used in previous

[6] Data from the United States Labor Department (https://data.bls.gov/timeseries/LAUMT082266000000005?amp%253bdata_tool=XGtable&output_view=data&include_graphs=true)

analysis to account for losses from the river to the treatment plant, losses in the treatment process and the distribution losses.

Distribution Losses [%] This factor is assigned by the user and applied to the utility demand to account for distribution and treatment system losses. It provides an estimate the raw water demand at the point of diversion.

3.4 Demand Scenarios

The demand scenarios to be used in the FCU modeling system can be created in the demand estimation tool. A demand scenario includes all the user variables needed to generate the annual demand estimate. The user-defined variables are stored in the ***WaterUseProcessing*** database in the ***DEMScenVars*** table and the scenario preferences are stored in the ***DEMScenarios*** table. The user can save and retrieve demand scenarios using the ***Scenarios Info Name*** box. To select an existing demand scenario, the user can simply select from the available dropdown list. To create a new demand scenario, the user needs to change the variables of interest (all white cells can be altered by the user), input a new demand scenario name in the Scenario Info Name box and select the Save New Scenario button.

3.5 Demand Timeseries for MODSIM

Monthly demand time series for input to the FCU system MODSIM model in the FCU modeling system can be created in the demand estimation tool for the scenarios stored in the database. A demand scenario includes all the user variables described above. A set of these variables is combined with monthly weather variables to generate monthly time series of demand. The weather variables are associated with hydrology ensembles, allowing the simulated hydrology to be synchronized with the demand time series. The weather variables in the demand scenario are populated with a time series of weather variables to generate the sequence of monthly demand values for each hydrology set. The current version of the demand estimation tool generates a set of 86 years of monthly demands, compatible with the Vulnerability Study model simulation period.

3.5.1 Weather Variables

Time series of precipitation and temperature are required to compute the weather-related demand model variables. The hydrology sets developed for the Vulnerability Study capture future variability and climate change, resulting in an ensemble of traces, based on paleo reconstruction of wet and dry periods.[7] Each trace consists of a sequence of possible climate occurrences based on historical monthly precipitation and temperature data that is re-sequenced based on the paleo reconstructed statistics, and then altered to simulate climate change.

The historical daily precipitation and temperature records for the CSU gage, provided by FCU, were used to create the weather time series for the demand estimation tool, using the same sequences used for each hydrology dataset developed for the Vulnerability Study[7]. The variables for the demand models calculated from the daily weather variables are the total precipitation in the month and the maximum daily air temperature in the month. The weather time series for the hydrology datasets were processed and stored in the '***FCU_HydrologyProcessing***' database. The precipitation time series for all the hydrology traces are stored in the '***precip_TS_AllTraces***' table, and

[7] RTI International, 2018. *Future Hydrologic Analysis Technical Memorandum*, Fort Collins, October.

the maximum temperature time series for all the hydrologic traces are stored in the '***temp_TS_AllTraces***' table.[8]

3.5.2 MODSIM Demand Catalog

The demand estimation tool allows processing and adding FCU System MODSIM demand time series to the database for each demand scenario and hydrology trace, to be used by the Modeling Management System (MMS). These time series should be created/cataloged in the database before running the model with the MMS. The demand estimation tool can display the time series in the GUI or import them into the modeling system database. The time series for MODSIM are created in the '***UTIL-RWM-P***' database in the table '***DEMTimeseries.***' This operation is achieved in the '***Estimated with Hydrology***' tab by:

- Selecting '***All Hydrologies***' radial button in the GUI Hydrology section
- Checking the '**Add TS to DB**' option
- Clicking '**Calculate TS.**'

3.5.3 MODSIM Demand

The demand estimation tool creates demand time series for the "Citydem" MODSIM node. This demand time series is created using the same method used in the GUI for a single year, in other words, the "Citydem" time series includes the base demand calculated with the regression equations and the specified conservation reduction factor, the large commercial users with 6" and 8" taps demand and the distribution loss factor applied to the sum of the base demand and the large commercial. The corresponding demand time series for each model run is imported into the '***CityDem***' node at run time, based on the specified demand scenario and hydrology trace. Figure 6 shows a sample of the monthly demand time series generated by the demand estimation tool for a few years, for two ensembles for the base climate scenario (CC Scen ID = 1).

[8] A default ID of '3246' was used for the processed weather variables.

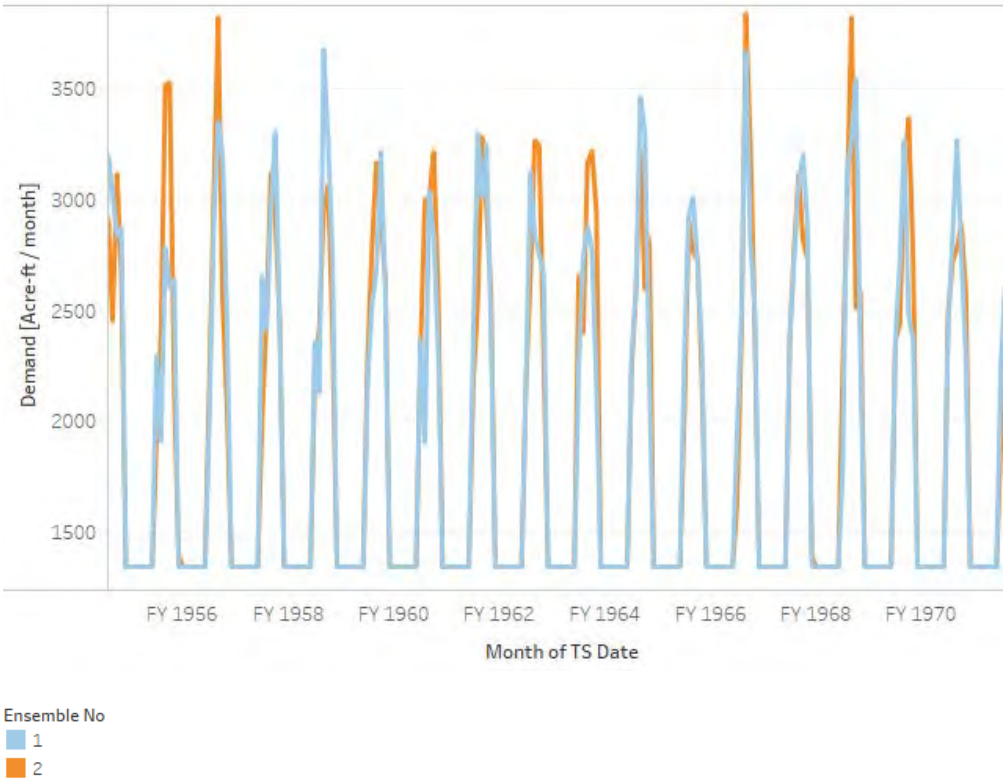

Figure 6 – Example of Monthly Time Series Generated by the Demand Estimation Tool

Appendix 1

Table 10 – Commercial Premises Converted to Multifamily Rate Code the Demand Estimation.

PREM_CODE	ORIGINAL SRAT_CODE	IRRIGATION_ONLY_METER_
63395	W544	No
80626	W544	No
86850	W544	No
88667	W544	No
12035	W522	Club
13105	W522	Yes
15704	W522	Yes
19970	W522	Yes
20315	W523	Club
20317	W523	Yes
21696	W522	Yes
21713	W522	Yes
22707	W523	No
22962	W522	Yes
22973	W522	Yes
24196	W522	Yes
24784	W522	Rec
24784	W532	Rec
24888	W522	Yes
26712	W522	Yes
29965	W522	Rec

PREM_CODE	ORIGINAL SRAT_CODE	IRRIGATION_ONLY_METER_
30844	W522	Yes
30845	W522	Yes
30846	W522	Yes
32185	W522	Yes
33374	W523	Yes
35161	W523	Yes
35788	W523	Yes
35789	W523	Yes
35792	W523	Yes
39031	W523	Yes
40117	W523	Rec
40146	W523	Yes
40147	W523	Yes
41684	W522	Club
42937	W523	Yes
43786	W522	Yes
43787	W522	Yes
45185	W523	Yes
45875	W522	Yes
50067	W522	Yes
51630	W522	Club
51756	W522	Yes
51797	W522	Yes
51875	W522	Yes
51914	W522	Yes
52064	W523	Yes
52069	W523	No
54452	W522	No
54453	W522	No
54867	W522	Yes
55465	W522	Yes
55861	W523	Yes
57060	W523	Yes
57345	W523	Yes
57876	W522	Yes
59135	W522	Yes
62694	W522	No
62979	W522	Yes
63731	W522	Yes
66540	W522	Club
66624	W523	Yes
66747	W522	Yes
67123	W522	Yes
67124	W522	Yes
68796	W522	Yes
71068	W522	Club
71175	W522	Yes
71207	W522	Yes
72246	W523	Yes
73577	W523	Yes
73957	W522	Yes
74159	W522	Yes
74463	W522	Yes
75506	W523	Yes
75952	W522	Club
75954	W523	Yes
75955	W523	Yes
79444	W522	Yes
79967	W522	Yes
84045	W522	Yes

PREM_CODE	ORIGINAL SRAT_CODE	IRRIGATION_ONLY_METER_
84156	W523	Yes
84157	W523	Yes
85306	W522	Yes
87497	W522	Club
88578	W522	No
88590	W522	No
88607	W522	No
88803	W522	No
89602	W522	No
89628	W522	No
89629	W522	No
89630	W522	No
89636	W522	No
89637	W522	No
89871	W522	No
90953	W522	No
12738	W521	Rec
15406	W521	Yes
15705	W520	Club
19672	W520	No
20010	W521	Yes
20386	W520	Club
21033	W521	Yes
21177	W521	Yes
21945	W520	Yes
22043	W520	Club
23892	W521	Club
24785	W521	Yes
24785	W531	Yes
25949	W520	Club
26760	W520	Club
30350	W521	Yes
30873	W521	Yes
31486	W521	Yes
33373	W521	Rec
35783	W521	Rec
37789	W520	Club
38133	W520	Pool
38926	W520	Pool
42131	W521	Yes
42287	W521	Yes
42288	W521	Yes
43539	W520	Club
43980	W520	Club
45872	W520	Club
46525	W521	Yes
48475	W521	No
50336	W520	Club
52347	W521	Yes
54249	W520	No
54250	W520	No
55582	W521	Yes
55610	W521	Yes
56058	W521	Club
58669	W521	Club/Pool
59377	W520	Club
59731	W520	Pool
61328	W520	Yes
61378	W520	Club
62187	W520	Pool

PREM_CODE	ORIGINAL SRAT_CODE	IRRIGATION_ONLY_METER_
64625	W520	No
64748	W520	No
64784	W520	No
64866	W520	No
65139	W521	Club
65599	W520	Rec
65854	W521	Pool
67176	W520	Pool
67382	W521	Pool
68960	W521	Yes
72501	W520	Yes
73576	W521	Club
73943	W521	Club
74570	W520	Pool
74614	W521	Yes
75575	W521	Yes
75601	W521	Yes
75953	W520	Maint
76151	W521	Yes
76352	W520	Pool
76631	W521	Yes
78005	W521	Yes
78573	W521	No
78658	W520	Club
80567	W520	Club
82258	W520	Club/Pool
82338	W521	Yes
82424	W521	Yes
82425	W521	Yes
85869	W521	Pool
86945	W521	Yes
87564	W520	Yes
87811	W520	Yes
89100	W520	Yes
89785	W520	No
90481	W521	Rec
90532	W520	Yes
91151	W520	Yes
91154	W520	Yes

Appendix 2

Table 11- Expected Residential Development Densities by Zone and Expected Split Between Single-Family and Multi-Family Development

	CITY PLAN DEVELOPMENT SCENARIO 2 - TARGETED CHANGES			CITY PLAN DEVELOPMENT SCENARIO 3 - BROAD CHANGES		
PLANNING ZONE	Dwelling Unit/Acre	% as Single Family	% as Multi-family	Dwelling Unit/Acre	% as Single Family	% as Multi-family
CC - COMMUNITY COMMERCIAL	20	5	95	30	1	99
CCN - COMMUNITY COMMERCIAL - NORTH COLLEGE	20	60	40	30	50	50
CCR - COMMUNITY COMMERCIAL - POUDRE RIVER	20	100	0	30	100	0
CG - GENERAL COMMERCIAL	15	5	95	15	1	99
CL - LIMITED COMMERCIAL	15	84	16	15	84	16
CS - SERVICE COMMERCIAL	15	50	50	15	40	60
D - DOWNTOWN	20	5	95	30	1	99
E - EMPLOYMENT	15	5	95	20	5	95
HC - HARMONY CORRIDOR	15	11	89	17	5	95
HMN - HIGH DENSITY MIXED-USE NEIGHBORHOOD	20	10	90	30	5	95
LMN - LOW DENSITY MIXED-USE NEIGHBORHOOD	4	41	59	4	41	59
MMN - MEDIUM DENSITY MIXED-USE NEIGHBORHOOD	15	8	92	17	8	92
NC - NEIGHBORHOOD COMMERCIAL	5	6	94	10	6	94
NCB - NEIGHBORHOOD CONSERVATION BUFFER	15	30	70	15	25	75

	CITY PLAN DEVELOPMENT SCENARIO 2 - TARGETED CHANGES			CITY PLAN DEVELOPMENT SCENARIO 3 - BROAD CHANGES		
NCL - NEIGHBORHOOD CONSERVATION LOW DENSITY	4	96	4	4	96	4
NCM - NEIGHBORHOOD CONSERVATION MEDIUM DENSITY	15	79	21	15	79	21
RDR - RIVER DOWNTOWN REDEVELOPMENT	20	10	90	30	5	95
RF - RESIDENTIAL FOOTHILLS	1.5	100	0	1.5	100	0
RL - LOW DENSITY RESIDENTIAL	4	95	5	4	95	5
UE - URBAN ESTATE	1.5	93	7	1.5	93	7

Appendix D HYDROLOGIC MODELING APPROACH TECHNICAL MEMORANDUM

City of Fort Collins Utilities
Water Vulnerability Study

Technical Memorandum

Hydrology Modeling Approach

Date: December 15, 2017 (Revised February 2, 2018)

From: Noah Friesen, Enrique Triana, Jon Quebbeman and Mark Woodbury

RTI International

To: Fort Collins Utilities

1 Introduction

This technical memorandum (TM) describes the approach that will be adopted for generating hydrologic data for use in the Fort Collins Water Vulnerability Study. Hydrologic inputs required for the Vulnerability Study include time series that contain greater variability than the historical record and reflect potential effects of future climate change.

The results of the Climate Change Literature Review TM prepared for the Vulnerability Study and the proposed hydrologic modeling approach were presented to Fort Collins Utilities (FCU) at a workshop on November 13, 2017. The literature review focused on the general approach, and at the workshop it was decided to adopt the bottom-up approach for the Water Vulnerability Study because:

- It is designed specifically to explore vulnerabilities and risk, which is aligned with the goals of the Fort Collins Water Vulnerability Study;
- Its results allow exploring vulnerabilities in the entire uncertain climate domain (Temperature and Precipitation) rather than having to select representative Global Circulation Models (GCM)s;
- Its results are not influenced by the uncertainty of downscaling GCM large-area projections to smaller catchment areas;
- It focuses the analysis on system sensitivities and conditions anticipated to be critical for the system performance;
- It provides flexibility to implement an adaptive planning approach, tracking trends to trigger corrective actions to vulnerabilities for changes registered in a specific direction of the future domain;
- It facilitates analyses of no regret and robust options by exploring the system response to those options for the entire future domain; and
- It allows estimating system performance as climate science evolves by overlaying future GCM predictions on the vulnerability results, without redoing the analysis.

The final hydrology modeling approach, presented herein, considers input from FCU and Northern Colorado Water Conservancy District (Northern), and addresses questions and concerns brought up at the workshop, especially regarding the modeling of Colorado-Big Thompson Project (CBT) basins. The general steps in the modeling approach are:

1. Generate new ensemble traces of precipitation and temperature;
2. Adjust traces to represent a different T and P climate;
3. Run hydrologic models for each trace and each basin;
4. Disaggregate streamflow results to the Poudre Basin Network (PBN) input points and run the PBN model using inputs;
5. Provide the inputs for the CBT quota model.

2 Hydrology Modeling Steps

The hydrology modeling approach presented in this section will be applied to basins required to determine the water availability for the FCU system model, including the PBN model and the CBT model, which generate input to the FCU system model. The basins for which this approach will be applied include: Poudre River basin, Big Thompson river basin, St. Vrain River basin, Boulder Creek basin, Frasier Creek basin, Willow Creek basin and Upper Colorado River basin. Figure 1 shows the locations of the river basins included in the vulnerability study.

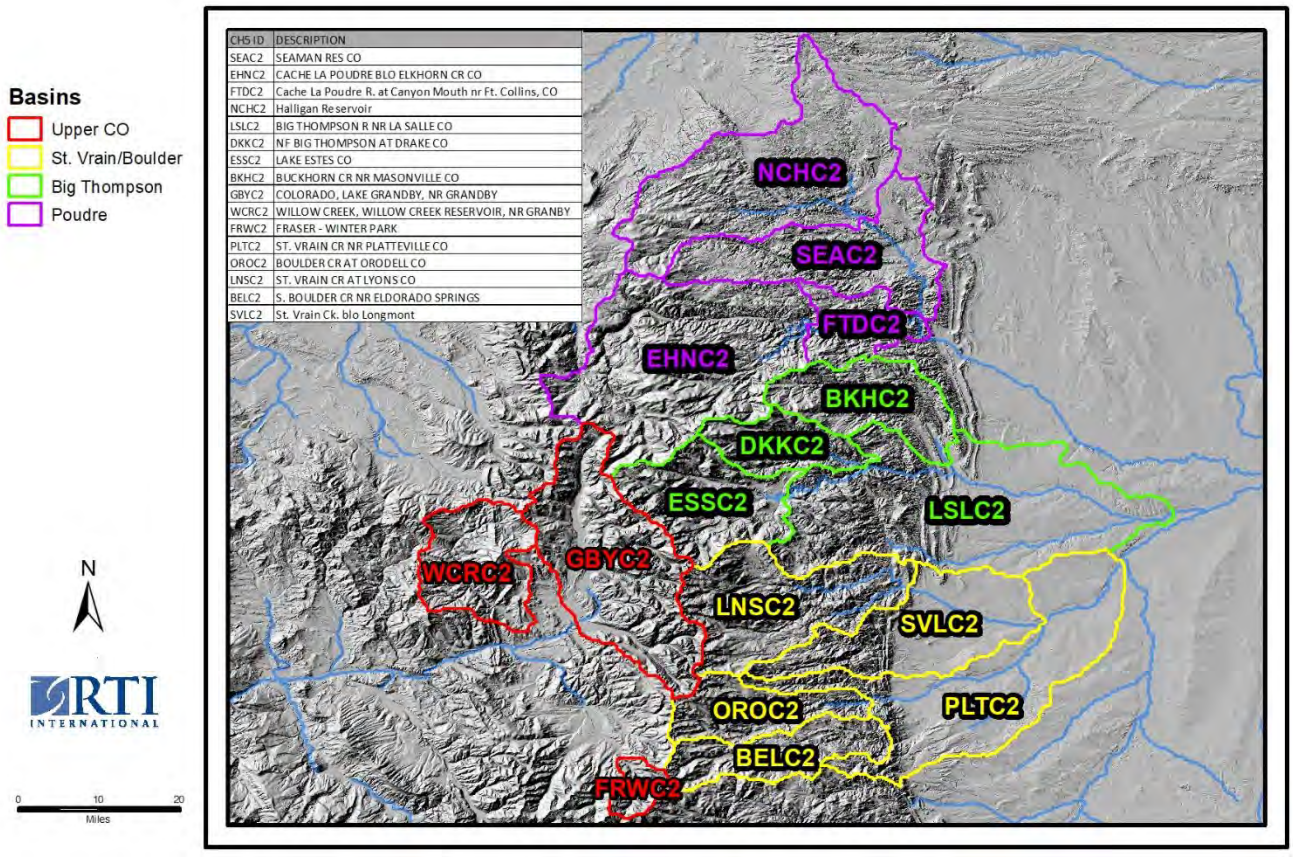

Figure 1 – Map Showing the River Basins included in the Hydrology Modeling for the FCU Vulnerability Study

2.1 Step 1 – Generate Ensembles

The approach to generate precipitation and temperature traces is designed to represent hydrologic variability and future climate change. RTI will generate precipitation (P) and temperature (T) traces based on wet-dry sequence statistics from paleo-hydrology reconstructions. RTI will follow the Block Homogeneous Markov (BHM) technique described by Nowak, Prairie, and Rajagopalan (2007).

RTI will use annual streamflow timeseries for the Poudre River produced by Dr. Connie Woodhouse (University of Arizona) extending back to 1615. This time series will be classified into wet and dry years, using the median annual flow during the observed historical period as the threshold to define wet and dry (Nowak, Prairie, and Rajagopalan, 2007).

RTI will generate 100 traces that are each 86-years long, which corresponds to the current period used in the FCU System model and corresponding data processing tools. Using the BHM procedure, RTI will select an 86-year period from the full paleo period for each of the 100 generated traces. The periods will be selected by sampling periods from the exceedance probability distribution of the representative 43-year running average annual flow from the paleo set to have periods with good representation of the range of wet and dry years estimated in the paleo hydrology. RTI will calculate a matrix of Wet-Dry transitional probabilities using the years in the selected period. The matrix will represent the likelihood that the next year will be dry or wet, based on the current year state. Using a different matrix for each ensemble trace "introduces more drought/surplus variability" (Nowak, Prairie, and Rajagopalan, 2007) compared to using a single matrix and captures more of the multi-year trends that could be washed out using long-term average probabilities. For a given trace, RTI will use the probability of wet and dry years to randomly select a starting state and then use the conditional transition probability matrix to randomly sample the next year type, then use that state to seed the selection of the next period, and so on. This procedure will be used to generate 100 traces of wet/dry year sequences.

RTI will use the models and datasets used in the JFRCCVS. The hydrologic models used in the JFRCCVS were first built for the Missouri Basin and Colorado Basin River Forecast Centers (MBRFC and CBRFC), which includes mean-areal precipitation (MAP) and mean-areal temperature (MAT) time series constructed from individual station records from long-term stations in and near the sub-basins. The River Forecast Centers quality controlled the station data as well as the resulting MAPs and MATs and handled any data filling needs. The time series extend from October 1949 through September 2005 for all the basins to be simulated. RTI will use these same time series and period for this study.

Each month in the observed P and T record will be sorted according to the year type (wet/dry) of the corresponding observed streamflow for that year. All months occurring in wet years will be classified as wet, and all months in dry years will be classified as dry, regardless of the precipitation magnitude of the individual month. For each 86-year trace of wet-dry states, RTI will build the P and T time series month-by-month using the wet/dry sequence and randomly sampling each month from the corresponding observed wet/dry monthly groups. The observed 6-hour precipitation and temperature series from the selected month will be used to create the time series.

For example, if the first year in the trace is wet, we will construct the synthetic year by sampling an October from the wet year group, then a November from the wet year group, etc. If the second year in the trace is dry, we will then sample all months for that year from the dry year groups. Using this procedure RTI will use both the observed precipitation and corresponding temperature to build

the synthetic traces. Sampling this way allows our traces to contain novel years that may be drier or wetter than any observed year, but are still based on actual observed data. The result of this process is the generation of baseline synthetic 6-hour precipitation and temperature series for input to the JFRCCVS rainfall-runoff models that capture the variability of the long-term historical climate.

Using paleo statistics from other basins and randomly sampling months on all the basins would not maintain the spatial correlation of the system time series. Transition probabilities in the South Platte paleo reconstruction will be used to capture the long-term variability in the flows for all basins, preserving the spatial correlation between the Poudre basin and the other modeled basins needed for the CBT model. The correlation will be maintained by sampling the same observed month for all basins when building the synthetic traces. For example, if we sampled October 1963 as one month in the Poudre basin while building a trace, we would build the traces for the other basins simultaneously using October 1963 for that month. The historical distribution of P and T across the basins during that month will therefore be embedded in the synthetic trace.

2.2 Step 2 – Apply Climate Change Adjustments

Using the bottom-up approach to explore system vulnerabilities to climate change, RTI will define a domain of potential changes of average precipitation and temperature. The 100 traces generated in Step 1 will be used as a baseline to compare against the same traces adjusted for climate change. The future domain will be explored by scaling P and T values by different amounts. RTI will create a set of hydrology traces to represent combinations of changes in P and T.

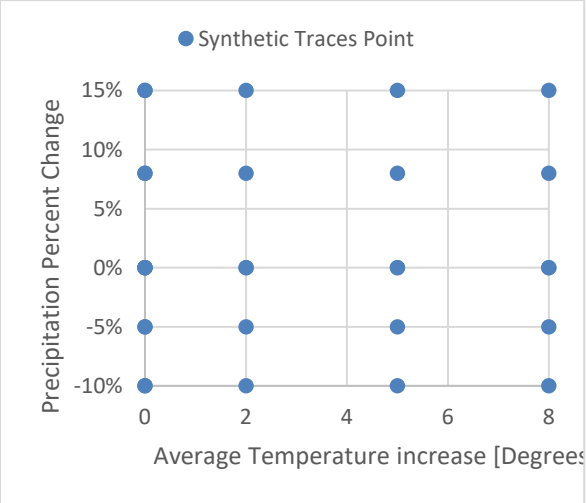

Figure 2 – Grid of Precipitation Change and Temperature increase to Develop Synthetic Hydrologic Traces

A grid of change values will be used to map vulnerabilities, with precipitation changes on one axis and temperature increases on the other. Precipitation changes will range from -10% (relative to current conditions) to +15%. Temperature changes will range from 0 °C to 8 °C above current temperatures. Figure 2 shows the grid with points at the combination of P and T for which synthetic hydrologic traces will be developed. The points in Figure 2 cover the entire domain but increase the detail in regions of the domain initially considered more important for the Vulnerability Study. All 100 traces will be adjusted for each grid point, leading to 1,900 climate change traces, in addition to the 100 baseline traces. These ranges are designed to be wide enough to include the GCM results from CMIP5 and hopefully future CMIP iterations. The National Climate Change Viewer from USGS indicates precipitation changes from -6% to +31%, and temperature increases from 0.6 °C to 4.9°C for the Poudre basin across the different GCMs for the 2050-2074 period (Alder and Hostetler, 2013). While some GCMs indicate that precipitation may increase more than 15%, we do not expect larger precipitation increases to be a source of vulnerability for Fort Collins Utilities.

Following a "bottom-up" approach by applying climate adjustments over a range, rather than matching specific GCM results, will allow a more thorough look at potential future conditions. The range of futures will be modeled and the futures that Fort Collins is vulnerable to can be identified. GCM-based future temperature and precipitation values can be plotted on top of the modeled ranges, to compare vulnerable futures against the futures projected by the GCMs. Figure 3 shows an example of the results of this bottom-up approach, with median vulnerability values for the 100 traces shown with interpolated colors (red to blue) in the T and P grid, and points representing the CMIP3 and CMIP5 GCM results of average change in T and P overlaid in green and purple.

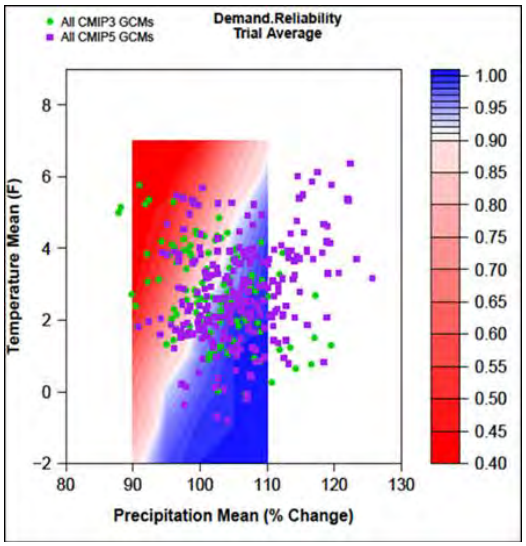

Figure 3. Example of bottom-up approach results
Source: Colorado Springs IWMP

The baseline traces will be adjusted for climate change uniformly. Temperature adjustments will be made by increasing every value in the time series by the adjustment amount. Precipitation adjustments will be made by scaling all values by the adjustment percentage.

While GCM results generally indicate that changes will vary between months, there is little consistency about the magnitude and timing of the variation among the different models (JFRCCVS, Figures 56 and 57). Choosing a single monthly distribution for changes may not accurately represent the true possibilities and running many different distributions would increase the complexity of the analysis for an uncertain benefit.

2.3 Step 3 – Run Hydrologic Models

RTI will use a set of calibrated hydrologic models to transform the baseline and climate-adjusted P and T into streamflow. These are the same models used in the JFRCCVS. Nothing in the models will be changed for this project, other than the precipitation and temperature inputs.

Recognizing that the model results do not perfectly represent reality in the simulated basins, RTI will apply bias-correction to the model output. The principles of the hydrologic models proposed tend to under-simulate large flows and over-simulate low flows. These tendencies are inherent to the modeling approach and cannot be fully eliminated through parameter changes. Quantile mapping is a procedure commonly used to reduce these biases (Gudmundsson et al. 2012). The distribution of the simulation results is adjusted to match the distribution of the observed streamflow. This step also reduces bias from any inaccuracy in the models. RTI will train the quantile mapping on the baseline case, and then use the same adjustments to correct all the results (baseline and climate-adjusted). This allows us to correct the model biases present in all runs while still allowing the results to simulate effects of climate change.

The JFRCCVS also adjusted potential evapotranspiration inputs when running these models to increase potential evapotranspiration (PET) for futures with higher temperatures. More recent research (Milly and Dunne, 2016) has shown that the adjustment procedure used significantly over-estimates the increase in PET. This is because using temperature increases to estimate PET increases

ignores other factors that limit PET, such as increased CO2 in the air reducing plant transpiration and vegetation changes due to the changed climate. Additionally, the JFRCCVS found that streamflow was not highly sensitive to PET increases. The ET is generally supply-limited, meaning soil moisture available for evaporating is less than the PET demand, and increasing the PET demand does not increase actual ET unless more soil moisture is available. Based on these factors, no PET adjustments will be made for this study. Note that the PET discussed here is only for natural vegetation in the watershed, and does not apply to irrigated crops. Increased agricultural PET is less limited by natural supply, and its effects for this study will be analyzed in the basin demand sensitivity analysis modeling to be performed by FCU.

The initial plan was to only run the Poudre Basin models and then assume that changes would be correlated with changes in the basins needed for the CBT modeling (Upper Colorado, Big Thompson, Boulder and St. Vrain). RTI investigated the correlations in streamflow changes between these basins using JFRCCVS results and found that the results did not exhibit a very strong correlation. For consistency and to generate a more complete product, RTI plans to also run hydrology models for the CBT basins using the same procedure as for the Poudre (described above). The Poudre Basin is split into 4 modeled sub-basins above the canyon mouth. The Upper Colorado above Lake Granby, Willow Creek, and the Fraser River are modeled as one sub-basin each. The Big Thompson is modeled as 3 sub-basins above Loveland and the St. Vrain and Boulder Creek watersheds are modeled as 4 sub-basins. FCU and Northern authorized the additional 95 hours required for this additional hydrology modeling scope as documented separately (Additional Hydrologic Modeling Estimate TM, 2017).

2.4 Step 4 – Disaggregate Flows and Run Yield Models

The hydrologic models provide flow at the North Fork below Seaman Reservoir and at the Canyon Mouth in the Poudre River Basin. The PBN model requires monthly flow inputs at 11 locations, mostly at higher elevations within the basin. Previous work by Riverside Technology, Inc. and CDM developed spatially disaggregated flows for the Poudre Basin Common Technical Platform (CTP), based on the two lower gage points. That work provides monthly factors for each PBN input point that can be used to distribute the downstream flows. These factors will be applied to the hydrologic model output to calculate inflows to the PBN model. There are other time series in the PBN model that are tied to the base hydrology and considered important for the analysis, i.e., the excess precipitation and the native flows time series. These time series will be re-sequenced based on the closest simulated flow to the base hydrology total flow at the two gages. The PBN model inputs will be organized in the central database for each trace resulting from the previous steps.

The CBT Model is a spreadsheet model that takes annual flows from the different CBT project sources and watersheds affecting other CBT allottee water supplies and estimates the annual quota that would be adopted by the Northern Board under those conditions. Northern will modify the CBT Model to incorporate inputs from the hydrologic models described above, and RTI will summarize and catalog the results from the hydrologic models into the central database developed for the Vulnerability Study. These results will be used by the FCU modeling system in conjunction with the CBT model to estimate an annual CBT quota for the PBN and the FCU system models. Baseline and climate-adjusted flows will be run through the models and cataloged in the central database using the functionality in the data management system (RTI and Stantec 2017) to be used in the Vulnerability Study.

FCU is investigating the changes in system yield for Fort Collins due to potential changes in future agricultural demands, assuming the higher temperatures will drive longer growing seasons with different water requirements within the constraints of the existing water rights. Also, FCU is investigating the effect of lower South Platte demands on the system yield for Fort Collins. The results of that analysis affecting the Vulnerability Study will be reflected in the final modeling approach.

3 Budget and Schedule Considerations

The proposed approach for the hydrologic modeling can be performed within the approved budget for Task 5 (including the CBT basins hydrologic modeling. The proposed activities can be performed within the original schedule (from December 2017 to February 2018) assuming no changes will be performed to the PBN model.

4 References:

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Appendix E FUTURE HYDROLOGIC ANALYSIS TECHNICAL MEMORANDUM

City of Fort Collins Utilities
Water Vulnerability Study

Technical Memorandum

Future Hydrologic Analysis Technical Memorandum

Date:	May 20, 2018 (Rev.1 Oct 30th, 2018)
From:	Noah Friesen, Colleen Wilson, Enrique Triana, Mark Woodbury RTI International
To:	Fort Collins Utilities (FCU)
Attachments:	Hydrology Traces Dashboard (FlowMetricsV4.twbx) Traces Selection Tool (Trace MCDA v4.xlsx) Precipitation and Temperature generated series (HydrologyDataset_042218.twbx , HydrologyDataset_042218_TEMP.twbx)

1 Introduction

This technical memorandum describes the development of the hydrology dataset developed for use in the Fort Collins Water Vulnerability Study. Hydrologic inputs required for the Vulnerability Study include time series for streamflows, water diversions, and other parameters that may contain greater variability than the historical record and reflect potential effects of future climate change and basin operations.

2 Hydrology Data Development

The hydrology development methods presented in this section were applied to the basins that must be analyzed and simulated to determine the water availability for the FCU system model, which is generated using the Poudre Basin Network (PBN) model and the Colorado-Big Thompson Quota (CBTQ) model. The basins included in the analysis are: Poudre River basin, Big Thompson River basin, St. Vrain River basin, Boulder Creek basin, Fraser Creek basin, Willow Creek basin and Upper Colorado River basin. Figure 1 shows the locations of the river basins included in the hydrological analysis.

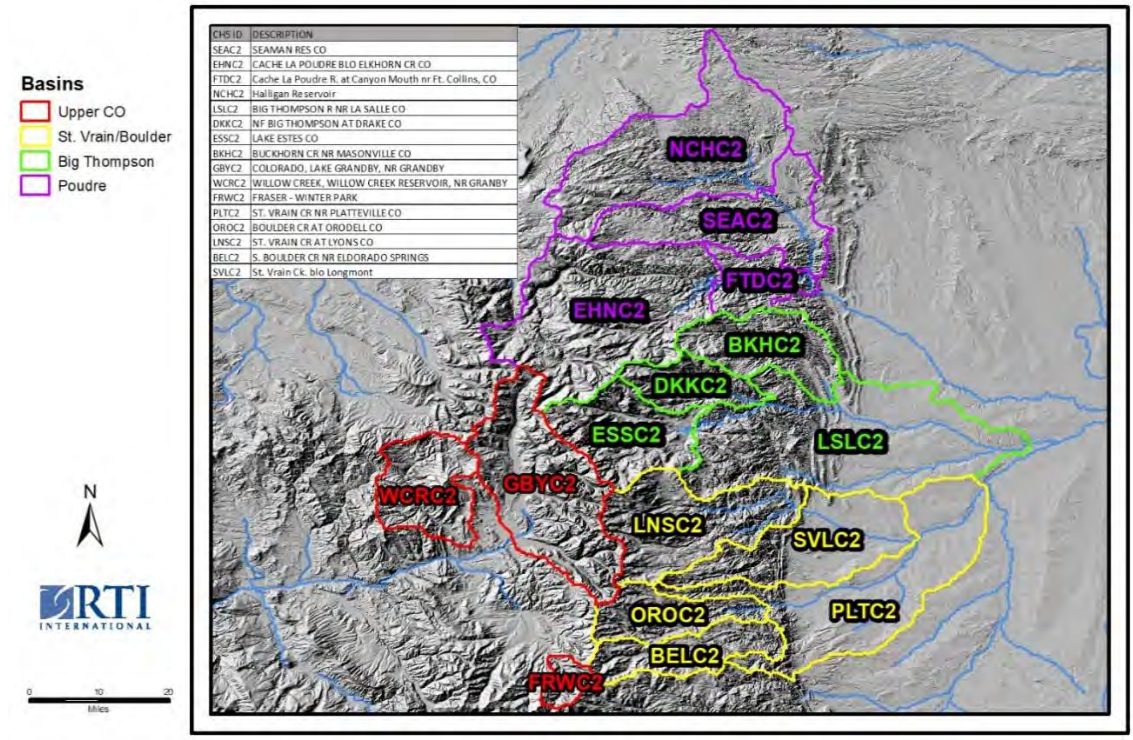

Figure 1 – Map Showing the River Basins included in the Hydrology Modeling for the FCU Vulnerability Study

The approach used to generate hydrologic inputs for the Vulnerability Study modeling is documented in the Hydrology Modeling Approach TM (RTI, 2018), which is key to understanding the presentation of results in this memo. The goal of the hydrology development approach is to generate synthetic sets of potential future hydrological inputs that include variability and large-scale shifts in precipitation and temperature trends due to climate change. The approach is based on the following steps:

- Weather Generation
  - Generate an ensemble of 100 precipitation and temperature traces for use in hydrologic simulations, each being 86 years long, which corresponds to the Fort Collins System model simulation period.
  - For each trace in the ensemble of reconstructed flow records, classify historical years as wet or dry.
  - Identify 100 sets of transition probabilities between wet and dry years based on 100 sub-sets of 86-year samples from the reconstructed record.
  - Construct 100 sequences of year type based on the 100 sets of transition probabilities.
  - Construct 100 synthetic precipitation and temperature traces by sampling entire months from the actual historical record according to year type, based on the 100 sequences of year type.
- Hydrological Modeling
  - Baseline: Generate streamflow traces from each of the 100 precipitation and temperature traces, using the Joint Front Range Climate Change Vulnerability Study (JFRCCVS) hydrologic models.

  - Climate Adjusted: Generate 18 sets of climate-adjusted streamflow traces based on various combinations of temperature and precipitation adjustments from historical conditions.
- Select representative traces for preliminary modeling.
- Pre-process inputs to the PBN model for use in yield modeling.

The following sections summarize the results of the hydrology development and processing to be used in the FCU Vulnerability Study.

2.1 Weather Generation (Ensembles)

Each year in the record of reconstructed flows for the Cache la Poudre River (the "Poudre") at Canyon Mouth (Woodhouse, 2006) was classified either as a wet or a dry year. This distinction was based on the median annual flow of the reconstructed data. The median of the reconstructed data from 1615-1999 was 286,712 AF. Figure 2 shows the plot of reconstructed annual flows in the Poudre River (blue) with the mean of observed flows (red). Annual flows greater than this threshold were considered "wet" and flows less than the threshold were classified as "dry."

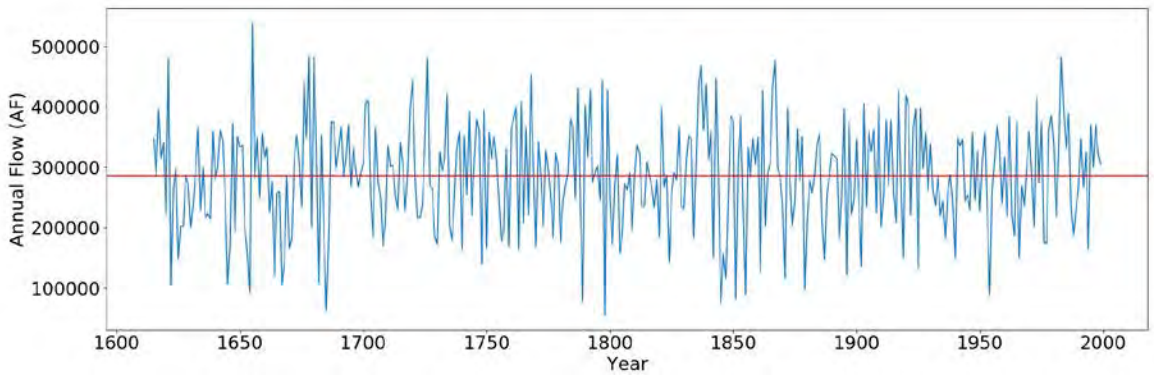

Figure 2 - Plot showing reconstructed annual flows at Canyon Mouth, 1615-1999, in acre-feet (blue) with the mean of observed flows (red).

RTI used a sampling procedure based on the exceedance of dry to wet transition probabilities from rolling windows over the reconstructed period to generate 100 traces that use statistics from a range of wet and dry periods. The selected period for the traces (and the rolling windows) is 86 years that agrees with the current Fort Collins planning model simulation period. The center-half of the selected period was used to calculate the transition probabilities of each window, excluding from the calculation the initial 21 years and the last 22 years of each window to add randomness to the transitional probabilities. Figure 3 illustrates the rolling window concept, showing the first 86-year window (gray) with the 43-year center-half window (orange). For the period of reconstructed values, 1615-1999, we use the center-half windows of 43 years to represent the 86-year windows, with the first center-half window starting in 1636 and the last center-half windows ending in 1977. For each 86-year rolling window, we assigned the center-half window probability of a dry year being followed by a wet year as the representative probability for the rolling window.

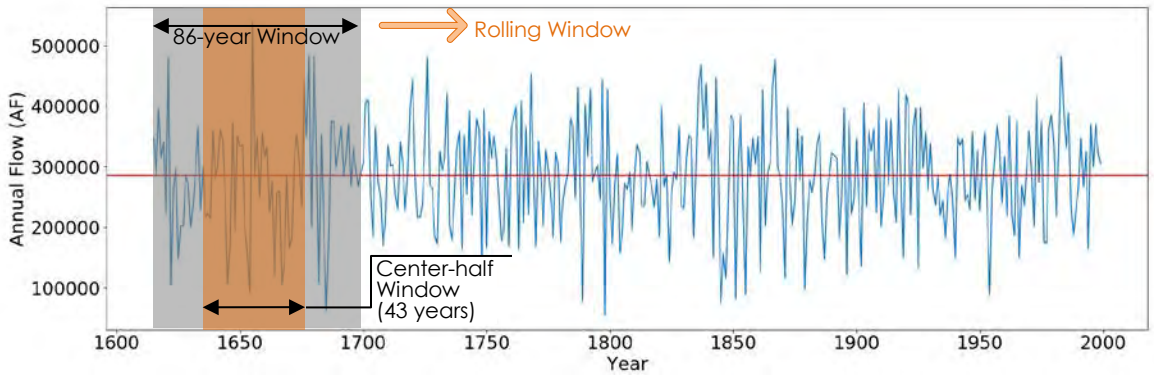

Figure 3 - Diagram showing the rolling 86-year window with the center-half window (yellow) used to calculate the probabilities of dry years being followed by wet years.

The dry-to-wet transition probability, written below as $P(D \rightarrow W)$, is defined by the following equation.

$$P(D \rightarrow W) = \frac{\text{No. of dry years followed by a wet year}}{\text{Total no. of dry years}}$$

The distribution of dry-to-wet transition probabilities in the center-half windows for the reconstructed period is shown in Figure 4.

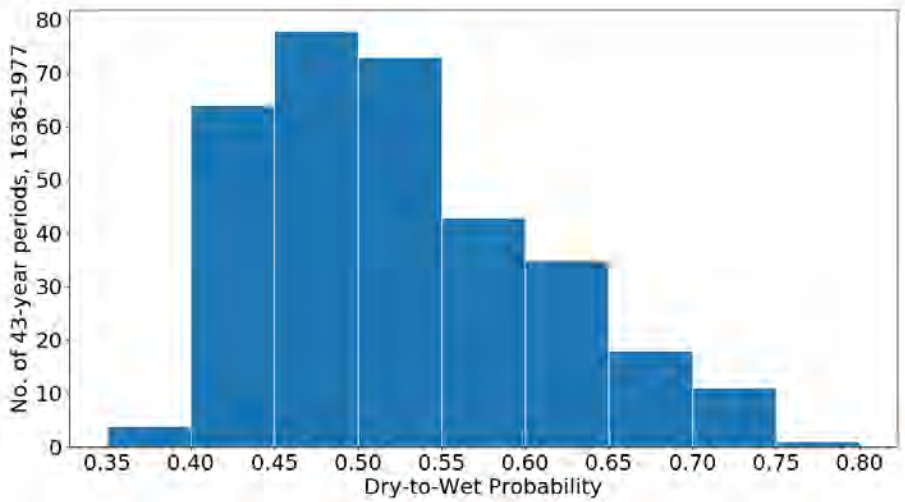

Figure 4 - Histogram showing the distribution of dry-to-wet probabilities for the rolling center-half windows for the reconstructed period

The dry-to-wet probability values representative for all the center-half rolling windows ranged from 0.38 to 0.78. Figure 5 shows the exceedance curve of the dry-to-wet probabilities for all the rolling windows.

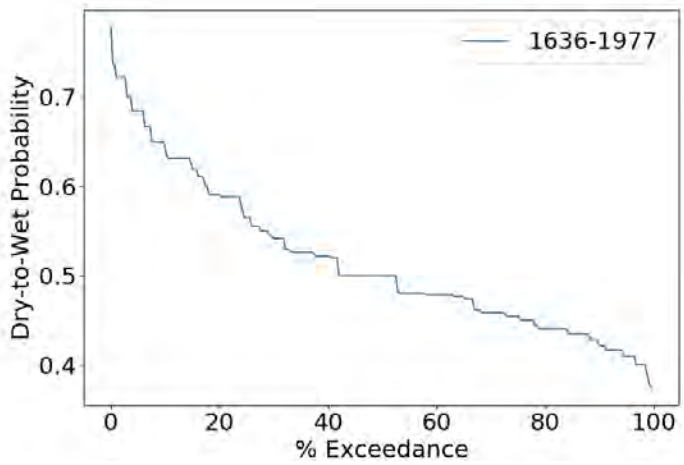

Figure 5 - Plot showing the exceedance curve of dry-to-wet probabilities calculated from the rolling 43-year periods

We performed the selection of 100 rolling windows using the exceedance curve, finding the rolling window that had a representative dry-to-wet transition probability closest to one for each percentage value in the dry-to-wet exceedance curve from 1 to 100 percent. The rolling windows were selected based on the representative transitions probability (center-half windows), but the transition probability matrix for generating the hydrological traces was computed using the 86-year rolling windows to capture in the statistics the random occurrences around the center-half window. Each of the resulting 86-year periods were analyzed to compute four transition probabilities: 1.) probability of a dry year followed by a dry year, 2.) probability of a dry year followed by a wet year, 3.) probability of a wet year followed by a dry year, and 4.) probability of a wet year followed by a wet year. Figure 6 shows a diagram of the four transition probabilities following the transition from the current state to the future state.

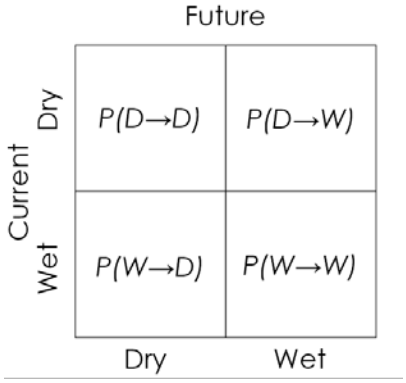

Figure 6 - Diagram showing the breakdown of the transition probability matrix.

For example, for an exceedance probability of 75%, we selected the window having the closest dry-to-wet exceedance value (75.08%) in Figure 5, which is identified with year 1850 that correspond to the first year of the center-half window. Figure 7 shows the 86-year window corresponding to the year 1850. The corresponding dry-to-wet transition probability for the center-half 43-year window is

0.45. The transition probabilities to generate this trace were then calculated using the 86-year window, 1829 to 1915, which resulted in a new dry-to-wet transition probability of 0.52, when including the years before and after the center-half window. The procedure in this example was completed for each percent of the exceedance curve.

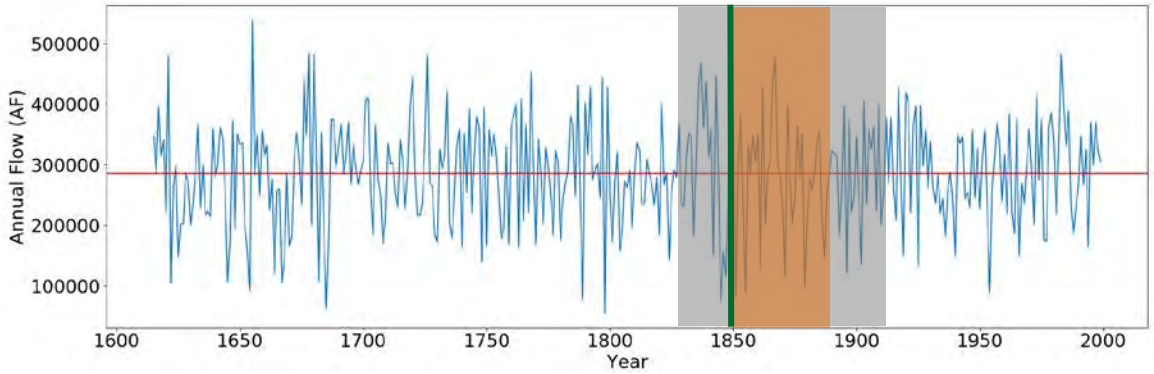

Figure 7 - The 86 years (gray shade) surrounding the year 1850 (green line) were used to calculate transition probabilities for a 75% exceedance. The 43-year period that contributed to the exceedance curve is shown in orange.

The 86-year window transition probabilities for the years corresponding to the 1 percent and 99 percent of the dry-to-wet exceedance curve in Figure 5 are shown in Table 1 and Table 2.

Table 1- Transition probabilities from the lower end of the exceedance curve (year 1737)

P(D→D) **0.45**	P(D→W) **0.55**
P(W→D) **0.53**	P(W→W) **0.47**

Table 2- Transition probabilities from the upper end of the exceedance curve (year 1649)

P(D→D) **0.43**	P(D→W) **0.57**
P(W→D) **0.56**	P(W→W) **0.44**

Historical years with 6-hour observed precipitation and temperature were classified as wet and dry years based on the historical flow at the Poudre River at Canyon mouth, using the median of the

reconstructed flow as the classification threshold. Years with annual flow above the threshold were classified as "wet" and years below were classified as "dry." The result was a bin of dry years, and a bin of wet years.

Each of the 100 sets of the annual transition probabilities was then used to randomly generate a sequence of 86 wet and dry years. The result of this process was 100 binary wet/dry sequences of 86 years each. Then, we used each of the binary sequences to engineer an 86-year long synthetic precipitation and temperature trace with 6-hour temporal resolution. For each of the year types in the sequence, we randomly pulled each of the 12 months of precipitation and temperature data (i.e., month-long chunks) from a historical year in the corresponding wet or dry year bins. Note that each month of the engineered series could potentially come from a different year with the corresponding wet/dry classification. For example, when the binary sequence called for a dry year, the January precipitation data was randomly selected from the pool of "Januarys from Dry Years." The same procedure was followed to select precipitation data for February to December for this dry year. The process continued with the next year type of the sequence, sampling months for that year type as described above. As a result, each synthetic precipitation year was composed of twelve month-long chunks originating from potentially different years, which were either all dry, or all wet.

The 100 synthetic 86-year time series of precipitation and temperature generated using this process were imported into dashboards to be visualized and compared. HydrologyDataset_042218.twbx contains the precipitation series summarized per month and the file HydrologyDataset_042218_TEMP.twbx is used to present the corresponding temperature generated series.

2.2 Baseline Hydrological Modeling

The hydrologic models from the JFRCCVS were used to generate streamflow traces for locations contributing to Fort Collins' water supply based on the precipitation and temperature traces described in the previous section. Both the synthetic precipitation and temperature traces and the historical precipitation and temperature data were used in this hydrology dataset. The historical inputs were designated as trace 0. The models were run using the National Weather Service River Forecast System and incorporate the SNOW-17 snow accumulation and melt model and the Sacramento Soil Moisture Accounting Model to calculate natural (unregulated) streamflow. The 16 sub-basins shown in Figure 1 were all modeled as part of this hydrology dataset. The models run at a 6-hour timestep and lag and K routing is used to route flow between sub-basins. The simulation period for the planning model is 86 years and agrees with the length of the synthetic traces. The hydrologic models were setup for 86-year simulation, arbitrarily starting in WY1939 and ending in WY2024 to avoid model issues with dates later than 2030. The historical trace of reconstructed naturalized flows at the control points are shorter and span from WY1950 to WY2008.

The 6-hour time series streamflow results from the hydrologic models were processed and converted to monthly flow averages in cubic feet per second for use in the Fort Collins and Poudre Basin system simulation models, which operate on a monthly time step. The monthly time series were bias-corrected to reduce inherent model errors. The bias correction is designed to account for errors in the hydrologic models due to both calibration errors and bias built into the design of the model. The hydrologic models used for this work tend to underestimate high flows and overestimate very low

flows. There are also calibration errors throughout the distribution. Bias correction using the quantile-mapping method helps to reduce this bias. The Tableau dashboard (FlowMetricsV4.twbx) summarizes the streamflow results.

To perform bias correction, estimated monthly natural flow data was available from the JFRCCVS for 5 of the 16 sub-basins in this study: Cache la Poudre at Canyon Mouth (FTDC2), Big Thompson at Drake (DKKC2), St. Vrain Creek at Lyons (LNSC2), Boulder Creek at Orodell (OROC2) and Colorado River at Lake Granby (GBYC2). For each of these 5 locations, the observed natural flows and the simulated historical flows were used to correct all the simulated trace flows. The correction amount was set for each point on the distribution function to match the distribution of simulated historical flows to the distribution of observed natural flows. This creates a set of correction amounts (positive or negative) for the full range of the distribution. So the 10th percentile flows (which can be a different magnitude in the observed flows than in the simulated flows) have a specific correction amount, the 90th percentile flows have a different correction amount, and every other point in the distribution has a correction amount. This set of correction values associated with various percentiles is then applied to each of the 100 generated traces for that sub-basin, and each monthly value in all traces is corrected accordingly. Each sub-basin with observed flows has a separate set of correction values.

See Figure 8 for the model results for FTDC2, and see Figure 9 for an example of the bias correction results at the FTDC2 location with the observed and simulated exceedance curve used to derive the correction and the correction applied to the trace 1 results. In Figure 9, the left plot shows the distributions of the observed and simulated time series and the right plot shows the simulated and corrected curves of trace 1. The difference between the observed and the simulated at each point in the left graph is applied as a correction to the same point on the right graph. So at low flows (below ~90 cfs, 40th percentile), the simulated flows are over-estimated compared to the observed. The correction of the flows below the 40th percentile is therefore negative and the corrected time series is lower than the original for that range.

Table 3 shows statistics for the corrections for each station. The mean row represents the average correction amount over all months in the period of record. The max and min rows represent the largest and smallest corrections in any individual month.

For sub-basins upstream of a point with observed data, the correction amount was scaled down proportionally to the relationship between the flow of the upstream point and the point with observed data, for a given month. As an example, the uncorrected total flow in a given month at the Canyon Mouth may be 100 cfs, which is the 10th percentile flow for that trace. The uncorrected flow on the North Fork below Seaman Reservoir is 50 cfs for the same month and trace. If the 10th percentile correction amount for the Canyon Mouth is 2 cfs, the correction applied to the North Fork will be 1 cfs. In another month, the Canyon Mouth flow may be 200 cfs (15th percentile) with Seaman Reservoir still at 50 cfs. If the correction amount at that percentile is 3 cfs, the correction at Seaman Reservoir that month would be only 0.75 cfs.

The Canyon Mouth bias correction was used in this way to also correct the Cache la Poudre below Elkhorn Creek (EHNC2), Halligan Reservoir (NCHC2), and Seaman Reservoir (SEAC2) flows. The bias correction at Drake (DKKC2) was used to correct the Lake Estes sub-basin (ESSC2).

The remaining sub-basins that did not have observed data or downstream observed data were not corrected. Correcting these other points using upstream or adjacent basins would potentially distort

the results by forcing the flow distribution at the corrected point to match the flow distribution at the observed point. Even adjacent basins may have quite different distributions. Discussions during the project have indicated that the Poudre Basin is the most important to Fort Collins Utilities' water supply, followed by the Upper Colorado Basin. The entire Poudre Basin and the Colorado River above Lake Granby were bias corrected. The other uncorrected streamflow locations in the Big Thompson Basin, St. Vrain Basin, and Upper Colorado Basin watersheds are included in this analysis mostly for CBT allocation modeling and will not be used directly in the PBN model.

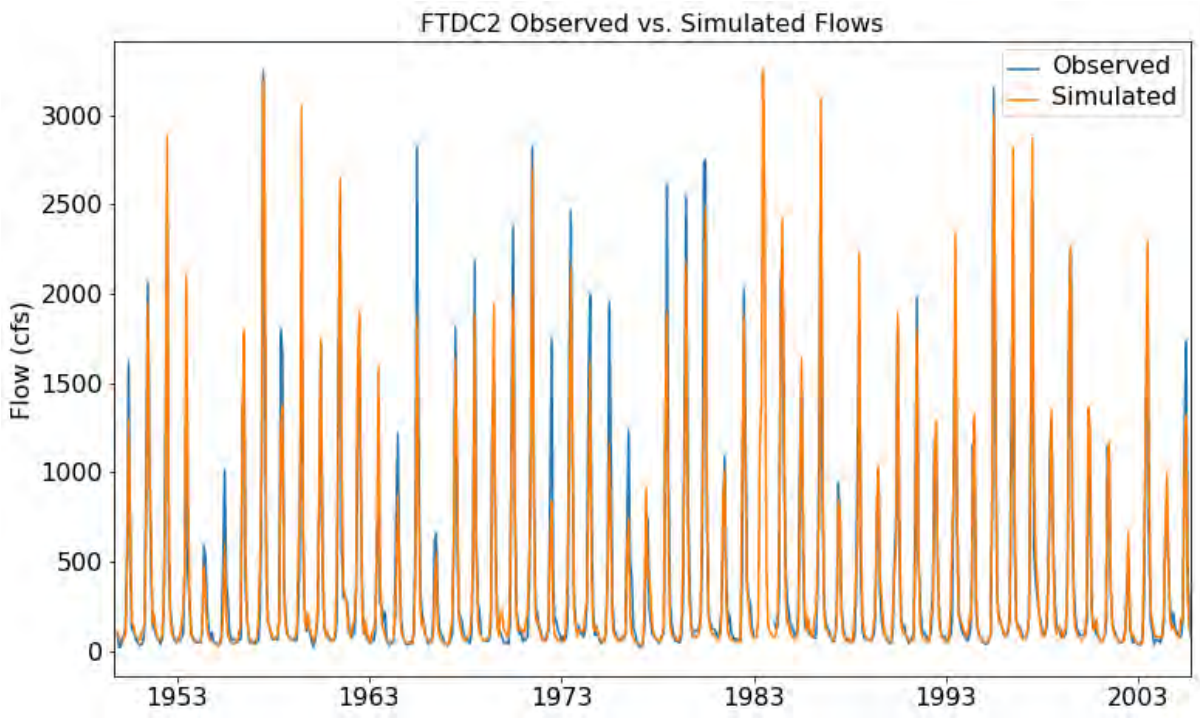

Figure 8 – Model Simulation Results for FTDC2

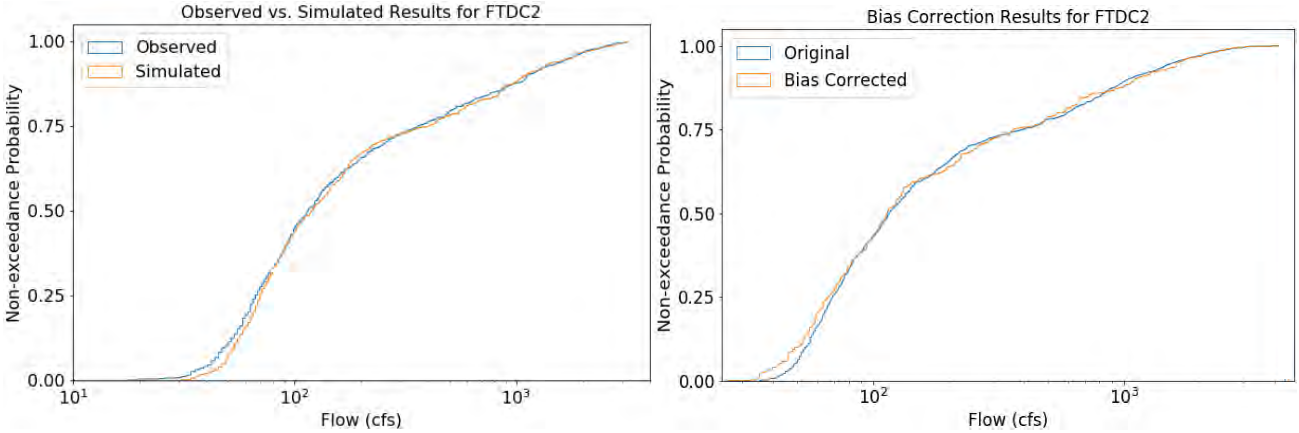

Figure 9 – Non-exceedance plots showing bias correction for FTDC2 (trace 0) and the result with bias-correction for trace 1.

Table 3 - Description of Corrections at Locations with Observed Flows

	FTDC2	DKKC2	LNSC2	OROC2	GBYC2	FRGC2
Mean correction (%)	-2.1	1.8	-2.5	4.1	-0.8	-7.1
Max correction (%)	11.6	74.0	15.3	44.9	23.1	9.4
Min correction (%)	-25.6	-28.0	-63.9	-36.9	-36.1	-17.8

2.3 Climate Adjusted Hydrological Modeling

In addition to the baseline modeling for all sub-basins and traces that is based on historical climate conditions, the climate scenarios defined in the Hydrologic Approach Technical Memo (RTI, 2018) were used to perturb inputs to the previously described hydrologic models to produce climate-adjusted streamflow traces. A climate scenario consists of a combination of temperature expressed as a deviation in °F from historical temperature conditions, and precipitation expressed as a deviation in percent from historical precipitation conditions. Figure 9 shows the selected scenarios in the Hydrologic Approach Technical Memo. Table 4 shows the names of the climate scenarios and their corresponding adjustment of temperature and precipitation.

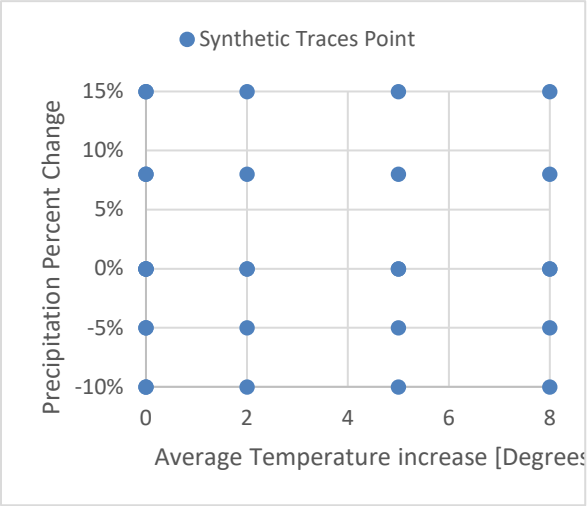

Figure 10 – Grid of Precipitation Change and Temperature increase to Develop Synthetic Hydrologic Traces

Table 4 – Climate Scenario Name and Definition

Scenario Number	Name	ΔT [°F]	ΔP [%]
1	Base	0	0
2	CC:T0P0	0	0
3	CC:T2P0	2	0
4	CC:T5P0	5	0
5	CC:T8P0	8	0
6	CC:T0P-10	0	-10
7	CC:T2P-10	2	-10
8	CC:T5P-10	5	-10
9	CC:T8P-10	8	-10
10	CC:T0P-5	0	-5
11	CC:T2P-5	2	-5
12	CC:T5P-5	5	-5
13	CC:T8P-5	8	-5
14	CC:T0P7	0	7
15	CC:T2P7	2	7
16	CC:T5P7	5	7
17	CC:T8P7	8	7
18	CC:T0P15	0	15
19	CC:T2P15	2	15
20	CC:T5P15	5	15
21	CC:T8P15	8	15

Precipitation and temperature adjustments were defined for each scenario in the Hydrologic Approach Technical Memo, and the hydrologic model inputs were adjusted accordingly. For example, scenario 15 is defined as a 2 °F temperature increase and 7% precipitation increase. To run scenario 15, the input temperatures for all sub-basins and traces were increased by 2 °F compared to the baseline for all timesteps in the simulated period. The input precipitation values were all increased by 7% for all timesteps. These changes were made by scripts that adjust the hydrologic model input files at run time, without having to create new input files.

The results from the climate adjusted hydrologic model runs were saved and processed the same way as the baseline results, including bias-correction. Figure 11 shows example monthly results for the Canyon Mouth gage, trace 1. Three climate scenarios are shown in addition to the baseline results. The scenarios all show earlier runoff due to temperature increases, and the volume of runoff

depends on the change in the precipitation as well as the temperature. See the Tableau dashboard for further exploration of these results.

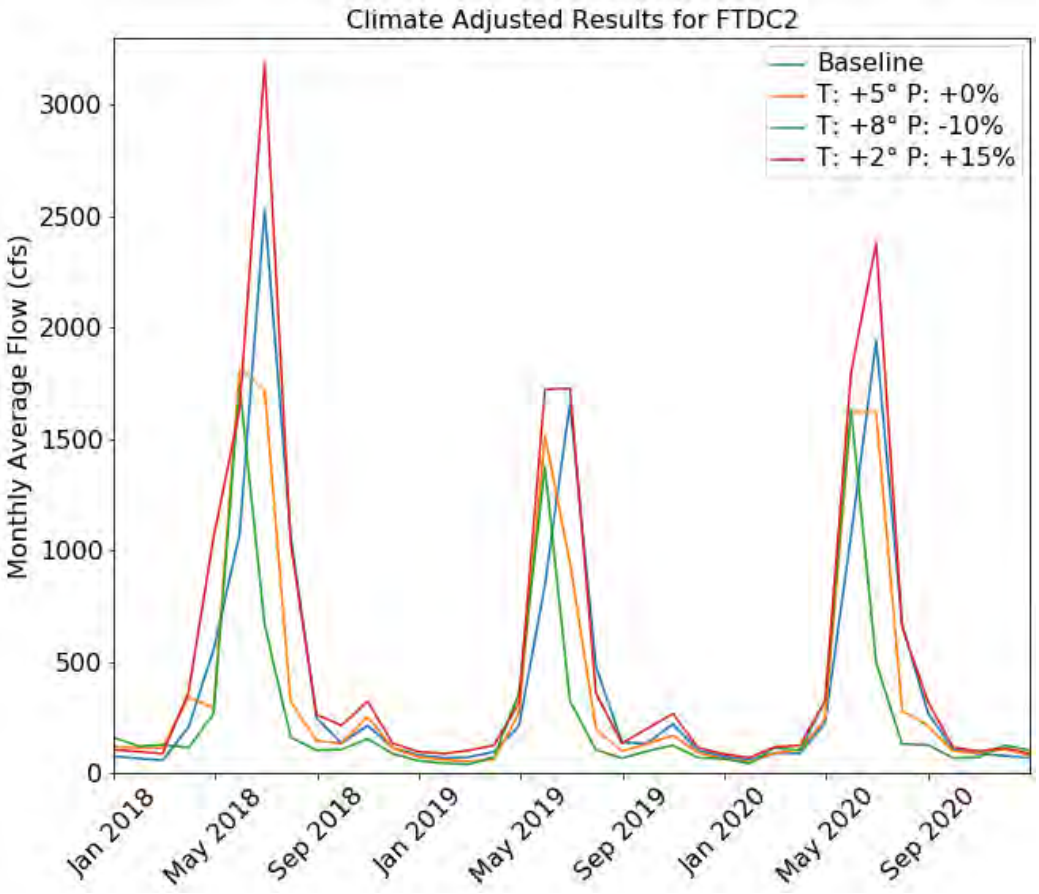

Figure 11 – Climate adjusted results example for FTDC2, trace 1.

2.4 Selection of Representative Traces

For the initial modeling of the impact of various risks in the Vulnerability Study, only 5 or 6 of the 100 traces will be used to allow more detailed analysis and initial exploration of vulnerabilities and system performance. This section describes the method used to select those representative traces.

A procedure and a selection tool were developed through discussions with Fort Collins Utilities to choose traces for this detailed modeling. A set of 24 metrics or statistical measures was developed for application to each baseline trace (Scenario 1) simulated streamflow that help describe the overall hydrologic characteristics of the traces, particularly the dry periods. The streamflow metrics include overall average value, minimum value, minimum of 3, 5, and 10-year moving averages, and resiliency among others. Based on input from FCU, a few of the metrics were selected as being the most relevant and useful for describing key hydrologic parameters of interest for selecting traces for the Vulnerability Study. Table 5 includes the definition of the metrics used in the selection of representative traces.

Table 5 – Definitions of Streamflow Trace Performance Metrics Selected for Analysis

Metric	Narrative
MovingAvg3_Min	Minimum three-period moving average of the average annual flows
MovingAvg5_Min	Minimum 5-period moving average of the average annual flows
MovingAvg10_Min	Minimum 10-period moving average of the average annual flows
Dry to Wet Probability (Resilience measure)	Number of months below the threshold (i.e., median flow) followed by a period above the threshold, divided by number of periods below the threshold
Average Dry Flows (Vulnerability measure)	Average of the values below the threshold (i.e., median flow) using periods below the threshold as a fraction of the threshold. For example, a value of 0.5 indicates that the average value when the value is below the threshold is 50% of the threshold.

An Excel-based selection tool[1] was developed that can be used to rank the traces from driest to wettest by weighting the different metrics according to user preferences. Each metric is given a score with a user-assigned weight and can be used in the ranking. For each metric a trace rank is calculated based on its position with respect to the extreme (i.e., drier or wetter) expected value. The score for each trace is computed multiplying the rank by the user selected metric weight and summing the weighted ranks for all the metrics. The traces are then sorted according to their total score and the top 10 are displayed. Scores from multiple basins and the 16 modeled points for a trace can be combined using weights for the selection of the top 10.

In discussion with Fort Collins Utilities the metrics used to select the representative hydrologic traces are the minimum value of the 3- and 10-year running average, resilience, and vulnerability. Metrics were all given an equal weight in the selection process. Resilience is defined here as the probability of having a wet year following a dry year, and vulnerability is the average of the annual streamflows in all the years with annual flow below the median annual flow. Two key locations were selected for the analysis of representative traces: the Cache la Poudre at Canyon Mouth and Colorado River above Lake Granby locations. These were used with equal weights.

The representative traces were selected based on the frequency that they ranked in the top 10 on the following analyses:

(1) Considering one metric and basin at a time, the top 10 traces in each case (i.e., the traces that had the highest metric scores, for example the lowest minimum 3-year running average annual streamflow) were compiled for the selection process. The results include 8 sets of 10 traces from all the metric/basin combinations (i.e., 4 metrics and 2 basins).

(2) The 4 metrics for each basin individually and the 4 metrics with the 2 basins were all equally weighted and used to select three additional sets of top10 traces that had a high rank when those factors were considered simultaneously.

Table 6 shows the top 10 traces for the 11 sets that resulted from the previous analysis and were used in the selection. From the 11 sets of top 10 traces, the traces that were present in the top 10

[1] File name: Trace MCDA v4.xlsx

most often were selected as the representative traces. An additional representative trace was the 50th ranked trace (i.e., median trace) with the 4 metrics and the 2 basins considered simultaneously and having equal weighting. The six traces chosen as the representative traces for use in the detailed risk assessment modeling are: **15**, **63**, **95**, **47**, **67** and **52**. Traces 15, 63, and 95 were present in the top 10 for many of the metrics and represent 3 of the top 4 traces when all metrics and basins are included at the same time. The other trace in the top 4 is 84, which has its driest period at the end of the trace, making it difficult to see the effects in the modeling results. Instead, trace 67 was selected, which appears in the top results several times and has an extended dry period in the middle of the record. Trace 47 appears in the top 10 only three times but is the driest trace at the Canyon Mouth when considering the 10-year average, which should make it a good trace for analysis. Finally, the trace ranked 50th out of 100 using all the metrics and both basins is 52.

Table 6 – Top 10 Traces for each of the Analyses used to Select the Representative Traces

Set	1	2	3	4	5	6	7	8	9	10	11
Metric	Min (Mov.Avg 3-yr)	Min (Mov.Avg 10-yr)	Resilence	Vulnerability	Min (Mov.Avg 3-yr)	Min (Mov.Avg 10-yr)	Resilence	Vulnerability	All	All	All
Rank\Station	FTDC2	FTDC2	FTDC2	FTDC2	GBYC2	GBYC2	GBYC2	GBYC2	FTDC2	GBYC2	All
1	83	47	15	58	84	67	95	11	15	95	15
2	15	18	13	44	15	84	15	69	84	84	84
3	84	84	91	15	95	70	98	59	63	11	63
4	67	6	95	86	70	47	3	63	35	63	95
5	8	31	87	29	63	6	11	99	3	15	3
6	78	98	7	35	83	95	52	4	87	78	98
7	47	67	35	6	16	63	74	84	29	67	69
8	18	81	60	63	78	76	6	57	60	76	29
9	95	3	84	60	52	83	17	96	98	4	81
10	87	83	96	78	11	25	18	41	69	98	6

Note:
- FTDC2 - The Cache la Poudre at Canyon Mouth
- GBYC2 - Colorado River above Lake Granby

2.5 PBN Input Preparation

The hydrology results described above capture more natural variability and more climate effects than the historical observed streamflow record, and thus represent sets of different potential conditions in the basin. The simulated naturalized flows are the source of the hydrology inputs for the PBN model. Several PBN model inputs in addition to the naturalized streamflows are also associated with the hydrology of the base existing conditions model. These model inputs were determined in the current model using the historical record of basin streamflows, diversions, and other observed or calibrated data. Because there was no straightforward way to adjust all the model inputs for the new variability introduced by the resequenced historical hydrology and the climate-adjusted hydrology, Fort Collins Utilities performed sensitivity analyses to determine the effect of those time series on the Fort Collins simulated yield. These analyses were used to select the method of handling those inputs in the generation of the hydrology input datasets for the PBN model for the Vulnerability Study. This section describes the hydrologic time series processing methods implemented for simulating future conditions in the PBN model.

2.5.1 Disaggregate Flows

The naturalized streamflows generated in earlier steps were used to compute annual streamflows at 11 inflow points for the PBN model that represent the upstream water availability for the different hydrology sets. RTI used the method developed for the Common Technical Platform (CTP), which is the modeling platform used for the Halligan Reservoir Enlargement EIS and Northern Integrated Supply Project EIS. It uses naturalized flows for the Canyon Mouth (FTDC2) and North Fork (SEAC2) gauges and a set of monthly factors to estimate the PBN inflows as a function of the naturalized flows at FTDC2 and SEAC2. The monthly factors for all the PBN inputs are shown in Table 7. To create each PBN monthly streamflow input the FTDC2 and SEAC2 flow was multiplied by the appropriate fraction for each month in the record.

Table 7 – Disaggregation Flow Factors for the PBN Inputs

MODSIM Point	DS Point	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
NATBARNES	Canyon Mouth	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.02	0.02	0.02	0.02
NATCHAMBERS	Canyon Mouth	0.07	0.1	0.11	0.05	0.05	0.06	0.17	0.21	0.14	0.14	0.13	0.11
NATCOM	Canyon Mouth	0.14	0.13	0.13	0.14	0.14	0.14	0.11	0.09	0.12	0.12	0.12	0.12
NATJWCRK	Canyon Mouth	0.02	0.02	0.03	0.01	0.01	0.01	0.04	0.05	0.03	0.03	0.03	0.03
NATLONG	Canyon Mouth	0.03	0.04	0.04	0.02	0.02	0.02	0.07	0.08	0.06	0.05	0.05	0.04
NATPETERSON	Canyon Mouth	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01
NATUP	Canyon Mouth	0.72	0.67	0.67	0.75	0.75	0.74	0.57	0.5	0.61	0.61	0.63	0.65
NATTWIN	Canyon Mouth	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
NATWORSTER	North Fork	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
NATHALLIGAN	North Fork	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
NATNRFRK	North Fork	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28

The PBN hydrologic input time series computed for all the traces were imported into the database and cataloged based on the climate change scenario and the trace number. The scenario names and IDs used to catalog the hydrology results into the database are shown in Table 4.

2.5.2 Other Time Series Inputs

It was identified that several input datasets, in addition to the disaggregated natural flow nodes described in section 2.5.1, would need to be developed in preparation for the modeling efforts of different hydrological scenarios for the Vulnerability Study. FCU staff performed several sensitivity analyses to help determine what method and level of effort should be used to develop the input datasets. The modeling constructs that were associated with the hydrology state and a function of the future conditions are:

- agricultural demands in the basin
- the downstream end of the network of water users in the South Platte River below the Kersey gage, referred as the "fish bone"
- excess precipitation construct, and
- trans-basin diversions

The following sections describe each of these sensitivity analyses and the resulting strategy for adjusting existing condition PBN inputs to reflect different future hydrologic conditions.

2.5.2.1 Sensitivity to Increasing Agricultural Demands in the Basin

PBN modeling simulations require input data for agricultural water demands in the Poudre Basin. There was a concern that increased agricultural demands under certain climate change scenarios could significantly decrease yields of FCU water supplies. FCU staff performed a sensitivity analysis to determine if FCU water supplies are sensitive to increased agricultural water demands in the Poudre Basin to help inform how to develop input data for future modeling simulations.

The sensitivity analysis effectively simulated an extended irrigation season and increased water demand during the irrigation season by approximately 10% per year to see if the increased demands impact FCU water supplies. The results of the analysis showed little decrease (less than 1% reduction in the Storage Reserve Factor) in the yields of FCU supplies. FCU staff determined that this minor impact did not warrant extensive effort to develop adjusted agricultural input data to represent different hydrologic conditions for future modeling scenarios. The base agricultural demands will be re-sequenced to account for water use in wet and dry periods for different hydrologic conditions.

2.5.2.2 Sensitivity to Increasing Demands from Other South Platte Basin Water Users

PBN modeling simulations also require input data which represents demands from other water users in the South Platte basin. There was a concern that increased South Platte demands under certain climate change scenarios could significantly decrease yields of FCU water supplies. FCU staff performed a sensitivity analysis to determine if FCU water supplies are sensitive to increased Poudre basin water demands from water users in the South Platte to help inform how to develop input data for future modeling simulations.

This analysis reduced available supplies in the South Platte basin by approximately 10% per year, thus forcing demands in the basin to seek water supplies further upstream in the Poudre Basin. The results of the analysis showed little decrease (less than 1% reduction in the Storage Reserve Factor) in the yields of FCU supplies. FCU staff determined that this minor impact did not warrant extensive effort developing adjusted input data to represent future water use by other South Platte water users for future modeling scenarios.

2.5.2.3 Excess Precipitation Construct

One PBN construct that is also tied to the hydrological regime consists of a demand node which represents native vegetation's water demand (NATIVE) and a supply node that represents the excess precipitation on croplands that is not removed from the system by evapotranspiration

(PRECIP). These nodes are part of a PBN construct that represents groundwater inputs and interactions to the Poudre River that are used to support calibration of basin inflows and operations with gaged flows along the river. There was a concern that changes in the NATIVE and PRECIP values under certain climate change scenarios could significantly decrease yields of FCU water supplies. FCU staff performed two sensitivity analyses to help determine if FCU water supplies are sensitive to changes in the NATIVE and PRECIP node inputs to help inform how to populate the nodes in future modeling scenarios.

The first sensitivity analysis populated the nodes with re-sequenced input data using one of the wet-dry year sequences developed for the alternate hydrology based on the paleo-derived transition probabilities. The second sensitivity analysis used monthly averaged input data from the existing model period of record for time series of the NATIVE and PRECIP model nodes. Both analyses resulted in notable changes to the yields of FCU water supplies and had consequential impacts to the Storage Reserve Factor in the modeling simulations. FCU staff and RTI explored correlations between other factors and these nodes but did not find any strong correlations. Although there are notable changes to FCU water supply yields, FCU staff understands that in the original development of the PBN these nodes and associated constructs were populated using '*like-year*' values from historical periods for synthetic modeling periods. This method uses time series values from the historical period to represent time series of future conditions based on similarities of flows at selected locations. Given its use in prior FCU modeling efforts, it would be reasonable to use like-year values from historical data for future hydrological scenarios for the Vulnerability Study.

2.5.2.4 Trans-basin Diversions

The FCU trans-basin imports from the Upper Colorado River basin into the Poudre River basin are simulated as inflow time series in the PBN model. These inflows are based on the historical diversions, which were determined by the system operators based on different factors, including water rights, availability of water in the diverting basin, storage availability and operations in the receiving basin, diversion capacities, repairs and maintenance schedules. Trans-basin diversions are a significant component (nearly 15% of the average native flows in the basin) of the FCU yield on an annual basis and are the drivers of the FCU's Reuse Plan; therefore, it is important to determine appropriate trans-basin diversion time series for modeling of future conditions.

An extensive analysis was performed to attempt to correlate the historical trans-basin diversions with naturalized flows at stream gages in both East Slope and West Slope basins. Correlations were investigated using monthly flows, annual flows, seasonally segregated flows, and other methods to attempt to find an approach for estimating historical trans-basin diversions from historical naturalized streamflows. Unfortunately, none of the analyses showed strong correlations between those variables. Based on this outcome, FCU staff recommended adopting the like-year approach to estimate trans-basin diversions, since this method was used to develop input data for sites without measured diversions in the previous versions of the PBN.

2.5.2.5 Recommended Like-Year Modeling Approach

The sensitivity analyses for the excess precipitation construct and the trans-basin diversions showed that impacts on the FCU yield could be significant. Therefore, it is necessary to implement an approach for representing those inputs synchronized with the future hydrological conditions to be simulated for the Vulnerability Study. An approach based on the *like-year*, used in previous PBN

analyses, is recommended to estimate these PBN input time series for future conditions. Although the results of the agricultural demand sensitivity analysis and the South Platte water users' sensitivity analysis suggest these inputs have little impact on FCU water supplies, for consistency, it is recommended to use a *like-year* approach for these time series as well to simulate future conditions.

The *like-year* approach determines values for the new time series based on values from a historical year with the most similar total annual flows at key locations. For example, if simulated year N has an annual streamflow for the Cache la Poudre River at Canyon Mouth of 25,100 acre-feet, the PBN input data from the historical year with the annual streamflow at the Canyon Mouth closest to 25,100 acre-feet would be used to populate the time series for simulated year N. For trans-basin diversions the conditions in both the Poudre River basin and the Colorado River basin are drivers of the diversion, so the recommended *like-year* approach was based on the sum of flows at the Cache la Poudre River at Canyon Mouth and the Colorado River at Granby Lake to select the historical year to represent the future conditions. That selected historical year was used to create the time series for all the PBN input datasets. This method adjusts PBN inputs to be consistent with the magnitude of flows for future conditions, according to the reduction/increase in simulated naturalized flow compared to historical conditions. Using the same like-year for all the input time series populated using the like-year approach preserves the relationships between the East Slope and West Slope operations captured in the historical data. For the selected alike year, the historical monthly time series were used for creating the synthetic time series of the PBN inputs. Table 8 shows the list of PBN names that are processed with the like-year approach.

Table 8 – List of PBN Nodes Processed with the Like-Year Algorithm

Node Name	Node Name	Node Name
ARTHUR	LARNO2	R17L
BHEATON	LARWELD	R18L
BIJOUCANAL	LIDDLEDITCH	R19L
BOXELDER	LILCACHE	R1L
BOYD	LONETREE	R20L
BRAVODITCH	LOWERPLATTE	R21L
CARLSONDITCH	LOWLINEDITCH	R22L
CHAMBERSDITCH	NATIVE	R23L
COY	NEWCACHE	R24L
DAVISBROTHERS	NEWMERC	R25L
EMPIRECANAL	NORTHSTERLING	R26L
FORTMORGAN	NPIC	R27L
FTCART_c	OGILVY	R28L
FTCLAR2_c	PAWNEEDITCH	R29L
FTCNMER_c	PETERSONDITCH	R2L
FTCPVLC_c	POWELLBLAIR	R30L
GREELEY3	PREWITTINLET	R31L
HARMONYNO1	PVLC	R32L
HENDERSONSMITH	R10L	R33L
ILLIFPLATTE	R11L	R34L
JACKSON	R12L	R35L
JACKSONLAKE	R13L	R36L
JONES	R14L	R37L
LAKE2	R15L	R38L
LAKECANAL	R16L	R39L

Node Name
R3L
R40L
R41L
R42L
R43L
R44L
R45L
R4L
R5L
R6L
R7L

Node Name
R8L
R9L
RAMSEYDITCH
REDLION
RIVERSIDECANAL
SCHNIEDERDITCH
SOUTHPLATTE
SOUTHRESERV
SPDEMAND
SPDEMAND2
SPRINGDALE

Node Name
SPWCPEX
STERLINGNO1
TAMARAKDITCH
TAYGIL
TRIRENT
UPPERPLATTE
WELDONVALLEY
WHITNEY
WSSC
WSSC_RF

2.6 Tools for Yield Modeling

RTI catalogued the hydrology sets into the FCU modeling system database and built tools to process inputs for the PBN model based on the future conditions and the time series generation recommended approach. The hydrology sets cataloged for the Vulnerability Study are composed of (1) the inputs to the PBN model, estimated from the simulated naturalized flow inputs, and (2) the naturalized flows simulated at the key locations.

RTI developed a tool to calculate the PBN inputs for the different hydrological scenarios that extracts the current time series in the PBN model (i.e., historical) to the database and resequences the time series to create PBN inputs for each alternate hydrology. The processed time series are written into the MODSIM version 7 ADA format to be imported into the PBN model at run time using the new modeling system functionality.

3 References:

RTI International, 2018. *Hydrology Modeling Approach TM*. Fort Collins Utilities Water Vulnerability Study. February.

Woodhouse, C.A. and J.J. Lukas. 2006. Multi-century tree-ring reconstructions of Colorado streamflow for water resource planning. Climatic Change 78: 293-315.

Appendix F SCENARIOS FOR VULNERABILITY ANALYSIS

City of Fort Collins Utilities
Water Vulnerability Study

Technical Memorandum

Scenarios for Vulnerability Analysis

Date: January 2, 2019 (Revised 01/25/2019)
From: Chip Paulson, Lisa Fardal, Neil Stewart
To: Fort Collins Utilities

Stantec

1.0 INTRODUCTION

As part of the City of Fort Collins Utilities (Utilities) Water Supply Vulnerability Study (Study), potential risks and uncertainties to both the Utilities water supply system and the Colorado-Big Thompson (C-BT) project, operated by the Northern Colorado Water Conservancy District (Northern Water), were identified, scored, and prioritized. These identified and prioritized risks and uncertainties are summarized in the *Risk Identification Technical Memorandum* (TM).

To quantify the impacts of these risks and uncertainties to the performance of Utilities' water supply system, baseline conditions for future scenarios were established in the three simulation models used in the Study. "Baseline conditions" consist of existing or currently planned water resources infrastructure and water rights portfolio, and existing operations. Next, the prioritized risks and uncertainties were assembled into scenarios that capture a variety of potentially impactful futures. These scenarios will be simulated in the three models and their performance will be compared to baseline conditions, quantifying their impact to the water supply system. This will help inform Utilities on which future conditions create significant vulnerabilities for their water supply system.

This TM presents the baseline assumptions for the three models used for the Study and the future conditions scenarios that will be simulated in them.

2.0 BASELINE ASSUMPTIONS

As noted above, baseline conditions are a future system state with existing or planned infrastructure, a portfolio of existing or planned water rights, and existing operations and policies surrounding water deliveries. Baseline conditions represent the conditions against which vulnerability impacts and, in later studies, proposed system improvements would be compared. Assumptions for baseline conditions were established in the three models included in the Study: the C-BT Quota Model, the Poudre Basin Network (PBN) Model, and the Fort Collins System Model (FC System Model). The baseline conditions across all three models do not include any identified risks or climate altered hydrology and are intended to represent the most reasonable future for planning purposes. Results of water supply system performance under the baseline conditions will be used to assess the impact of the selected scenarios and the vulnerability of the Fort Collins water system.

2.1 C-BT QUOTA MODEL

The C-BT Quota Model, developed and maintained by Northern Water, has several input controls for simulation in the model. This section presents the baseline settings for those input controls, organized similarly to how they are presented in the C-BT Quota model. All risks under "Simulation Settings" are off. These settings were set based on discussions between Northern Water and Fort Collins Utilities' staff.

- **Table 2.1** shows the baseline settings for initial storage contents, assuming Chimney Hollow is operational.
- **Table 2.2** shows the baseline settings for the C-BT municipal and industrial (M&I) and agricultural ownership controls
- **Table 2.3** shows the baseline settings for the Windy Gap controls
- **Table 2.4** shows the baseline settings for the additional controls

Table 2.1 - Initial Storage Contents in CBT Quota Model

Storage Item Name	Starting Value (acre-feet)
Lake Granby, Horsetooth and Carter Lake (LG+HT+CL) Beginning of Year (BOY) Active Contents	550,000
M&I C-BT Carryover Storage	20,000
Agricultural C-BT Carryover Storage	0
Windy Gap Storage in Lake Granby (LG)	0
Windy Gap Storage in Chimney Hollow (CH)	90,000
First Year Potential Regional Pool	0

Table 2.2 - C-BT M&I Ownership and Demand and Agricultural Demand

Item Name	Item Value
Initial M&I C-BT Units (1000 of units)	263.5
Annual Percent Increase in M&I Units (%)	0
Final M&I C-BT Units (1000 of units)	263.5
Initial Average M&I C-BT Demand (thousand acre-feet)	146.7
Annual Percent Increase in M&I Demand (%)	0
Final Average M&I C-BT Demand (thousand acre-feet)	146.7
Lease M&I Surplus C-BT to Agriculture	On

Table 2.3 - Windy Gap Input Settings

Windy Gap Item Name	Item Value
Project On/Off	On
In-Lieu Program	Off
Firming Project	On
Units not in Firming Project	40
Units in Firming Project	440
Demand, Non-Firming Project Participants (thousand acre-feet)	4
Demand, Firming Project Participants (thousand acre-feet)	26
Max Annual Firming to Move to Chimney Hollow (thousand acre-feet)	30

Table 2.4 - Additional Model Inputs

Item Name	Item Value
Annual Carryover Program Shrink (%)	10
Carryover Limit (%)	20
Regional Pool Program	On
Non-Charge Program	On
East Slope C-BT Priority Diversions	On

2.2 PBN MODEL

Baseline settings in the PBN model will be the same as those described in the CTP Modeling Report (CDM Smith, 2013). No additional adjustments will be made. A new suite of hydrologic traces based on the current climate were developed for this Study, as summarized in *Future Hydrologic Analysis TM #6*. These traces change some of the inputs to the PBN and will be used in the non-baseline simulated scenarios.

2.3 FC SYSTEM MODEL

The FC System Model Data Management System (DMS) controls inputs to the MODSIM model that simulates operations of the Fort Collins water supply system. This section presents the baseline settings for the DMS input controls organized similarly to how they are presented in the DMS.

- **Table 2.5** shows the baseline settings for the Halligan Reservoir input controls. Halligan Reservoir is assumed to be enlarged as described in the draft Halligan Reservoir Enlargement EIS documents for baseline conditions.
- **Table 2.6** shows the baseline settings for the demand input controls.
- **Table 2.7** shows the baseline settings for the water rights input controls.
- **Table 2.8** shows the baseline settings for the C-BT project input controls.

Table 2.5 - Halligan Reservoir Input Settings

Reservoir Input Item	Item Value
Reservoir Size (acre-feet)	8,125
Initial Volume (% of Total)	90
Link to LCUwc Season Capacity, acre-feet/year	2,388

Table 2.6 - Demand Input Settings

Demand Input Item	Item Value (acre-feet/year)
Large Contractual User – Single Use	3,004
Large Contractual User – Wholly Consumable	5,110
Population-Based Demand	28,304
Total Demand	**36,418**

Table 2.7 - Water Right Input Settings

Water Right Item	Item Value (Useable Shares)
C-BT	18,855
NPIC	3,563.75
NPIC # CBT units per share	3.2
WSSC	26.42
PVLC	201.21
New Mercer	59.62
Larimer Number 2	79.53
Arthur	440.88

Table 2.8 - C-BT Input Settings

Item Name	Item Value
C-BT Obligations, Total (shares)	3,411
% Reduction for Pipeline Decrees (%)	0
C-BT Rentals	Off
C-BT Carryover	On

The Total Demand value for the baseline modeling (Table 2.6) differs from previous modeling efforts due to how two specific demands are being captured in the updated modeling structure. The new modeling structure explicitly captures reuse plan related demands as part of the new Reuse Plan construct. The Large Contractual User – Wholly Consumable demand and the C-BT Obligations demand are therefore reduced accordingly. Additionally, the previous population-based demand value included demands related to an agreement with Fort Collins-Loveland Water District. This demand is now captured as part of the C-BT Obligation value in Table 2.8, as it better reflects operations. It should be noted that for the Baseline simulations, Colorado State University (CSU) is included within the population-based demand (as shown in table 2.6), but future scenario simulations, that use the Demand Tool, will reference CSU's contractual obligations as a Large Contractual User – Single Use demand.

3.0 SCENARIOS FOR SIMULATION

Scenarios of risks and uncertainties for simulation were assembled by Utilities and Northern Water staff. When assembling scenarios, there were several categories with different options that could be selected. This section summarizes the categories for simulation and identifies the options for consideration. Additionally, subsection 3.5 presents the identified scenarios that will be simulated, including the baseline. Model settings for these scenarios are assumed to be a future condition that is not necessarily tied to a specific year. Hydrology is run over a wide range of temperature and precipitation combinations that could take place anytime between now and a distant future year. Demand scenarios are developed through a demand model with inputs based on potential future scenarios. Finally, system risks are events that could happen anytime between now and the distant future.

3.1 HYDROLOGY

A new suite of hydrologic traces based on the current climate were developed for this Study, as summarized in *Future Hydrologic Analysis TM #6*. These traces include 100 synthetic traces of re-sequenced historical years and the historical hydrology, for a total of 101 available hydrologic traces. Due to simulation time constraints, not all 101 available hydrologic traces may be necessary for a given scenario. Therefore, a subset of 6 synthetic traces was selected from the full 100 using a process described in Section 2.4 of *Future Hydrologic Analysis TM #6*. This subset captures different drought types that are similar to, or more serve than droughts in the historical record to more robustly assess performance.

When assembling a scenario, it can have one of the three following hydrology options:

- Historical hydrology only
- Subset ensemble containing the 6 selected synthetic traces and the historical hydrology
- Full ensemble of 100 synthetic traces and the historical hydrology

Ultimately, each scenario simulated will be run under the full ensemble of 100 synthetic traces.

3.2 CLIMATE CHANGE SCENARIOS

The hydrologic traces, based on historical hydrology, as described in Section 3.1 can be adjusted by offsets in temperature and precipitation to capture the effects of potential future climate change. A total of 20 combinations of temperature and precipitation offsets (including no-change) can be applied to the hydrologic traces as described in *Future Hydrologic Analysis TM #6*. Temperature varies up to 8 degrees F warmer than current conditions, and precipitation varies between 10 percent drier and 15 percent wetter than current conditions.

When assembling a scenario, it can have one of the two following climate change options:

- No change in temperature or precipitation
- Full temperature and precipitation offset range (20 climate options)

3.3 DEMAND SCENARIOS

Demand scenarios will be generated by the Demand Model described in *Future Demand Estimating Methods TM #3.* In addition to representing effects of population growth,

development density and development type, demand forecasts from the Demand Model will be tied to overall climate (temperature and precipitation offsets), and the specific sequence of hydrology for each hydrologic trace. Utilities will choose two demand levels for simulation in future scenarios.

3.4 SYSTEM RISKS

System risks were identified and prioritized by staff from Utilities for their system and by staff from Northern Water for the C-BT system, as described in *Risks and Uncertainties TM #4*. The prioritized risks and uncertainties listed in **Table 3.1** were available for inclusion within a scenario. How these system risks are simulated is described in Section 4.1 of the *Risks and Uncertainties TM #4*.

Table 3.1 - List of Prioritized Utilities and Northern Risks and Uncertainties

ID	Risk or Uncertainty Name
A9a	Reuse Plan Gone
A9b	Reuse Plan Interrupted
AN2	Colorado River Hydrology Uncertainty / Major Outage of C-BT Project
D1	Demand Risks
O1	Outage – 24” Pipeline
O11	Outage - Pleasant Valley Pipeline
O17	Halligan Reservoir Not Enlarged
O18	No C-BT Carryover Storage
O2	Outage – 27” Pipeline
O3	Algal Blooms in storage reservoirs
O4	Outage - Michigan Ditch
O5	Outage - Horsetooth Reservoir Outlet
O8	Outage - Joe Wright Reservoir
ON12	Conveyance Systems to Horsetooth Outage
ON17	Farr Pump Plant Outage
ON18	Adams Tunnel Outage
ON19	Lake Granby Dam/Dike System Outage
ON20	Windy Gap Plant Outage
W1	Wildfires in Poudre Basin watershed
WN4	Wildfires – Northern East Slope

3.5 IDENTIFIED SCENARIOS FOR SIMULATION

Utilities Staff, in coordination with other stakeholders, identified 13 total scenarios for simulation, including baseline. These 13 scenarios are described below and summarized in **Table 3.2**. (Note: Utilities may revise one or more of these scenarios based on the results of the baseline analysis and pending simulations of individual system risks.)

- **Baseline** – As part of any vulnerability assessment, baseline conditions need to be established to quantify the negative impacts from other risks and/or uncertainties. The Baseline scenario developed for simulation in this study does not include any system risks, increased demands or climate-change influenced hydrology and the settings are listed in Section 2.0.

- **Climate Change Impacts** – Two of the highest perceived impactful risks were longer droughts not captured in the historical record and the compounding impacts of climate change (change in runoff volume and timing). This scenario includes the full hydrologic ensemble and a range of potential future climate change conditions. Because future climate change conditions include a no-change future, how climate change may worsen these drought conditions will be quantified. No additional system risks are included.

- **Loss of Storage** – Utilities presently has limited storage in their water supply system, potentially making them vulnerable to any future conditions where that limited storage is further reduced. This scenario captures the impacts to the water supply system if both the Halligan Reservoir expansion EIS is denied and Utilities loses their C-BT Carryover Storage account as decisions regarding both are ultimately beyond Utilities control. This scenario will be applied across all climate change options and hydrologic trace ensembles.

- **Increased Demands** – While future demand estimates account for uncertainty in water use and population, a scenario was included to capture the impacts of uncertain future demand growth. This scenario captures two potential demands generated from the Demand Tool as well as an increased demand outside the current planning horizon that is a fixed percentage higher than the greatest Demand Tool trace. This scenario will be applied across all climate change options and hydrologic trace ensembles.

- **Halligan Permitting Denial** – The baseline assumption includes the expansion of Halligan Reservoir, which at the time of Study has not competed the permitting process or been constructed. Because of the uncertainty around that assumption, this scenario is included to represent a future condition where the expansion of Halligan Reservoir expansion does not happen. This scenario will be applied across all climate change options and hydrologic trace ensembles.

- **Poudre River System, Acute Outage** – Infrastructure to deliver yield from the Poudre River to the city is potentially vulnerable to failures due to either natural disasters (landslides or wildfires) or emergency maintenance outages. This scenario captures the impact of a short - term outage of the 24-inch Pipeline, the 27-inch Pipeline, and the Pleasant Valley Pipeline, which are simulated as one link in the FC System Model. This scenario will be applied across all climate change options and hydrologic trace ensembles.

- **Poudre River System, Environmental Impacts** – Yields from the Poudre River are potentially vulnerable to prolonged environmental impacts that could cause constraints in delivery and treatment infrastructure. This scenario quantifies impacts on water supply performance due to algal blooms or environmental issues resulting from wildfires in source watersheds (e.g. increased sediment deposition). This scenario will be applied across all climate change options and hydrologic trace ensembles.

- **C-BT System, Acute Outage** –Utilities receives a significant portion of their yield from the C-BT project; therefore, risks to that system are included in the vulnerability analysis. There are a variety of potential causes for a short-term outage of critical C-BT delivery

infrastructure such as an outage of the Adams Tunnel or Farr Pumping Plant. This scenario captures the impact of this C-BT infrastructure risk to the performance of the Utilities water supply system. This scenario will be applied across all climate change options and hydrologic trace ensembles.

- **C-BT System, Long-Term Reduction** – It is not possible to predict if or when actual flows in the Colorado River below Lake Powell will fall below 75 million acre feet on a 10 year rolling average, how long actual flows in the Colorado River below Lake Powell could be below 75 million acre feet on a 10 year rolling average, or whether and how such flows would, under the Colorado River Compact or Upper Colorado River Compact, affect Colorado-Big Thompson Project diversions. Given these uncertainties, for purposes of the Vulnerability Study, Utilities assumed that in the event of a long-term C-BT project outage, the C-BT quota will be set to 25% for a 10-year period. This assumption was made by Utilities based on total storage capacity in the C-BT system and the potential length of this type of outage. It is intended to capture the possible effects of a wide range of conditions that could affect C-BT deliveries over an extended period and does not represent any defined future Colorado River Basin or C-BT scenario.

- **Horsetooth Reservoir Outage** – Lack of redundancy with the Horsetooth Reservoir outlet works puts deliveries of Utilities' yield from this reservoir at risk. Recent problems with the outlet works have shown that this type of risk can occur; therefore, it was included as a scenario. This scenario will be applied across all climate change options and hydrologic trace ensembles.

- **Reuse Plan Changes** – There are future uncertainties around the Reuse Plan due to changes in water use and energy generation facilities, which are outside Utilities' control. This scenario captures impacts to water supply system performance due to either an elimination of the Reuse Plan or changes to it that reduce the available supply to Utilities. This scenario will be applied across all climate change options and hydrologic trace ensembles.

Table 3.2 - Summary of identified scenarios for simulation

ID	Scenario Name	Hydrology Trace	Climate Change	Demand Scenarios	System Risks
1	**Baseline**	Baseline trace	None	Baseline Demands	None
2	**Climate Change Impacts**	Full ensemble (101 traces)	All	Baseline Demands	None
3	**Loss of Storage**	Full ensemble (101 traces)	All	Two selected Demand Model Scenarios	No Halligan Expansion, no Carryover – Entire simulation period.
4	**Increased Demands**	Full ensemble (101 traces)	All	Two selected Demand Model Scenarios plus one Scenario with a fixed increase	None
5	**Halligan Permitting Denial**	Full ensemble (101 traces)	All	Two selected Demand Model Scenarios	No Halligan Expansion – Entire simulation period.
6	**Poudre River System - Acute Outage**	Full ensemble (101 traces)	All	Two selected Demand Model Scenarios	24 - inch Pipeline, 27 - inch Pipeline, and PVP. 100% outage for 12 months starting in October of year 10.
7	**CBT System - Environmental Impacts**	Full ensemble (101 traces)	All	Two selected Demand Model Scenarios	Algal blooms – CBT water use shut off for one year, June through October; East slope wildfires – effective for 3 years (CBTQ model) Both risks start in a randomly selected dry-year(1).
8	**Poudre River System - Environmental Impacts**	Full ensemble (101 traces)	All	Two selected Demand Model Scenarios	Algal blooms – CBT water use shut off for one year, June through October; Wildfires – effective for 10 years. 24 - inch Pipeline, 27 - inch Pipeline, and PVP. Year 1 - 100% outage from June to September, Years 2 – 10, 25% from April - October. Both risks start in a randomly selected dry-year(1).

9	**CBT System – Acute Outage**	Full ensemble (101 traces)	All	Two selected Demand Model Scenarios	Adams Tunnel outage - 25% quota for 3 years starting year 11.
10	**CBT System – Long-Term Reduction**	Full ensemble (101 traces)	All	Two selected Demand Model Scenarios	Quota set to 25% for 10 years following a randomly selected dry-year(1).
11	**Horsetooth Reservoir Outage**	Full ensemble (101 traces)	All	Two selected Demand Model Scenarios	O5- Horsetooth outage for 9 months starting in October year 10.
12	**Reuse Plan Change 1**	Full ensemble (101 traces)	All	Two selected Demand Model Scenarios	A9a – 100% outage – Entire simulation period.
13	**Reuse Plan Change 2**	Full ensemble (101 traces)	All	Two selected Demand Model Scenarios	A9b – 50% reduction – Entire simulation period.

Note: (1) Dry year is selected by binning current hydrology into dry, average and wet groups. A random year is then selected from within the dry bin. The same random year is used for all “dry-year trigger” scenarios

4.0 CONCLUSIONS AND NEXT STEPS

Utilities staff set baseline assumptions for the three water resources models used in the Study to quantify impacts and assess vulnerability. Additionally, staff assembled hydrology, climate, demand, and system risk settings into 13 scenarios that capture a variety of potential future conditions that could threaten Utilities' water supply system. The next step is to simulate the conditions for each scenario and use the resulting water supply system metrics and level of service goals to identify the scenarios of concern to Utilities based on their impacts to water system performance.

AGU PUBLICATIONS

Water Resources Research

RESEARCH ARTICLE
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The twenty-first century Colorado River hot drought and implications for the future

Bradley Udall[1,2] **and Jonathan Overpeck**[2,3]

[1]Colorado Water Institute, Colorado State University, Fort Collins, Colorado, USA, [2]Colorado River Research Group, Boulder, Colorado, USA, [3]Department of Geosciences and Department of Hydrology and Atmospheric Sciences, Institute for the Environment, University of Arizona, Tucson, Arizona, USA

Key Points:
- Record Colorado River flow reductions averaged 19.3% per year during 2000–2014. One-third or more of the decline was likely due to warming
- Unabated greenhouse gas emissions will lead to continued substantial warming, translating to twenty-first century flow reductions of 35% or more
- More precipitation can reduce the flow loss, but lack of increase to date and large megadrought threat, reinforce risk of large flow loss

Supporting Information:
- Supporting Information S1

Correspondence to:
B. Udall,
Bradley.udall@Colostate.edu

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Abstract Between 2000 and 2014, annual Colorado River flows averaged 19% below the 1906–1999 average, the worst 15-year drought on record. At least one-sixth to one-half (average at one-third) of this loss is due to unprecedented temperatures (0.9°C above the 1906–1999 average), confirming model-based analysis that continued warming will likely further reduce flows. Whereas it is virtually certain that warming will continue with additional emissions of greenhouse gases to the atmosphere, there has been no observed trend toward greater precipitation in the Colorado Basin, nor are climate models in agreement that there should be a trend. Moreover, there is a significant risk of decadal and multidecadal drought in the coming century, indicating that any increase in mean precipitation will likely be offset during periods of prolonged drought. Recently published estimates of Colorado River flow sensitivity to temperature combined with a large number of recent climate model-based temperature projections indicate that continued business-as-usual warming will drive temperature-induced declines in river flow, conservatively −20% by midcentury and −35% by end-century, with support for losses exceeding −30% at midcentury and −55% at end-century. Precipitation increases may moderate these declines somewhat, but to date no such increases are evident and there is no model agreement on future precipitation changes. These results, combined with the increasing likelihood of prolonged drought in the river basin, suggest that future climate change impacts on the Colorado River flows will be much more serious than currently assumed, especially if substantial reductions in greenhouse gas emissions do not occur.

Plain Language Summary Between 2000 and 2014, annual Colorado River flows averaged 19% below the 1906–1999 average, the worst 15-year drought on record. Approximately one-third of the flow loss is due to high temperatures now common in the basin, a result of human caused climate change. Previous comparable droughts were caused by a lack of precipitation, not high temperatures. As temperatures increase in the 21st century due to continued human emissions of greenhouse gasses, additional temperature-induced flow losses will occur. These losses may exceed 20% at mid-century and 35% at end-century. Additional precipitation may reduce these temperature-induced losses somewhat, but to date no precipitation increases have been noted and climate models do not agree that such increases will occur. These results suggest that future climate change impacts on the Colorado River will be greater than currently assumed. Reductions in greenhouse gas emissions will lead to lower future temperatures and hence less flow loss.

1. Introduction

A large number of studies over the last 25 years have considered the future runoff of the Colorado River (Figure 1) under climate change. Nearly all of these studies have cautioned that future warming will deplete the flow of the river, but the results have varied from minor to major [*Nash and Gleick*, 1991; *Christensen et al.*, 2004; *Milly et al.*, 2005; *Brekke et al.*, 2007; *Christensen and Lettenmaier*, 2007; *National Research Council*, 2007; *Seager et al.*, 2007; *Barnett and Pierce*, 2008; *Ray et al.*, 2008; *Barnett and Pierce*, 2009; *Rajagopalan et al.*, 2009; *Cayan et al.*, 2010; *Reclamation*, 2013; *Harding et al.*, 2012; *Seager et al.*, 2012; *Vano et al.*, 2012; *Ficklin et al.*, 2013; *Vano et al.*, 2014; *Ayers et al.*, 2016; *Milly and Dunne*, 2016]. In contrast, the latest U.S. Government assessment implies little or no change is likely because precipitation increases will be sufficient to maintain temperature-depleted flows [*Reclamation*, 2016]. Fifteen years into the twenty-first century, the emerging reality is that climate change is already depleting

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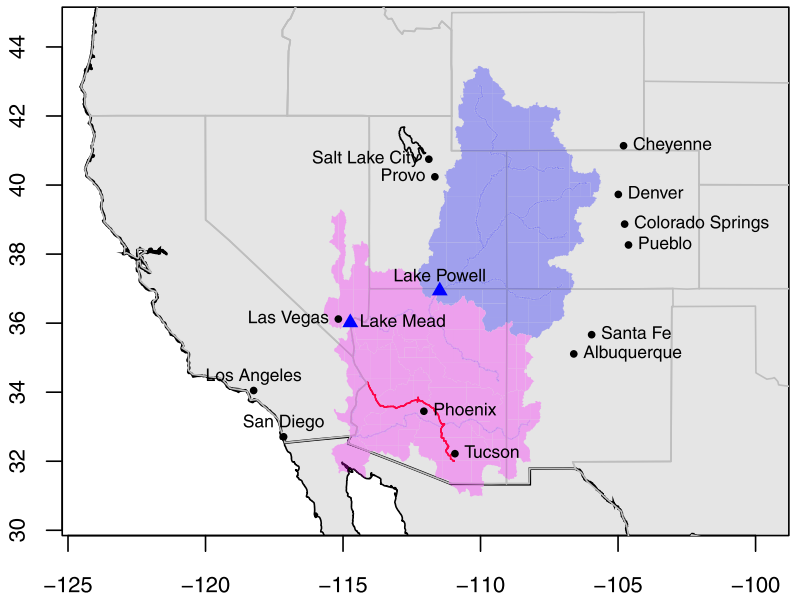

Figure 1. Map of the Colorado River Basin. Lower and Upper Basins, major U.S. cities receiving Colorado River water, major tributaries, and Lakes Mead and Powell are shown. The Central Arizona Project canal in red.

Colorado River water supplies at the upper end of the range suggested by previously published projections. Record setting temperatures are an important and underappreciated component of the flow reductions now being observed.

Between the start of the drought in 2000 and the end of 2014, our analysis period, annual flow reductions averaged 19.3% below the 1906–1999 normal period, and Lakes Mead and Powell, the nation's two largest reservoirs, ended the period at approximately 40% of maximum volume despite starting the period nearly full [*Wines*, 2014; *Colorado River Basin Stakeholders*, 2015] (Figure 2a). This drought has continued into 2015 and 2016 with higher, but still below normal, flows estimated at 94% in 2015 and 94% in 2016 with unusual late season May and June precipitation in both years that raised runoff by nearly 20% [*Alcorn*, 2015, 2016]. Despite these smaller recent reductions, Lake Mead continues to decline and in May 2016 it hit a level not seen since its initial filling in the 1930s [*James*, 2016]. The overall Colorado River reservoir system stores 4 times the annual flow of the river, one of the largest ratios in the world. This storage provides a large drought buffer when full. However, when the reservoirs are low, shortage risk can be high for years because high demands, now equal to twentieth century average flow, make it difficult to refill system storage [*Reclamation*, 2012]. While the multiyear California drought has been garnering more national attention, the more slowly unfolding Colorado River drought is every bit as serious and also has national and international ramifications [*Wines*, 2014].

The Colorado River Basin encompasses seven states and northern Mexico and is home to 22 federally recognized tribes. The river provides municipal and industrial water for 40 m people distributed across every major Southwestern city both within and without the basin, including Los Angeles, San Diego, Las Vegas, Phoenix, Tucson, Salt Lake City, Denver and the entire Front Range of Colorado, Albuquerque, and Santa Fe [*Reclamation*, 2012].

Continued low flows would result in additional declines at Lake Mead, eventually requiring Lower Basin (Arizona, California, Nevada) water delivery shortages with mandatory cutbacks imposed primarily on Arizona, but also Nevada and Mexico [*Verburg*, 2011]. At the same time, Upper Basin (Colorado, New Mexico, Utah, Wyoming) water users would continue to endure physical shortages from a lack of water. These initial Lower Basin Lake Mead delivery shortages and Upper Basin physical shortages are manageable to a point; however, under current operating rules with continued low flows during the next 6 to 8 years Lake Mead would drop to elevation 305 m (1000 feet) above sea level, resulting in a number of serious and unprecedented problems [*Collum and McCann*, 2014].

In the Lower Basin, Arizona could theoretically lose its water allocation for the entire Central Arizona Project canal, a critical $4.4B, 530 km cross-state 2 bcm/yr water source for 4.7 m people, multiple sovereign Indian

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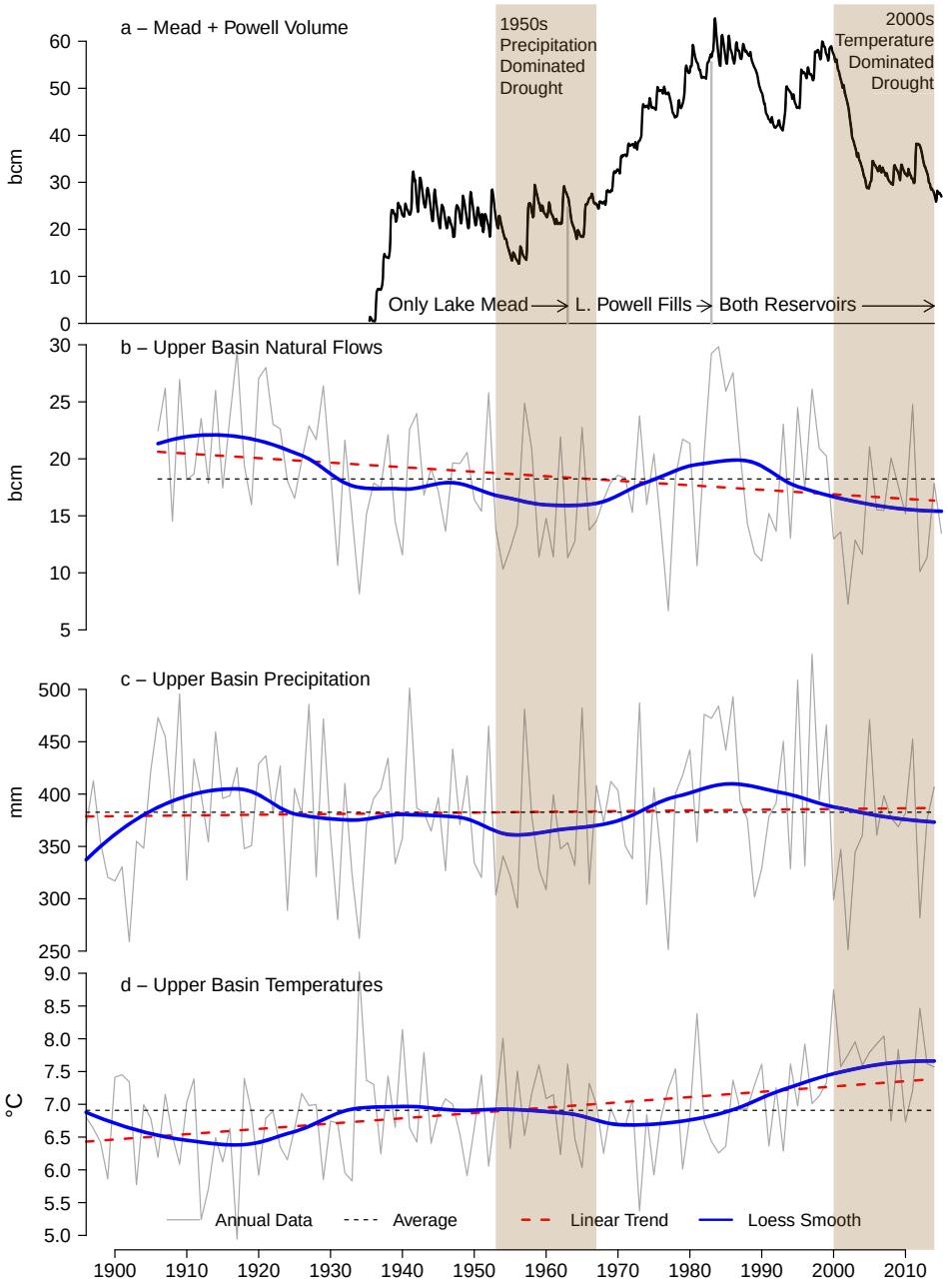

Figure 2. (a) Lakes Mead and Powell combined monthly contents. Upper Basin annual Colorado River (b) runoff at Lees Ferry from 1906 to 2014, (c) precipitation and (d) temperatures from 1896 to 2014. Mead first filled in 1935, Powell in 1963 (supporting information Text S1). Two 15-year drought periods, 1953–1967 and 2000–2014, are highlighted and discussed in main text.

nations, and over 120,000 irrigated hectares [*Glennon*, 1995; *Colorado River Basin Stakeholders*, 2015]. This canal currently relies on occasional but uncertain "equalization" releases from Lake Powell that only occur with irregular and rare large Powell inflows. The extra water is delivered when Lake Powell reaches levels substantially higher than Lake Mead, a use allowed under the 1922 Colorado River Compact section III (e) and formalized most recently under rules established in a 2007 Record of Decision for coordinated operations of Lakes Powell and Mead and for shortage sharing in the Lower Basin [*Department of Interior*, 2007].

Under normal operating rules, without these extra inflows, Lake Mead has excess outflows of 1.5 bcm per year, the so-called Lower Basin "structural deficit" [*Collum and McCann*, 2014]. The structural deficit was created in 1968 when Congress authorized the Central Arizona Project (CAP). In order to obtain the support of

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the large California Congressional delegation, Arizona agreed to rely on this unused, but in the long run unreliable water, because there was not enough remaining unallocated Lower Basin water. The CAP had long been a desire of Arizona and the state was willing to make this bargain despite its flaws [*Johnson*, 1977]. This same water is first available for use by the Upper Basin under the Colorado River Compact, but heretofore has not been developed for Upper Basin use. A plan to augment the Colorado River with flows from outside the basin, discussed during the hearings on the legislation, but not included in the final package due to opposition from potential source areas, was never revisited by Congress. Reclamation in 2011 said that such augmentation was now unlikely.

The structural deficit only became a problem when the CAP was fully completed in the mid-1990s combined with the drought that began in 2000. Upper Basin demand growth has also played a small role, although Upper Basin demands are still much less than forecast in 1968 for the year 2000 [*Tipton and Kalmbach, Inc*., 1965; *Johnson*, 1977]. The recent Lake Mead declines are strongly influenced by this imbalance, and solutions to this deficit have been a recent focus of the Basin states and federal government [*Central Arizona Project*, 2016; *Davis*, 2016].

The Upper Basin also has serious issues, one of which ripples into the Lower Basin. When the surface of Lake Mead declines to an elevation 305 m (1000 feet) above sea level, Lake Powell will also be below its minimum power pool 75% of the time [*Collum and McCann*, 2014]. This occurs in part because low Mead levels make "equalization" releases from Powell more likely thus driving Powell lower. Hydropower losses at Lake Powell could result in substantial rate increases for irrigators who rely on the reservoirs for long term lower cost power contracts, and would also dry up funding for basin-wide programs necessary for water delivery environmental compliance [*Adler*, 2007; *Collum and McCann*, 2014]. Under such low reservoir conditions, there is also a high likelihood that the Upper Basin states would have to curtail existing water deliveries to cities such as Denver, Colorado Springs, Albuquerque and Salt Lake City in order to make required deliveries to Lake Mead. Heretofore, largely because of the structure of the Colorado River Compact, the Upper Basin and Lower Basin have been managed separately. With permanent flow declines of approximately 20%, however, the required deliveries to Lake Mead would become a hardship on the Upper Basin, as well as create Lower Basin delivery shortages [*Reclamation*, 2007; *Barnett and Pierce*, 2009; *Rajagopalan et al*., 2009]. The original compact, signed during one of the wettest periods in the last 450 years [*Woodhouse et al*., 2006], did not envision how large scale flow declines would be managed between the basins, and such declines could cause an allocation crisis between the Upper and Lower Basins [*Adler*, 2008].

Understanding the cause of, and reacting properly to, the ongoing drought is critical to the future of the Southwest. Herein we investigate the role of precipitation versus temperatures as causes of the current drought, provide temperature-based and precipitation-based twenty-first century flow projections and provide policy implications of these findings. Our approach separates the impacts of high-confidence temperature projections from those associated with the much lower-confidence projections of future precipitation using a simple but powerful sensitivity technique. Moreover, we make a novel—and important—case that there is a high likelihood that the impacts of continued atmospheric warming will overwhelm any future increases in precipitation because prolonged dry periods lasting multiple decades are likely to negate the beneficial impacts of additional precipitation during other times.

2. Causes of the 2000–2014 Drought

The 2000–2014 drought is defined by the lowest average annual flows for any 15-year period in the historical record. To analyze this drought, gridded 4 × 4 km temperature and precipitation data from 1896–2014 for the area above Lees Ferry were obtained from the Precipitation-Elevation Regression on Independent Slopes (PRISM) model [*Daly et al*., 1994; *Guentchev et al*., 2010; *Oyler et al.,* 2015a, 2015b; *Rangwala et al.,* 2015]. In addition, we obtained reservoir contents and natural flows at Lees Ferry from the U.S. Bureau of Reclamation (Reclamation) (Text S1). Lees Ferry is situated just below Lake Powell and is the Compact dividing line between the Upper and Lower Basins. Approximately 85% of the flow originates above Lees Ferry [*Christensen and Lettenmaier*, 2007].

Historically, Upper Colorado River Basin precipitation has been the main Colorado River runoff driver such that high flow years (1920s, 1980s) were associated with high precipitation and low flow years (1930s, 1950s) with low precipitation (Figures 2b and 2c). The current drought (our study period is 2000–2014, but

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Table 1. Winter/Summer/Annual Upper Basin Mean Water Year Precipitation

	1953–1967			2000–2014			1896–2014	
	mm			mm			mm	
	Total	Anomaly	Anomaly % of Mean (%)	Total	Anomaly	Anomaly % of Mean (%)	Mm	% Avg
Winter (Oct to Mar)	176	−16	−8.6	187	−5	−2.7	192	100
Summer (Apr to Sep)	184	−7	−3.6	179	−12	−6.4	191	100
Total	359	−23	−6.1	365	−17	−4.6	383	100

the drought is still on-going), with its modest −4.6% precipitation decline and −19.3% flow decline, stands in stark contrast to the second-lowest 15-year flow period (1953–1967), a precipitation-driven drought with averaged precipitation reductions of −6.1% per year and flow reductions of −18.1% per year (Figures 2b and 2c and Table 1). Compared to the 1950s drought, the 2000s feature much more (near normal) winter precipitation (−8.6% 1950s decline versus −2.7% 2000s) and significantly less summer precipitation (−3.6% 1950s decline versus −6.4% 2000s). The 2000s precipitation decline is only 75% of the decline in the 1950s, thus begging the question of why the recent drought was more serious. What has changed is that temperatures in the runoff producing Upper Basin are now 0.9°C above the 1896–1999 average and are the highest in the gaged record; whereas temperatures during the 1953–1967 drought were much cooler and only slightly above the 1896–1999 average (Figure 2d and Table 2). This makes the current drought unprecedented in the gaged record.

In contrast to the more precipitation-driven current California drought [*Diffenbaugh et al*., 2015; *Williams et al*., 2015], lack of precipitation is only partially to blame for the Colorado River runoff declines during the last 15 years. Instead, approximately a third, or more, of the recent Colorado River flow reduction is most likely a result of record-setting warmth. Since 1988 an increase in the frequency of warm years has been strongly associated with lower flows than expected [*Woodhouse et al*., 2016], suggesting an important role for temperature in flow losses. Such temperature-driven droughts have been termed "global-change type droughts" and "hot drought," with higher temperatures turning what would have been modest droughts into severe ones, and also increasing the odds of drought in any given year or period of years [*Breshears et al*., 2005; *Overpeck*, 2013]. Higher temperatures increase atmospheric moisture demand, evaporation from water bodies and soil, sublimation from snow, evapotranspiration (ET) from plants, and also increase the length of the growing season during which ET occurs [*Pitman*, 2003; *Weiss et al*., 2009; *Seneviratne et al*., 2010; *Seager et al*., 2015a]. Warm season (April to September) warming has been identified by models as especially important in reducing Colorado River flows because of the increases in ET from longer growing seasons [*Das et al*., 2011]. Increases in measured vapor pressure deficits in the Southwest caused by warming and a decrease in water vapor provide strong support for higher ET during the recent drought [*Seager et al*., 2015b]. As increasing temperatures drive further drying, additional positive feedbacks are possible in the form of lower humidity and less evaporative cooling, decreased cloudiness and increased incident radiation, as well as decreased snow cover and more radiative heating [*Betts et al*., 1996; *Brubaker and Entekhabi*, 1996; *Pitman*, 2003; *Seneviratne et al*., 2010]. In the twentieth century, droughts were associated almost exclusively with a lack of precipitation. In this century, however, high temperatures alone can lead to anomalously dry conditions.

Table 2. Upper Basin Water Year Flows and Temperatures

	Average Annual Flow		Average Annual Temperature	
Period	bcm	% 1906–1999	°C	°C Anomaly to 1896–1999
1953–1967	15.38	81.9	7.0	0.2
2000–2014	15.15	80.7	7.7	0.9
1906–1999	18.77	100.0	6.8	0.0
1906–2014	18.27	97.3	6.9	0.1

3. Estimates of 2000–2014 Temperature-Induced Flow Loss

Over the last several years several studies specific to the Colorado River Basin have investigated the specific relationships among temperatures, precipitation and flow in the basin using the concepts of temperature

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sensitivity and precipitation elasticity [*McCabe and Wolock*, 2007; *Nowak et al*., 2012; *Vano et al*., 2012, 2014; *Vano and Lettenmaier*, 2014]. Temperature sensitivity is defined as the percent change in annual flow per degree rise in annual temperature. Precipitation elasticity is defined as the fractional change in annual flow divided by the fractional change in annual precipitation [*Vano et al*., 2012]. Note that elasticity has been studied for both increases and decreases in precipitation, whereas sensitivity is typically investigated only for temperature increases. These numbers can be determined empirically and through model studies.

Previous studies on temperature sensitivity and precipitation elasticity show that future impacts to streamflow from increases in temperatures and changes in precipitation can be considered separately using sensitivity and elasticity, and then added together to produce flow estimates [*Vano et al*., 2014; *Vano and Lettenmaier*, 2014]. Considering these effects separately and additively is a powerful conceptual tool for investigating climate change impacts because of the ease in measuring the two variables for current impacts and the wide availability of temperature and precipitation projections from global climate models for assessing future impacts. In addition, the large differences in certainty associated with future changes in the two variables (temperature will surely increase, whereas precipitation may increase or decrease—see below) helps to set apart the risk of future changes in flow associated with each variable.

Vano et al. [2012, 2014], *McCabe and Wolock* [2007], and *Nowak et al*. [2012] provide multiple estimates of the flow sensitivity of the Colorado River flow to temperature using three different methods. *Vano et al*. [2012, 2014] utilized six high-resolution, commonly used hydrology models and two different temperature adjustment methods to obtain Lees Ferry temperature sensitivities. They report an average sensitivity of −6.5%/°C warming with a one standard deviation range from −3.0% to −10.0%/°C for the Upper Basin. Approximately 50% models show increasing sensitivity and 50% decreasing sensitivity as temperatures warm so we elect to use a constant sensitivity over all future temperatures. *McCabe and Wolock* [2007] constructed a simple water balance model that infers an average temperature sensitivity of −8.9%/°C and *Nowak et al*. [2012] found an empirical temperature sensitivity of −13.8%/°C.

We use the complete one standard deviation range (−3%/°C to −10%/°C) of the *Vano et al*. [2012, 2014] temperature sensitivity estimates as they were the most conservative and rigorous of the three studies we investigated. Using this range, we found that recent warming of 0.9°C has likely already reduced river flows from −2.7% to −9% from the mean 1906–1999 flow. This represents approximately one-sixth to one-half (average of one-third) of the total flow loss during the 2000–2014 drought.

The higher temperature sensitivities of the two other studies suggest the actual Colorado River temperature sensitivities are near the upper end and possibly exceed the *Vano et al*. [2012, 2014] estimates. These higher sensitivities imply much greater temperature-induced losses during the current drought (−7.9% to −12.3% versus −2.7% to −9%). Empirical results from the 2000 to 2014 drought also point to mid to high temperature sensitivities. *Vano et al*. [2012] report precipitation elasticities ranging from 2 to 3 at Lees Ferry. Thus, using a midrange precipitation elasticity of 2.5, the 2000–2014 annual −4.6% precipitation decline implies runoff reductions of −11.4%, leaving the remaining −7.9% decline to be explained by other causes. If temperature were the sole cause of this remaining decline, the inferred temperature sensitivity is −8.8%/°C. Using a precipitation elasticity of 3.0 implies a temperature sensitivity of −6.2%/°C, very close to the midrange Vano et al., sensitivity. These temperature sensitivities imply large losses as temperatures rise, the subject of the next section.

4. Twenty-First Century Flow Response to Changing Temperatures and Precipitation

For the analysis on how future temperatures and precipitation would affect runoff, and for investigating how well current linked climate-hydrology models can reproduce the current drought, we used Reclamation's climate projection data sets [*Brekke et al*., 2013, 2014]. These data sets use Coupled Model Intercomparison Project 3 and 5 (CMIP3, CMIP5 after the class of climate models used) climate model projection data linked to the Variable Infiltration Capacity hydrology model to produce flows from 1950 to 2099 (supporting information Text S2, Figures S2, and S3)] [*Liang et al*., 1996; *Meehl et al*., 2007; *Moss et al.,* 2010; *Taylor et al*., 2012].

The same temperature sensitivity and precipitation elasticity numbers discussed above can be used to estimate future flow reductions using climate model outputs under high (business-as-usual, SRES A2 and

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RCP8.5) and moderate (somewhat reduced by mitigation, SRES A1B and RCP4.5) greenhouse gas emissions to the atmosphere. By 2050, moderate and high emissions are projected to yield Upper Basin *mean* warming of 2.6–2.8°C (Figure 3), three times recent warming, and by 2100, warming of 3.6°C under moderate emissions and 5.4°C under high emissions. This warming implies total multimodel mean temperature-induced flow losses at midrange sensitivity of −6.5%/°C of about −17% by midcentury and −25% to −35% at end-century (Figures 4 and 5). The multimodel mean complete flow loss *range* over both periods and both emissions is approximately −8% to −55% using the lower and upper temperature sensitivities (Figures 4 and 5). As discussed above, there is little empirical evidence that the true temperature sensitivity of flow to temperature increase is near the low sensitivity.

Temperature-induced losses may be somewhat buffered by projected additional precipitation that can increase runoff by 2–3% for every 1% change in precipitation [*Vano et al.*, 2012]. At midcentury precipitation increases of +4–+11% given a midrange elasticity of 2.5 would balance the range of temperature-induced flow losses at a midrange—6.5%/°C sensitivity (Figure 5, right *y* axis). At end-century, with the same sensitivity and elasticity, additional precipitation increases of +4–+20% would balance the range of possible temperature-driven losses. At a higher −10%/°C sensitivity, the balancing precipitation would need to be as great as +15% or more at midcentury and +22% or more at end-century. While these may seem like relatively small increases in precipitation, and thus possible, they would represent a major and unprecedented change in precipitation regime compared to the observed historical variation in precipitation (Figure 2c). During the twentieth century, for example, the wettest 10-year period (1983–1997) had only a +8% precipitation increase. This unusual period was marked by major floods downstream of Lakes Powell and Mead due to uncontrolled reservoir spilling and the near catastrophic loss of the spillways at Glen Canyon Dam [*Udall*, 1983].

Vano and Lettenmaier [2014] argue that the sensitivity-based approach used in our projections provides similar estimates of future streamflow to those generated with more computationally intensive coupled-model methods, except for some (i.e., 10%) overstatement of flow reductions at the highest levels of possible warming by 2100 (e.g., the business-as-usual SRES A2 scenario used in the CMIP3 projections and the RCP8.5 in the CMIP5 projections). This would reduce the end of century high emissions mean flow reductions shown in Figure 5 to a still very significant −45% by 2100.

Recent studies have suggested that CO_2 fertilization may increase plant water efficiency thus reducing future evapotranspiration which could serve to mitigate our projected losses [*Milly and Dunne*, 2016; *Swann et al.*, 2016]. Both studies call into question results that show large portions of the globe drying in the twenty-first century [e.g., *Dai*, 2012; *Cook et al.*, 2014]. However, *Milly and Dunne* [2016] and *Swann et al.* [2016] show that, despite this increase in plant water use efficiency, the Southwestern US will still dry, a finding that is consistent with multiple global assessments showing substantial drying risk to midlatitude areas such as the Colorado River Basin. Moreover, a recent Australian study found that higher

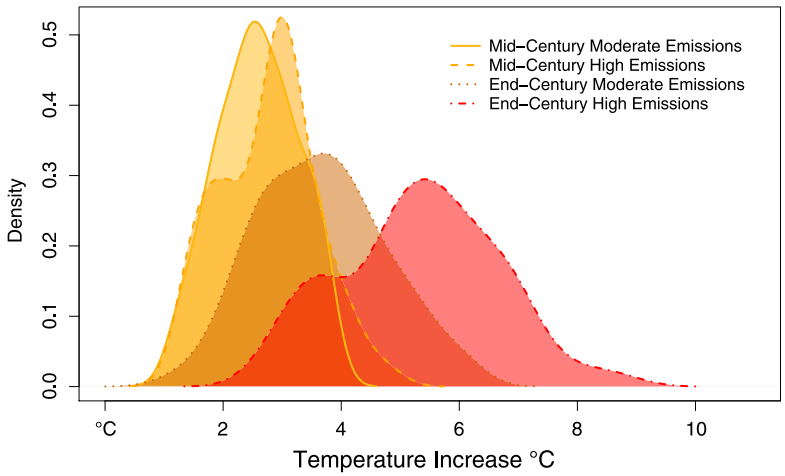

Figure 3. Probability density functions of Upper Colorado River Basin temperature projections for midcentury and end-century under moderate (SRES A1B and RCP4.5) and high (SRES A2 and RCP8.5) emissions.

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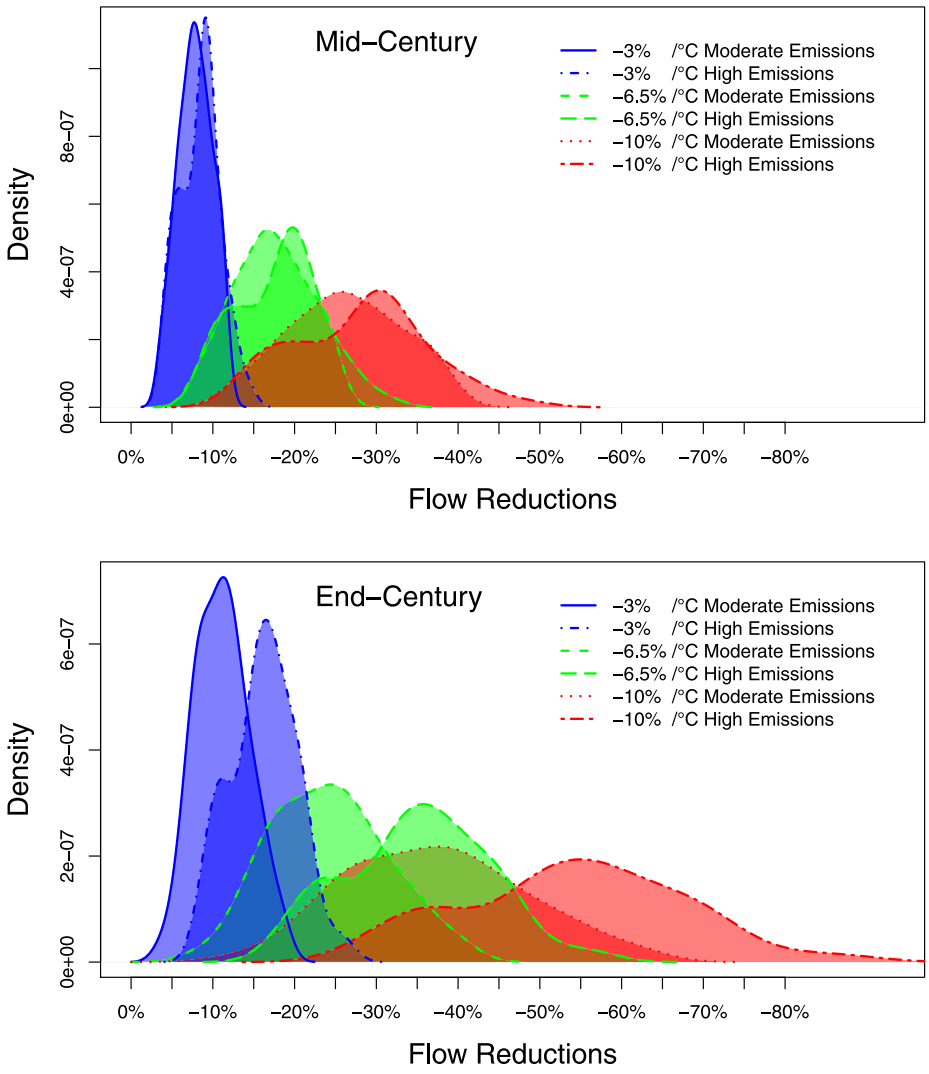

Figure 4. Probability density functions of Upper Colorado River Basin temperature-induced flow reductions for midcentury and end-century with the three temperature sensitivities (−3%, −6.5%, −10%) and the two levels of emissions (Moderate: SRES A1B and RCP4.5 and High: SRES A2 and RCP8.5).

evapotranspiration associated with the increased plant growth stimulated by higher CO_2 outweighed any CO_2-related water-use efficiency effect, and served to reduce streamflows in semiarid regions [*Ukkola et al.*, 2015], a trend that must be exacerbated by the temperature-induced lengthening of the growing season. These results suggest that plant physiological responses are likely consistent with our results, and in any case, do not invalidate them.

5. Megadrought Risks to Flows

Megadroughts lasting decades in the Colorado River Basin have occurred in the past, with resulting substantial flow reductions [*Meko et al.*, 2007]. Multiple papers now suggest there is high twenty-first century risk for megadrought in the American Southwest and that the risk will increase as temperatures rise [*Ault et al.*, 2014; *Cook et al.*, 2015; *Ault et al.*, 2016]. In addition, current GCMs underrepresent the frequency of megadrought [*Ault et al.*, 2012, 2013]. These findings provide additional support for large flow reductions during at least multidecadal drought periods and suggest that current twenty-first century flow projections underrepresent this risk.

Significant Colorado River flow losses occurred during previous multidecadal megadroughts. During the twelfth century, flow reductions of approximately −16% occurred during one 25-year period [*Meko et al.*,

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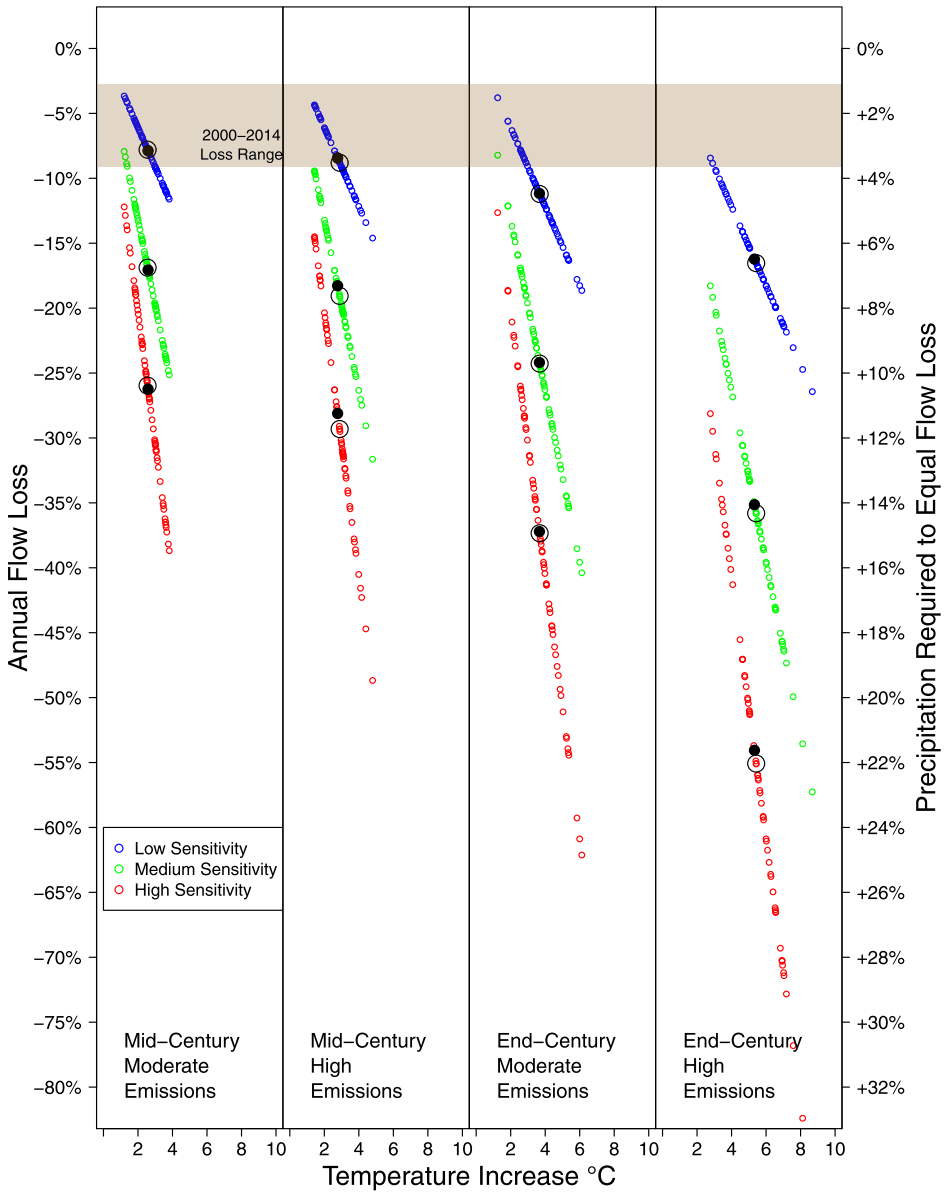

Figure 5. Temperature-induced flow losses by model run (one per dot) with temperature increases shown on horizontal axis. For each period (midcentury, end-century) and emissions type (moderate, high), flow losses for each model run are shown with the 3 (low = −3%/°C, medium = −6.5%/°C, high = −10%/°C) temperature sensitivities. Black dots/circles are averages/medians for each sensitivity. Precipitation increases needed to counteract flow losses at right are based on 2.5 precipitation elasticity. Range for the temperature-induced losses during 2000–2014 drought are shown in shaded brown at the top (supporting information Text S5).

2007]. Evidence indicates that hemispheric and Southwest temperature anomalies were significantly smaller during past megadroughts than the rapid on-going current warming that could easily exceed 4–5°C by the end of century under business-as-usual emissions [*Salzer and Kipfmueller*, 2005; *Mann et al.*, 2009; *Salzer et al.*, 2014] (Figure 5). Using the additivity concepts discussed above, additional warming of 1°C, 2°C, or 3°C beyond the historic twelfth century megadrought temperatures would have reduced the −16% flow declines by an additional −6.5%, −13%, or −19.5% at medium temperature sensitivity. These additional reductions would have thus turned a −16% flow decline into declines of −21.5%, −28%, or −34.5%, losses near the middle of our projections.

There is recent strong evidence that continued warming over the next 80 years could increase the risk of multidecadal drought [*Ault et al.*, 2014, 2016; *Cook et al.*, 2015]. Independent of the added drought risk due

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to continued warming, the risk of a 35-year precipitation-deficit drought later in this century exceeds 15% within a 50-year period [*Ault et al*., 2014]. In contrast, with continued anthropogenic warming, the risk of multidecadal megadrought in the Southwest increases to over 90% over this century if there is no increase in mean precipitation; even if modest precipitation increases do occur, the risk will still exceed 70% [*Ault et al*., 2014, 2016]. At medium warming (4°C), 20–30% precipitation increases will be needed to reduce megadrought risk below 50% and at high amounts of warming (>6°C), it will take a ~40% increase in precipitation to reduce megadrought risk below 50% [*Ault et al*., 2016]. These changes in precipitation are huge and unlikely, and they would still only reduce megadrought risk to below 50%.

Both the CMIP3 and CMIP5 Global Climate Models may not adequately reproduce the frequency of occurrence of known past decadal and multidecadal precipitation droughts [*Ault et al*., 2012, 2013]. In the Colorado River Basin empirical evidence of this problem can be found in the linked GCM-hydrology model results from Reclamation's projections for the basin [*Brekke et al*., 2014]. Approximately half of the CMIP5 models and one-quarter of the CMIP3 models cannot simulate the 2000–2014 drought at any point in the twenty-first century (supporting information Text S3 and Tables S1–S4). This wet bias significantly affects the mean flows of drought-capable and nondrought capable models. At the end of the twenty-first century, the models unable to simulate the current drought are much wetter (109% of twentieth century average Lees Ferry runoff for CMIP3, 113% for CMIP5) than the models that are able to simulate the current drought (85% of average runoff for CMIP3, 91% CMIP5) (supporting information Tables S1–S4). These flow differences are greater than 20%, and represent the difference between serious management challenges and significant oversupply.

6. Risk-Based Framing of Future Runoff Projections

At present, some outputs from global climate models are ready to support reliable risk-based policy while others are not as ready. A key novel aspect of our research is to provide more insight into where confidence is warranted, and where it is not, with respect to projections of future climate and flow change in the Colorado River Basin. In the case of the Basin, every single moderate and high emissions model simulation agrees that temperatures will continue to rise significantly with continued emissions of greenhouse gases to the atmosphere—this result is robust, highly certain and well-suited for informing policy choices. The fact that observations also show substantial warming only strengthens this assertion.

On the other hand, simulated future precipitation change in the Basin is clouded with much greater uncertainty due to substantial disagreement among models and a highly uncertain ability to simulate realistic change in key phenomena such as storm-track position or decadal and longer-scale drought. Whereas climate models are in general agreement that cool season (warm season much less certain) precipitation declines are likely in the Lower Colorado River Basin, these same models disagree when it comes to the sign and amount of precipitation change that is likely in the Upper Basin. This is because precipitation change in the Upper Basin will depend heavily on the exact changes in the position of cool season jet stream and storm-tracks, two aspects of climate change that are not simulated with confidence by global climate models [*Collins et al*., 2013].

Moreover, there is strong evidence that the mean positions of both the jet stream and storm-tracks are likely to push poleward, expanding the area of aridity in the Colorado River Basin, but the amount of this expansion is poorly constrained [*Collins et al*., 2013]. Multiple studies, including some focused on the American Southwest, suggest that the proximate cause of this drying, Hadley Cell expansion, is already well underway and will continue [*Seager et al*., 2007; *Scheff and Frierson*, 2012; *Feng and Fu*, 2013; *Norris et al*., 2016; *Prein et al*., 2016].

Our results regarding future changes in Colorado River flows agree with many previous studies in suggesting climate change translates to flow reductions, although our work is generally not directly comparable because we separate out high confidence temperature-related impacts from the possible effects of much less certain and highly variable precipitation projections. However, our work, as well as this larger body of literature, appears to be at odds with the recent Reclamation projections for the Colorado River Basin, which are widely cited and used. Reclamation's projections use a global climate model output that is downscaled to drive a hydrology model. It is worth understanding why our results emphasize substantially greater risks along with apparently greater flow losses.

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The 2011 CMIP3 climate change flow projections by Reclamation indicate a modest multimodel median flow decline of −9% by 2060 for the river, but with a wide range of outcomes from flow increases to flow decreases [*Reclamation*, 2012] (supporting information Table S1). Reclamation's most recent CMIP5 projections show no change in mean and median basin-wide flow by 2070s [*Reclamation*, 2016], but also embody a wide range of results. Compared to CMIP3, the CMIP5 results show increased precipitation, especially in the northern parts of the basin including Northeast Utah, Northwest Colorado's Yampa River and the Green River in Wyoming [*Brekke et al*., 2014; *Ayers et al*., 2016] (supporting information Tables S1 and S3). The increased precipitation in the CMIP5 model runs compared to CMIP3 can be attributed to more southerly storm tracks in CMIP5 that occur in late spring [*Brekke et al*., 2014].

Another issue arises in both the CMIP3 and CMIP5 data sets when GCM precipitation is adjusted by the downscaling techniques necessary for off-line hydrology models. The first step in Reclamation's downscaling is a bias correction step. This step can add approximately 5% more precipitation to the raw GCM precipitation, and this increase appears to not have a physical basis [*Reclamation*, 2013; *Brekke et al*., 2013]. The final downscaling step, spatial downscaling, also increases GCM precipitation, although there is at least a plausible physical explanation for some of the increase: higher elevations in the Rockies receive large amounts of precipitation, but these elevations are not properly modeled by the GCMs. In one study of the CMIP5 data set after downscaling, dry and average models show precipitation increases of approximately +∼5% from the raw GCM output, but the wettest models show +∼10% increases, doubling future precipitation increases from +10% to +20% [*Lukas et al*., 2014]. This extra precipitation is manifested in a number of hydrology model runs that project huge and implausible flow increases in some years that are 150% of the highest known flows in the twentieth century (supporting information Text S4, Figures S2, and S3). The downscaling wetness problem has been identified, but has not been not resolved [*Lukas et al*., 2014]. Reclamation acknowledges that the newer CMIP5 projections have not been determined to be better or more reliable [*Brekke et al*., 2014]. It is noteworthy that internally consistent GCM-only Southwest runoff projections almost uniformly produce significant declines in both CMIP3 and CMIP5 runs [*Milly et al*., 2005; *Seager et al*., 2007, 2012; *Koirala et al*., 2014; *Milly and Dunne*, 2016].

Our results are generally comparable to Reclamation's most recent results when considering the full range of our analysis when both precipitation and temperatures are included. However, our focus and emphasis is on the large near-certain temperature-induced flow declines with a separate analysis of precipitation. Reclamation, by contrast, has a focused on climate multimodel-ensemble median declines, including medians calculated across emission scenarios [*Reclamation*, 2013, 2012]. Decision makers often treat these median outcomes as a proxy for risk despite the fact that the median obscures the wide range of results and lumps wet and dry, warm and hot, large and small emission increases and, most critically, near certain temperature increases and very uncertain precipitation changes.

We assert that the large precipitation increases necessary to offset substantial temperature-induced flow decreases appear unlikely to occur for a number of reasons. These reasons include the potential for storm tracks to go north of the basin due to Hadley Cell expansion, the high potential for megadrought to increase evaporation while reducing precipitation and runoff for extended periods, the large size of the needed precipitation increases, especially when compared to decadal historical increases, the consistent identification by global assessments of the Southwest as an area likely to dry, and finally the lack of any trend over the last century or last 16 years (Figure 2c). Hence, we choose to focus on highly likely temperature-induced declines with separate analysis of the precipitation needed to offset these declines.

7. Policy Implications and Solutions

The climate science take-home messages for Colorado River managers are thus: (1) there is little doubt (i.e., high confidence) that temperatures will continue to increase as long as the emissions of greenhouse gases to the atmosphere continue; (2) there is also high confidence that continued temperature increases will cause river flows to decline, ranging from −11% to as much as −55% by end of century under moderate to high emissions (Figures 4 and 5); (3) there is only low confidence associated with the possibility of storms and precipitation in the Upper Basin increasing enough to even partially offset the temperature-driven declines in river flows; (4) the risk of multidecadal megadrought in the Basin is significant even in the absence of continued anthropogenic climate change, and this risk rises substantially with continued global

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warming; (5) the likelihood of drought and megadrought means that there will likely be decades-long periods with anomalously low runoff even if there is an increase in precipitation relative to the historical mean during some other periods due to anthropogenic climate change.

Temperature-driven threats to the flows of the Colorado are thus large and real. The only way to curb substantial risk of long term mean declines in Colorado River flow is thus to work toward aggressive reductions in the emissions of greenhouse gases into the atmosphere. Our work shows that modest (e.g., RCP4.5) reductions in greenhouse gas emissions, while having better outcomes than the business-as-usual future (e.g., RCP8.5), still imply large Colorado River flow losses.

The record warm nature of the on-going Colorado River drought indicates that this drought is not just a natural drought, and our work demonstrates that flows are unlikely to return to the twentieth century averages if we only wait. Unusually wet periods like the 1920s and 1990s will still continue to occur, but they will co-occur with higher temperatures that will increase water demand from plants, soil, snow, and humans.

Climate models and theory suggest that flow reductions would be more severe in the Southern portions of the Upper Colorado Basin affecting tributaries such as the San Juan, Dolores, and Gunnison more severely, with smaller impacts to more northerly tributaries such as the Yampa and Green [*Ayers et al*., 2016]. Such spatial distribution would provide additional water management challenges in that the more southerly basins have in general more people, infrastructure, and uses. Such a distribution would create new localized water supply shortages in addition to the overall basin-wide issues.

Other known threats to streamflows include the potential large scale loss of conifers [*Breshears et al*., 2005; *Adams et al*., 2009; *Allen et al*., 2010, 2015], and the impacts of dust on snow [*Painter et al*., 2010; *Deems et al*., 2013]. These factors along with the observed and projected temperature-induced Colorado River flow declines, the inability of many linked climate-hydrology models to simulate persistent droughts, and the increasing likelihood of hot drought and megadrought, all imply that future Colorado River water supply risk is high. It is imperative that decision-makers begin to consider seriously the policy implications of potential large-scale future flow declines. Stable twentieth century Colorado River flow regimes may not reoccur for many centuries—the time scale of climate system readjustment to the complete cessation of greenhouse gas emissions [*Solomon et al*., 2009; *Collins et al*., 2013].

The Colorado River declines do not stand alone as the only warming-related threat to Southwestern water supplies. The Rio Grande also has a grim prognosis [*Reclamation*, 2013; *Elias et al*., 2015]. The drought in California has garnered national attention, and multiple studies have strongly implicated increasing temperatures as a contributor to these woes [*Griffin and Anchukaitis*, 2014; *Belmecheri et al*., 2016; *Diffenbaugh et al*., 2015; *Mann and Gleick*, 2015; *Seager et al*., 2015a]. Southern California is particularly at risk, with a critical economy and a very large population, all coupled with a large reliance on both climate-threatened in-state, as well as Colorado River, water.

Adjusting to the new reality of rapid climate change will not be an easy or fast task; water management and water policy change slowly. The Colorado River is managed by a complex set of agreements, interstate compacts approved by Congress, international agreements, legislation, and court decrees set in place over the last 100 years [*Verburg*, 2011]. Most agreements were derived from twentieth century state-based negotiations with win/lose policy prescriptions that minimized basin-wide considerations of economic prosperity and potential harm [*Adler*, 2008]. None expressly includes climate change risk management, nor the provision for flow reductions that will be relentless on decadal timescales. New agreements often take years to put in place [*Department of Interior*, 2007]. The recently proposed structural deficit solution [*Central Arizona Project*, 2016], while important and laudable for the short term, will not solve the problem of large scale flow losses. With reduced water supplies, much will have to change in these agreements to address equity, economics, and social concerns on regional, state, basin-wide, and even national levels. Climate change threats to western water supplies are very real, and should prompt great concern and urgency among both water managers and the citizens of the Southwest.

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TRANSCRIPT OF PROCEEDINGS

LARIMER COUNTY

BOARD OF COUNTY COMMISSIONERS

LAND USE HEARING

WEDNESDAY, MAY 16, 2018

THORNTON WATER PROJECT 1041, FILE #18-ZONE2305

COMMISSIONERS PRESENT:	STAFF PRESENT:
SEAN DOUGHERTY, CHAIRMAN	MATT LAFFERTY
JEFF JENSEN	DEBBIE JOHNSON
MINA COX	DENISE RUBALL
RAY CARRAWAY	ROBERT HELMICK
GARY GERARD	ROD BLOOMSTRUM
CURTIS MILLER	MARK PETERSON

SPEAKERS FROM THE AUDIENCE:

John Barth, Esq.	Sandy Hellser
Roberta Norman	Lynn Nichols
Mark Hyden	Jerry Palt
Scott Horack	Scott Glick
Elaine Spencer	Jim Camben
Dick Brouch/Brow	Patricia Corb/Mark Corb
Scarlet Sparkle Delia	Nancy Terry
Dennis Pierrero	Sean Shelly
Ryan Donovan	Christine Cracked
Karen Wagner	Jason Kinable
Karen Colavity	Gloria Edwards
Patricia Babbit	Lauren Sager
Harry Sheline	Mike McGlocklin
Penny Hillman	Teresa Rose
Doug McAllister	Nan Sollo
Robert Kitchell	Lucy Brickman
Janet Carabello	Rebecca Shelly
Georgia Locker	Rick Steadman

MR. DOUGHERTY: Good evening, ladies and gentlemen. We're going to go ahead and get started. I know we have a full house here, and I want to respect everybody's time.

Welcome to the May 16th, 2019 meeting of the Larimer County Planning Commission. It's a tradition of the Planning Commission to start off our meetings with the Pledge of Allegiance. I'd ask you to please rise and join us.

(Everyone stood and recited the Pledge.)

MS. SKAHAN: Thank you all very much.

My name is Sean Dougherty and I am the Chairman of the Planning Commission. Thank you all for coming tonight.

I've got a list of things I'm going to read through here, and then we will get started.

Your participation helps your Planning Commission understand the issues and impacts regarding the items before us. Copies of tonight's Agenda are on the wall by the door, please take one. And also, please mute your cell phones at this time.

The Planning Department staff provides us with a comprehensive package, almost 700 pages, of information about the projects and we did do a site visit today. Even so, we gain insight from the

information and viewpoints that you provide. Your input is welcomed and appreciated. We're here to listen to and carefully consider all information about this project.

If you wish to speak tonight, hopefully you've signed in out by one of the front doors and you will be recognized by me. When you come to the podium, please provide us with your name and spell any uncommon names, so the Record will be accurately reflected. We will start the clock after that.

We ask that you keep your comments relative to the land use of the matter being discussed, and we ask that you direct your comments to the members of the Commission.

We understand that the issues before us tonight are important to those involved and that those feelings and emotions can run high. We ask you to respectfully listen to everyone's presentations. You may or may not agree with them, but please do not interrupt with applause or other kinds of demonstrations.

In order for us to get through this hearing tonight in a timely fashion, I cannot allow demonstrations.

Please direct your comments to the Planning

Commission and the staff, not the Applicants or the other speakers.

I have some brief comments about the role of the Planning Commission for the audience, both those who are and those who are watching on TV.

The Planning Commission acts as an advisory board to the Larimer County Commissioners. We review and make recommendations on land use issues outside of town and city boundaries. Please note that the responsibility and authority to make the final decisions on these land use matters rests with our three elected County Commissioners.

The Planning Commission is the final decision-making body for location and extent reviews, as well as amendments to and approvals of the Larimer County Master Plan and its subplans.

The members of this Planning Commission are volunteers and I would like each member of the Commission to introduce him or herself, starting on my left.

MR. JENSEN: My name is Jeff Jensen. I've been on the Planning Commission almost eight years and I live in the City of Fort Collins.

MS. COX: My name is Mina Cox. I live west of Bertha and I've been on the Planning Commission for

15 years.

MR. DOUGHERTY: Commissioner Carraway?

MR. CARRAWAY: My name is Ray Carraway. I've been on the Commission about a year and I live in the Masonville area.

MR. GERARD: Gary Gerard, I've lived in the Larimer County my whole life, on the Planning Commission for about eight years. I live south of Loveland.

MR. MILLER: My name is Curtis Miller. I've been on the Commission for eight years, and I live in Loveland.

MR. DOUGHERTY: And again, I'm Sean Dougherty. This is my ninth year on the Planning Commission.

Mr. Lafferty, would you please introduce the staff in attendance?

MR. LAFFERTY: Yes, I'd be happy to.

My name is Matt Lafferty, I'm the principal planner with the Community Development Department, the planning division portion of that, and there are copies of the Agenda still remaining on the back wall here. Feel free to get a copy of that, if you want to follow along.

Also, as I stated a little bit earlier,

there's some assisted listening devices down here. If you're having trouble hearing the proceedings, feel free to come down and we'll help you those devices.

To my right tonight are two individuals. One of them is Debbie Johnson, the other is Denise Ruball (phonetic). They are also with the Community Development Department and it's their responsibility tonight to record tonight's proceedings on audiotape and videotape and then transcribe that information into a written record.

So it's important that you speak clearly and give us your information regarding your name when you approach the dias.

To my left is Rob Helmick. He's staff planner on this project with the Planning Department.

And to his left is Todd Bloomstrum (phonetic). He is the Public Works Director. We've got another service group. I can't remember what the name of it is.

And to his left is Mark Peterson, the Assistant County Engineer. To his left is -- not the assistant, the County Engineer, Rusty is out there.

And Leah Snyder (phonetic) is with the Health Department tonight.

And that'd be staff present for tonight's

proceedings.

MR. DOUGHERTY: Thank you, Mr. Lafferty.

All right. The first -- I want to remind everyone, if you have not -- if you want to speak tonight, and you have not yet signed up, please see one of our staff members that are in the lobby at both ends, actually waving in the back of the room.

If you don't sign up, I may not be able to call you to come up to speak, and we've still got a few minutes while we go through the first couple of items on our Agenda.

The first two items on our Agenda this evening allow public comment about land use matters that are not on our Agenda for the evening. A few points about this public comment: During this public input period, we cannot consider information on items that are scheduled or likely to be scheduled for a hearing in the future.

If your comments are about an item that is likely going to be in the future, we will ask you to please share your input at that time.

While this public comment is about items not on our Agenda, these items should pertain to land use. Public comment made on these items will likely not be addressed this evening, but will be forwarded to staff

for review and potential response at a later time.

Is there anyone in the audience who wishes to speak on any item having to do with the County Land Use Code that is not on the Agenda this evening?

(No audible response.)

MR. DOUGHERTY: Seeing none, Item 2 on our Agenda, is there anyone in the audience who wishes to speak concerning other relevant land use matters not on the Agenda?

(No audible response.)

MR. DOUGHERTY: All right. Our next item of business is the approval of the minutes from the April 18th, 2018 meeting. Are there any corrections or additions to the Minutes?

MR. JENSEN: I move that we accept the Minutes for the April 18th meeting.

MS. COX: Second.

MR. DOUGHERTY: I have a motion and a second. Thank you.

We will proceed with a voice vote of the Planning Commission. All in favor, please signify by saying, "Aye."

MANY VOICES: Aye.

MR. DOUGHERTY: Any opposed?

(No audible response.)

MR. DOUGHERTY: Excellent. Motion passes.

Typically there are two types of hearing items on our Agenda, consent items and full hearing items. Very simply, a consent item is an item that there is usually no dissension by any other party.

This evening we have a full hearing item; that is, a full hearing will be conducted to give the Planning Commissioners both sides of the application, so we can give an informed recommendation to the Board of County Commissioners. We will allow public comment on these after we have the full presentations.

I will let you know here in advance, because there are a lot of people signed up. If we get past 10:00 o'clock tonight and we still have a lot of public comment coming, likely we will just finish public comment and we will have to adjourned to tomorrow night to finish this. There will be no further public comment. If we get done earlier than that, though, we will hear this all the way through.

Our item tonight is the Thornton Water Project 1041. It is File No. 18-ZONE2305. Our staff contact is Rob Helmick. The description starts on page 1 and we will have brief presentations from Mr. Lafferty and Mr. Helmick.

Mr. Lafferty, please take it away.

MR. LAFFERTY: Thank you, Chairman Dougherty.

Matt Lafferty, again, with the Community Development Department.

As pre-occurred before tonight's meeting, I just wanted to spend just a couple of minutes before Rob's presentation to outline what we're here for tonight and what we're not here for tonight.

On the screen before you this evening is a section out of the Land Use Code for Larimer County that addresses areas of activities of state interest. This is referred to as "1041."

These -- this language comes to us via Section 2465.1-404 of the Colorado Revised Statutes. And those statutes authorize the county to decide as a county whether or not certain public utilities or other major factors like pipelines or gas lines, transmission lines, solar facilities, airports, things like that, are a matter that we want to evaluate as part of our process in the land use arena.

And through this process, Larimer County has adopted several of those things that are outlined by statute that we want to review. One such items is the siting and development of new domestic water or sewer transmission lines, that meet certain criterias, which is outlined in the language behind me on the screen.

I bring this up tonight because I wanted to be -- everybody to be aware that we are not allowed tonight to act on where the water comes from, where it goes, where it's drawn from, those are decisions that have been made by the State of Colorado as the part of their responsibilities through the Water Court and the Division of Water Resources.

So where the source of water comes from, how it gets here, and where it's drawn from, has already been resolved at the State level. As an analogy to that, I would like to use an example. If we were doing an electrical transmission line across the county, we would look it as a 1041 application. We would study for its impacts as it relates to impacts on the environment, visual impacts, impacts on the neighbor's proximity to the neighbors and what-not, to make sure that the issues could be mitigated in a way that everybody could accept that.

What we don't worry about is where the electricity comes from, how it's generated, or what causes it to be generated.

So tonight we are reviewing an application for a pipeline and where that pipeline will go and how the impacts associated with that pipeline should and will be mitigated in order for it to be a good feature

for Larimer County or whether it should not be in Larimer County.

And so with that precursor to tonight's proceedings, I would like to turn this over to Rob Helmick. He's the staff planner on this application and did the majority of the analysis and I'll let him have his presentation with you-all.

Thank you.

MR. HELMICK: Thanks, Matt.

Mr. Chairman, Rob Helmick for the Planning staff.

You have a voluminous packet. It runs over 600 pages of analysis and public comment, and in addition, you had provided to you the link to the electronic version of all of the application materials provided by the City of Thornton, which are these two monster notebooks. Mapping and other information, analysis and study of the pipeline and its components.

The City of Thornton has submitted this application for a 1041 application for the water line, as Mr. Lafferty pointed out. The specifics are 26 miles of pipeline in unincorporated Larimer County, pipeline of 48 inches in diameter. It's a welded steel pipe.

Pertinent facilities to that include a

40 million gallon per day pumping facility, a one million above-ground water tank, and other appurtenances to the system.

Associated with that are the acquisition of a 50-foot permit and 40-foot temporary construction easement. The pipeline is located out of the County Road right-of-way, or it would be located within a county road right-of-way.

City proposes this pipeline to move the water, which their rights were acquired in the '80s and subsequently, as Mr. Lafferty pointed out, received court approval to use the rights for municipal use. City of Thornton and the staff began some communication as early as 2/2014 with more discussions in 2015 and a pre-application conference when the application was done in May of 2016.

There were a variety of public outreaches done by the City of Thornton through 2016 and '17, and the application was originally submitted at the very end of 2017 and was scheduled for hearings in March and April of this year. Those hearings were deferred after the County stopped processing to request additional information from the City of Thornton with respect to certain issues associated with the Douglas Road corridor of this alignment.

The general alignment starts at Water Supply and Storage Reservoir No. 4 north of Douglas Road and heads east to the Larimer/Weld County line. There's a water tank proposed at that location and then the line runs straight down the alignment of Weld County 13, Larimer County 1, and exits Larimer County in Johnstown.

It also passes through, in doing that, a small piece of the City of Fort Collins and large areas of the towns of Timnith, Windsor, and Johnstown, as well as parts of unincorporated Weld County. Except for the Douglas Road corridor, which is defined as the current roadway right-of-way, the permanent corridor is anywhere from 500 feet to a quarter mile wide. This allowing for minimizing impacts to properties, structures, and resources, as the actual construction documents for such a project and right-of-way acquisition would occur, without requiring a return of process, unless there's a significant deviation from the approved corridor.

With respect to alternatives, the graphic here is out of the application materials and reflects the second round of alternative analysis that Thornton conducted. The first round was how do they get the water to Thornton; the second round was defining a

corridor which basically defines that from Water Supply and Storage Reservoir No. 4 to the City of Thornton's water treatment facilities just north of the City of Thornton.

These lines on the map represent an analysis that Thornton conducted prior to submitting the 1041 Application that identified corridors that they would evaluate. That evaluation was looking at both local input and desires, as well as dealing with minimizing impacts to right-of-ways, and minimizing impacts to water bodies and wetlands, by-passing geologic hazard areas, minimizing impacts to environmentally sensitive areas, and on.

And from that then came the proposed corridor, which is this map, (indicating), starting at Water Supply and Storage Reservoir No. 4, moving down Douglas Road to the intersection with Turnberry or Larimer County 11, then staying out of the roadway right-of-way on City of Thornton property going north to County Road 56, east on 56 to the railroad tracks, south on the railroad tracks a half-mile east, another mile-plus to the middle of property owned by Thornton, then north back to County Road 56. On County Road 56, then all the way to the Larimer/Weld County line, going north approximately a half mile to where the one

million gallon water tank would be located, and then straight down Weld 13, Larimer 1, all the way through Tinmouth, Windsor, Johnstown, to the Larimer/Weld County line in Johnstown at Weld County Road 50.

After some initial conversations with the Applicant and after the public meetings, there was some concern about alignment through neighborhoods. And the initial advice from staff back in 2014 and '15 was that we would not consider locating a pipeline like this in a county road right-of-way.

Subsequent to those conversations, internal policy changed and we advised Thornton that we would consider looking at a pipeline alignment within existing county road or future county road right-of-way, and from that then came this analysis of corridor linkages that Thornton analyzed. Those corridors took the original corridor which came out of Water Supply and Storage No. 4, which is at the center, left-hand side of your screen, and basically the initial proposal which comes straight out of that, buzz straight east along an alignment that would follow and then hook up with an alignment halfway between County Road 56 and 54 Douglas Road, and then across the interstate.

Because of some significant amount of neighbor concern, we asked Thornton to do an analysis

and so they analyzed a series of northern corridors, which are all these in yellow, which propose to come out of No. 4, go north, either outside or adjacent to or through Eagle Lake, get over to Highway 1, and then over to County Road 56 and then east. A series of central corridors, which are the ones in green here, which come right out of 4 and then go straight east, or they looked at three alignments along Douglas Road, north of, in and south of the right-of-way of Douglas Road.

They conducted a significant -- an extensive analysis of those alignments and their conclusions is -- and their application then became a out of 4 to a pump station outside of Reservoir No. 4, then along Douglas Road to Turnberry, thence north to County Road 56. So that is the application that we have reviewed for you this evening.

The pumping facility location is on a property north of Douglas Road. Starlight Drive is here, (indicating). No. 4 is here, (indicating). Eagle Lake is here, (indicating). There is a three-acre area that the City of Thornton has identified that they need to -- would like to acquire as the area necessary to facilitate the construction of their pumping facility.

If you go east of the County line, here is County Road 56. The pipeline runs north and the star represents the generalized location of where their proposed water tank might go, and this is a more -- a map from the application which identifies the proposed siting area for this one million gallon water tank.

So the 1041 Application has 14 criteria for review. You have our written analysis of those 14 criteria. I will hit the high points. I won't go over all of them, in trying to respect time.

The first is that the proposal is consistent with the master plan and applicable inter-Governmental Agreements. The analysis for the City of Thornton and our analysis of their analysis supports that the principles of the master plan are addressed and the request is consistent with the Larimer County Master Plan.

This route is through several growth management areas, as well as incorporated areas, which do not have GMAs. I would note that the Master Plan does contain a specific principle, which speaks to future transfers of water out of the County. Having been part of those conversations, I can tell you that this was adopted in part response to the actions of the City of Thornton in the '80s. But that the transfers

that the City of Thornton did, were essentially complete by the time these policies were adopted in the Master Plan.

As I talked about, the Applicant has presented reasonable siting and design alternatives and explained why no reasonable alternatives are available. From our perspective, they have done a thorough going analysis, both at the microscale for the Douglas Road corridor and as a more macro scale for the balance of the corridor, and analysis of alternatives, and the alternative presented by the City of Thornton as their preferred route does, in fact, meet the test of thorough analysis of alternatives for the proposal.

With respect to adopted County standards, the City of Thornton in Section 8 of the Code, specifically wetlands, the City of Thornton proposes to bore and avoid any interference in jurisdictional wetlands. They will obtain a nation-wide permit from the court to confirm that there are no jurisdictional wetland areas affected.

There are hazard areas, principally flood plain in Larimer County, on the Poudre, Big Thompson and Box Elder Creek. The City of Thornton on all three of these waterways proposed to bore and avoid any flood plain under these three river or stream corridors.

With respect to wildlife, the City of Thornton's environmental analysis for the preferred route identifies that there were possible conflicts for wildlife, both as listed were species of concern. Mitigation proposed includes avoidance, seasonal limitations and prohibition on certain activities. No other significant wildlife issues have been identified along the preferred route.

There may be, as a result of these mitigations, seasonal or other temporal restrictions to avoid conflicts with those listed species.

There are multiple irrigation facilities affected by this request. The Applicant will be required to cooperate and mitigate on any issues with any of those respective ditch companies. If they're required to bore, they will bore. If an open cut is permitted, they will do that. If our licenses or agreements Thornton required, the City of Thornton must acquire them.

They will need to obtain an air quality permit. They will need to obtain stormwater quality permits. That is the overview on standards.

The proposal will not have a significant adverse effect on, or will adequately mitigate significant adverse impacts on the land on which the

proposal is situated, and on lands adjacent.

Proposal, at least in the initial Douglas Road Corridor is located at a significantly developed area. There are some impacts to vegetation. And the impact in the project area, those impacts will be mitigated through the use of best management practices and do not constitute a significant impact on land affected or adjacent to the pipeline.

Issues with groundwater and drainage in the area of any bore or cut must be mitigated.

There are no historic or sites identified that are negatively affected by this proposal. There is not a significant negative impact to public health and safety. The proposal is not subject to significant risk from natural hazards, including flood, wildfire, or geologic hazard, principally because all the flood plain hazards, which are the principle ones associated with this request are to be bored and avoided.

Adequate public facilities are available for the request.

The Applicant will mitigate any construction impacts to county roads, bridges, and related facilities. Many of the conditions that you see in the staff report are those generated by the Engineering Department, specifically intended to address the

concerns of impacts through county roads and county facilities.

The benefit of the development outweighs losses of any natural resources or reduction of productivity of agricultural as a result of the proposed development.

There's no evidence that's been presented which would suggest the pipeline and its construction will cause a reduction in the productivity of the agricultural lands, nor are there any impacts to natural resources have been identified in the analysis.

The proposal demonstrates a reasonable balance between the costs of the Applicant to mitigate adverse impacts and the benefits achieved by such mitigation. We believe that the Applicant has presented adequate evidence to that respect.

The Applicant has presented a thorough analysis of the proposal and proposed alignment and corridor, our evaluation is that that avoids significant environmental issues as committed to disrupting the minimum -- causing the minimum disruption from this application or the construction activity.

So with respect to our analysis and findings, the findings are on the screen in front of you. We

find as a staff that the request is consistent with the Master Plan. It causes no significant impacts to natural manmade environment, is a reasonable alternative selected from several, identifies need of permits and permission and commits to obtain them, and it demonstrates a reasonable balance between costs to the Applicant to mitigate and any significant adverse impacts in the benefits.

There are now 30 conditions proposed, and those are available in the Agenda that went out to the public. The first is -- I'm not going to read them all, but the first is that everything that they have committed to in the application, or they commit to in the hearing process, is their commitments and the Applicant will be held to those commitments.

The approval designates a corridor along the alignment and deviations to accommodate, field issues will not affect the approval. Significant alterations to the route shall be evaluated by the County prior to commencing activity and may be subject to further review.

There are conditions related to roadway condition, roadway analysis, construction permits, permitting and access to all properties at all times for roadway access, that there's coordination with

emergency service providers and the school district to ensure that there is access and adequate school bus access at all times.

There is a pre-, during and post-project evaluation by Larimer County of any work done in a right-of-way.

The City acknowledges that the County Transportation Master Plan recognizes certain improvements along a portion of the proposed alignment west of County Road 11. We are not determined whether any roadway improvements will be implemented along Douglas Road within in the next five years. If the County proceeds with roadway improvements along Douglas Road, Thornton shall coordinate construction contracting administration with Larimer County.

One of the conditions is that irrespective of any action of the County, Thornton shall return the roadway -- any roadway that they are into, to pre-construction or better condition, which may mean resurfacing the roadway with an overlay throughout the construction area.

Patching -- spot-patching is not an acceptable alternative.

With respect to post-1041 permit action, a site plan review, building permits and development and

construction permits and access permits from Larimer County will be required for their various activities.

The pump station shall be designed to be consistent with the character of the neighborhood.

Water tank shall be located with the western slope of the hill on which it's proposed to be located, and designed in such a manner to avoid skylighting and minimize visual impacts to adjoining properties. All construction activities shall be coordinated with and respect all seasonal avoidance requirements established by the Colorado Department of Parks and Wildlife and the Fish and Wildlife -- US Fish and Wildlife Service.

And I've provided to you this evening, and to the Applicant, too, one, a modification to Condition 8, which adds air quality and noise to the parenthetical, "Thornton shall obtain and conduct, construct the activities in compliance with all required county, state and federal permits, including but not limited to" -- and we've added then, "air quality and noise" to that list that's in Condition 8.

Condition 30 from the -- speaks to, "Thornton shall be responsible for locating septic systems and wells and all associated distribution lines, servicing lots along the corridor prior to commencing any construction activities, septic systems must be" --

it's all there. "Identify, repair, do not damage or in fact, if there is damage, repair immediately."

That would conclude my comments. I'd be glad to answer questions, but I think Mr. Peterson has a presentation and then staff is available for any questions that the Commission may have.

MR. DOUGHERTY: All right. Thank you, Mr. Helmick.

Mr. Peterson, do you want to just continue on?

MR. PETERSON: Yes. Thank you.

Again, my name is Mark Peterson. I'm a County Engineer, and I was going to touch on some aspects of the pipeline that go into a little more detail, some aspects of both the pipeline, Douglas Road itself, and then just the touch on the more specific aspect of Thornton's Pipeline and Douglas Road.

So in terms of use of right-of-way corridors, certainly they are there primarily for use of roadway and transportation, but we have hundreds of miles of utilities in our rights-of-way even now as they exist, and that covers everything from water distribution, sanitary sewers, storm sewers, culverts and drainage, cross-culverts, gas, electric, other underground infrastructure and the like.

So it's a very broad range of public use -- public utility use of those rights of way.

In terms of specific requirements that Thornton has to meet, or any -- really, any user of our public right-of-way has to meet. First and foremost, they have to obtain right-of-way use permits. We issue about 300 permits a year for various activities within our public right-of-way.

We need to see engineer plans. As Rob has already noted, they need to address schedule, duration, work hours. Traffic control plans have to be developed and that has to include a detour plan, as appropriate. They have to address emergency response needs, local access needs, mail delivery, school bus access, and the like.

They have to meet construction and restoration requirements that are contained in the Larimer County design standards, whether those are urban roadways or rural roadways, as applicable.

And then as Rob mentioned, they have to restore roadway pavements or roadway surfaces to condition that's equivalent to or better than pre-project conditions.

And as already been touched on, they need to obtain all the necessary and appropriate other permits.

And part of our right-of-permit process, as well, is the Applicant warranties their repairs.

If you go to our Transportation Master Plan -- and I'm going to touch on kind of the Douglas Road Corridor. If you look on our Transportation Master Plan, we had both short-range capacity needs and long-range capacity needs identified in those plans. And this is a diagram showing the short-term capacity needs, and the different colored lines to note the type of improvement that's needed to convey traffic. Basically, it's traffic capacity.

If we then look at longer term needs, for purposes of our Transportation Master Plan, long term went out to the year 2040 and, in fact, the Planning Commission just adopted an updated Transportation Plan this last year. So again, what it identifies is needs to pave unpaved roads, or perhaps widen an existing road, add shoulders to it. Go to a three-lane section in some cases, or even a four-lane roadway in the future.

We zoom in on the Master Plan, this area that's highlighted in orange, is what was identified for a segment of Douglas Road. It's basically a segment running from County Road 17 on the west to State Highway 1.

On the east, and it identified that at some point in the future, in the long-term future, improvements would be needed from strictly a capacity standpoint on this road segment, and tht was to accommodate future estimates of traffic growth. And again, it's very much an estimate of traffic growth over this long-term horizon. We can't say exactly how traffic will grow, because it's largely a function of both development and growth in the region and use of the roadways by traffic coming from different areas in the county.

Also contained in the Transportation Master Plan was traffic counts, and so this compares 2016 counts relative to 2040 projections -- and again, the different colors denote different ranges of traffic -- average daily traffic on each of these road segments. Probably the thing to note is you're going to see over the next 20-plus years, you're going to see significant growth in traffic on the various road segments throughout the County and so red obviously is denoting the highest ranges of growth, but you can kind of see a lot of roads converting from a 400-5,000 range going into the 5,000 to 10,000, or 10,000-plus ranges of traffic.

And again, this is Douglas Road shown in the

orange.

If you look on our page network, again Douglas Road is also known as County Road 54. It's one of the few kind of east/west connections that actually extend west of State Highway 1, so the whole series of irrigation reservoirs and lakes that we have in this part of the County really affect or influence where you can make transportation connections, and so Douglas Road is one of those that can pick up traffic from 17 and west of State Highway 1, and convey it towards I-25. Certainly there's no direct connection to I-25, but there is the Mountain Vista Interchange on I-25 to the south.

In terms of road function, Douglas Road is currently classified as an "arterial roadway," meaning its primary function is mobility. The thing to note is that Larimer County has a five-year capital improvement plan and it identifies funded projects through the -- currently through the year 2022.

We do have signalization of State Highway 1 and Douglas Road. That's part of the current five-year capital improvements program. It's a project -- a cooperative project basically between Larimer County, the Colorado Department of Transportation, and the City of Fort Collins. Right now it's grant-funded in large

part and we've got money to start the design in 2019 and construction in 2020, but the thing I would note is that no other improvements to Douglas Road are included in the current capital improvements program.

Typical road elements: If you start looking at what might be needed in the future and Douglas Road is you're apt to maintain a travel lane in each direction. We've typically looked. It would have a rural section, generally with roadside drainage. Consideration certainly is widen, pave shoulders to support bicyclists, pedestrians, and the like.

We've looked at turn lanes, whether they be continuous or localized, and those are appropriate for both safety and capacity. And then you would be looking to extend and reconstruct drainage and irrigation crossings as part of any type of future capital improvement program that would be done on this roadway.

So when we held a public meeting in January, we came forward. We -- at a very conceptual level, we identified what might be required in terms of pavement width and right-of-way width associated with a three-lane, paved roadway, with eight-foot shoulders. One of those lanes is a center -- continuous center turn lane. And that was looking at improvements going from County

Road 17 or Shields, over to Turnberry.

We got a fair amount of public comment. We tried to listen to what people were telling us, and so we took another look at what, again, might be done at a conceptual level for improvement project, the Douglas Road. So we basically looked at six-foot shoulders along the entire length of that roadway, again, to better support bike and ped use, as well as traffic safety. Either as some nominal increase in road capacity that comes about through widened shoulders, as well.

So when we go to a six-foot shoulder situation, there's basically no improvements that are required for the stretch of road between County Road 13 and Turnberry. That roadway segment already has six-foot shoulders that were constructed back when development occurred in Hearthfire (phonetic) through the City of Fort Collins.

And we looked from a safety need, where we've got driveway access locations and the need for center continuous turn lanes, and really that extends from Swan Lane to State Highway 1. That's where we've got most existing development, a lot of driveway access points, as well.

And then going beyond that, we would just

look at widened shoulders along the remaining portions of the roadway in this reach.

We put that information out on the website. This is an example of a plan view that was also shown that's available out on the web that identifies existing right-of-way widths and how the lane configuration would lay out. Again, this is somewhat conceptual in nature. We certainly have not gone through a full design process.

And these are examples of roadway cross-sections, so the existing roadway cross-section is shown at the top and really the only change in something like this is where we've got -- where we have two- to six-foot shoulders, now we would have six-foot shoulders in all those areas where we would be staying with the two-lane section.

This is a typical example of a road with six-foot shoulders. This is Boyd Lake Avenue that was just constructed last year.

And then if you looked at that segment that would have -- potentially have a center continuous turn lane, that's really what you're looking at in cross-sectional view there, and this is an example of Shield Street.

North of Apoota River (phonetic), County,

again, did an improvement project on that roadway a few years back and put in a center continuous turn lane on that roadway.

So again, from a road perspective, along Douglas the current right-of-way width varies. It's anywhere from 60 to 100 feet in width. We only acquire -- if we go to do a road project of any type, we're only to go and acquire the right-of-way deeded for that specific road improvement project.

If you were talking about the portion that had a center continuous turn lane, with a reduced shoulder to six-foot on each side, the total width needed would be around 80 feet. Again, this needs to be qualified by the fact that this is assuming you have a roadside barrow ditch on each side and what actually is needed and what the actual topography is on either side of the road would influence those actual catch-points and required right-of-way widths.

If you then take the areas where you wouldn't have a center continuous turn lane, you obviously eliminate that 12 feet from the width of the road platform.

In terms of the pipeline corridor, we went back to the City of Thornton and asked them do additional data collection, go out and locate the

utilities that were out there currently in existence, to locate fences and other features to identify property lines and right-of-way limits, and they provided those exhibits.

They have submitted information to us that identifies that the proposed pipeline and the associated work limits can be located within the existing right-of-way along Douglas Road, as it currently exists.

That's the extent of my presentation.

MR. DOUGHERTY: Thank you, Mr. Peterson.

Do the Planning Commissioners have any questions for staff?

Commissioner Jensen.

MR. JENSEN: Mr. Helmick, correct me if I'm wrong. I thought I heard you say that we had 14 review criteria. Our package shows 12.

Did we miss a couple, or did you really mean 12?

MR. HELMICK: I think I really meant 12.

MR. JENSEN: Okay. Also on No. 8 of the criteria that you listed, I caught what you said when we add -- that you added air quality permitting to that. You said one more, and I missed that. Can you tell me what that is, please?

MR. HELMICK: Noise.

MR. JENSEN: Noise, okay, thank you.

MR. DOUGHERTY: Commissioner Carraway?

MR. CARRAWAY: Yeah, I just had a question for Mr. Lafferty.

Matt, this may be a legal issue, and I may be asking for more than what you're able to help me understand here, but my understanding in regard to state law is that it does give the counties a tremendous amount of discretion in regard to the 1041 process. And that mitigation that does not directly relate to the project itself, is something that can be required by the County.

Is that your understanding, or am I asking for just way too much of a legal issue here?

MR. LAFFERTY: That's a legal issue, but I think that any criteria that you have to -- anything mitigation that you require as part of an application has to have a rational nexus to what's being proposed. If there's no nexus between what's being proposed and what you're using to mitigate, then you're acting outside of the limits of what the application is about.

MR. DOUGHERTY: Commissioner Cox?

MS. COX: Mr. Peterson, how long -- you mentioned warranties, the very last line there. How

long are the warranties for and what are those warranties?

MR. PETERSON: It's basically about restoration of the surface of the roadway, you know, that we don't see settlement or failure of the pavement. It's two years is what's in our right-of-way permit.

MS. COX: And then one other question: On the 1041, if Thornton wants to come back in and add more pipelines, they would have to go through another 1041 process; is that correct? 1041 only allows for repair, replacement, but not necessarily additional pipelines within their current pipeline corridor that they would be putting in.

MR. PETERSON: They get what they asked for. They don't get anything more. So if they want another pipeline or another major facility, it's a whole new application.

MS. COX: Thank you.

MR. DOUGHERTY: Other questions for staff?

(No audible response.)

MR. DOUGHERTY: I have a question for Mr. Lafferty, I believe, or actually it might be for Mr. Helmick.

Earlier there was a comment about easements

and either a 50-foot easement or 40-foot construction easement. Is that 50-foot easement only if the pipeline as proposed would be outside of the right-of-way of the road?

MR. LAFFERTY: That's correct.

MR. DOUGHERTY: Okay. I just wanted to clarify that. Thank you.

Other questions for staff?

Yes, Commissioner Jensen.

MR. JENSEN: On an arterial road, is a two-inch overlay normally the way that is paved, or would it be more than that normally?

MR. LAFFERTY: Well, so what they have to do as part of their project is they will have to restore any disturbed road portions like where they complete excavate through the pavement, they will have to do significant patching, and there's standard on the patch thickness. I don't have that number off the top of my head, but it's a fairly considerable thickness of asphalt on a arterial roadway, and then we're basically saying that because we4 believe there is going to be enough disturbance and damage to the road and enough disturbed areas that we want the entire roadway with a leveling course and a two-inch overlay over it.

MR. JENSEN: Okay.

MR. LAFFERTY: When it's all said and done. So it's not just a two-inch overlay by itself. It's patching and a two-inch overlay.

MR. JENSEN: Okay. That was my question, so thank you.

MR. DOUGHERTY: Just to continue along with that, Mr. Peterson, Item No. 4 on our -- on the recommendation conditions talks about stabilizing an asphalt patching, all pavement areas disturbed or damaged during the pipeline installation, Item No. 5 says due to the large extent of pavement removal required, they're responsible for leveling course and two-inch thick asphalt overlay.

Is it either/or? I thought it was only the two-inch?

MR. PETERSON: No, they have to fully stabilize and patch all areas that are excavated and disturbed as a result of pipeline construction. In addition to that, they're putting a two-inch overlay -- leveling course and two-inch overlay over the entire width of the existing roadway.

MR. DOUGHERTY: So on top of the patches?

MR. PETERSON: Correct.

MR. DOUGHERTY: Okay. Thank you. I just wanted to --

MR. PETERSON: So that we get a new continuous road surface over the existing road.

MR. DOUGHERTY: Thank you.

Any other questions for staff?

(No audible response.)

MR. DOUGHERTY: Okay. The City of Thornton is our Applicant and I would like to invite their representatives up to give their presentation.

And please state your name for us.

MR. KOLEBER: Mr. Chairman, Members of the Planning Commission, my name is Mark Koleber, K-O-L-E-B-E-R. It's also up on the screen.

I am the Thornton Water Project Director for the City, and I'd like to provide you with some information about the Thornton Water Project to highlight some of the areas of our 1041 permit application.

I'd like to start with the project overview. The Thornton Water Project is proposed in the Larimer County 1041 Permit Application is for delivery of the water associated with the Water Supply and Storage Company and Jackson Ditch Company shares, which have been diverted from the Poudre River since the late 1800s. These shares were acquired from willing sellers by the City of Thornton in the 1980s.

There will be no change in the point of diversion of these shares and delivery of this water through the pipeline will not result in any additional water being diverted from the Poudre.

One of the first things our City Council did before we started introducing the project to the public, was to establish the mission, vision, values, and guiding principles for staff as we worked on this project. These include open communication and transparency about the project, collaborating with the communities along the pipeline route, and a commitment to being a good neighbor and good steward, for those that are affected by our project, as well as the Thornton residents.

Like the cities across Northern Colorado, Thornton is growing. And the City is working to achieve what all Municipal water suppliers strive for, and that's to provide a reliable water supply to current and future residents.

In addition, Thornton Water Project will help address issues with some of our current water supplies so that we can meet the expectation we all for our water. A safe quality drinking water supply when we turn on the tap.

The Thornton Water Project, along with

Thornton's other sources, will meet the City's projected municipal needs through 2065.

Mr. Helmick covered some of this, but I'd like to cover some of the detail and as the Thornton Water Project as proposed in the 1041 Application is a result of a series of evaluations about how to deliver the City's water. I'll cover these steps in more detail, but in general there were four steps to get to the current proposed project configuration.

We started with looking at different concepts for how to deliver the water and determined that a pipeline was a concept that met our project needs.

Next, we looked at where that pipeline could go through the counties and towns that were between the Water Supply and Storage Company Reservoirs in the City of Thornton.

We further refined those potential routes by looking at ten alternative alignments in the area north of Fort Collins.

And finally, we looked in detail at Douglas Road to make sure that alignment would work.

The delivery concepts we looked at are shown here on this slide. We looked at a pipeline from the Water Supply and Storage Company Reservoirs to Thornton and that's what's before you tonight. We also looked

at running the water down the Poudre to Windsor and then in a pipeline to Thornton. We looked at trading the water through the CBT System, over to Horsetooth and Carter and on down, and a pipeline out of Carter Lake to Thornton. And we looked at running the water down the Poudre River to the South Platte, and then operating the water as exchange to get the water into Thornton's system on Clear Creek in the South Platte River.

Our delivery concept evaluation concluded that the pipeline from the Water Supply and Storage Company Reservoirs is the only one of these concepts that can meet the purpose and need of our project.

And there are a few other things that need to be considered, such as Thornton's decree currently only allows these water rights to be diverted to the historical point of diversion, which is the Larimer County Canal.

Continuing to divert at the Larimer County Canal maintains the ability for Thornton to use the water storage associated with the Water Supply and Storage Company Reservoirs, and storage is a critical component of any municipal water supply system.

The Poudre River downstream of Shields Street isn't classified by the State for water supply uses, so

the river downstream of Fort Collins, where some would like us to take our water, doesn't have their protections needed to use that source for a drinking water supply.

Using a pipeline also avoids the water lost that would be associated with running water down the river, and again, it's important to note that these flows have been diverted in to the Larimer County Canal for over 100 years, so the Thornton Water Project won't change the amount of water flowing through Fort Collins.

So once we had determined that the pipeline was the only delivery concept that met the project needs, we started working with local governments, utilities, districts, and others, to identify where the pipeline should go.

Mr. Helmick covered some of this: We started with a corridor that was six miles wide, east of I-25, three miles tall north of Fort Collins. We went out and we talked to the communities, counties and towns, and identified where would be the good routes and the map that Mr. Helmick already showed, and I also show up here, was this first round of our outreach. We went back again to come to the conclusion of our corridor, and Mr. Helmick has shown that.

And then to ensure we could provide information to residents along the preferred corridor, we set up a project-specific website, as well as an email address, and phone number where people could send us comments and get questions -- or get answers for their questions.

Through the website, you could also sign up to receive project updates. To-date we've had over 15,000 visits to our website. We sent out 11 project update newsletters, and we have 374 people signed up to receive our newsletters.

This digital outreach was a key component of our plan to reach out to residents that might be affected by our project.

The overall outreach plan was discussed with the Larimer County staff, who concurred that the additional outreach would be helpful in ensuring residents understood the project.

In late 2016, we held four open houses along the proposed I-plan corridor to introduce the public to the project and to start gathering feeDVAck that we would need for our project. We held meetings in Fort Collins, Windsor, Johnstown and Firestone.

For these open houses, any property owner within 500 feet of our initially proposed quarter to

half-mile corridor was mailed an invitation to our open houses. Thornton sent out invitations to 1272 property owners, including 849 property owners in Larimer County.

A reminder invitation was sent out after our first two open houses, letting people know that were still two more open houses, if they wanted to get information about our project.

There were 146 people that signed up at these open houses, and there were some that attended, but didn't sign in.

Part of our sign-in included the opportunity to sign up for our email project updates, and attendees were provided with cards to submit comments on our project.

We presented information about the proposed project corridor, general construction sequences, and the City's land acquisition process, as well as an overview of the project and some Thornton history associated with the project. The open house resulted in many good, one-on-one interactions with members of our project team and we received great feeDVAck on what we should take into consideration when we identify a specific route for the pipeline.

Because there have been some questions about

open house notifications, specifically along Douglas Road, I wanted to show the area that we used for mailing open house invitations. Invitations were mailed to the owner of any property that included area within the redline on this map, and we used the Larimer County Assessor's information for mailing addresses for the property owners.

As a follow-up to the open houses, we received several requests to meet with property owners and HOAs. We attended HOA meetings, as well as meetings with small groups of residents. We received additional area-specific feeDVAck from residents at these meetings, and I think it's important to point out that we attended any meeting that we were invited to.

It didn't click.

(Adjusting equipment.)

MR. KOLEBER: Thank you.

Subsequent to the open houses, Larimer County staff requested that we look at alternative routes, including use of
County Road right-of-way and Mr. Helmick covered some of the discussion, as well.

We looked at ten alternative routes, removing from the Water Supply and Storage Company Reservoirs to the northeast corner of a Thornton-owned farm, which on

this map is this green hatched area, and so we own -- this is Turnberry and this is Road 56. This green hatch area is a Thornton-owned farm. And from there, the corridor continues east.

Our analysis used criteria that addressed the concerns we heard during the open houses, and other meetings with residents and from Larimer County staff. We used criteria that took into consideration both the construction of the project, as well the ongoing operation of the project. The route in Douglas Road had the overall best score.

Thornton held a community meeting to present the results from the alternatives analysis and provide information on the Douglas Road alignment. Thornton sent invitations to property owners within the redline shown on the map, as well as emailed invitations to those that had signed up for our project updates. 153 people attended that meeting.

In addition, Larimer County staff presented information about the Douglas Road transportation needs at this meeting.

Because there were some concerns about the 500-foot wide corridor along Douglas Road, that the City had included in its initial 1041 Permit Application, Larimer County requested that the City

confirm that the pipeline could, indeed, be constructed within the existing Douglas Road right-of-way, as proposed by Thornton.

Mr. Helmick and Mr. Peterson have already shown that information that confirmed that we were able to build entirely within the Douglas Road right-of-way.

This map shows the corridor that Thornton proposes for construction of a Thornton Water Project. The 1041 Permit Application only covers those areas of unincorporated Larimer County along the proposed pipeline route. The pipeline construction in the incorporated areas of Timoth, Windsor, Johnstown, will be permitted through those jurisdictions.

Thornton is requesting that Larimer County approve a corridor for the Thornton Water Project because it would allow Thornton the ability to work with the property owners, to find a suitable location for the pipeline on their property, to adjust the pipeline location to accommodate existing utilities or other conditions, and allow Thornton to work with property owners to find the best fit for a pipeline route through planned developments.

The corridor does not provide for future construction of additional pipelines. And once construction is complete, the corridor will no longer

apply and Thornton will have only the easements that it does acquire.

Any future pipeline installation by Thornton 50 or more years down the road, would require a 1041-type permit under the regulations in effect at that time.

Mr. Helmick has already covered the source water pumping station. I won't go into any more detail on that.

Then along with the conditions of approval that the County staff have recommended as part of the permit, Thornton has proposed 145 mitigation measures and commitments to ensure the Thornton Water Project impacts are minimized or prevented.

Outside areas where construction will occur in County Road right-of-way, Thornton will acquire easements for construction of the pipeline. Thornton will respectfully work with property owners and provide just compensation for any easements that the City acquires.

Thornton will work with the property owners to locate the easements where the impact can be minimized.

The property owner will be able to use the surface over the pipeline once construction is

complete.

In the area where a pipeline is constructed, the property and any improvements, like fences or landscaping will be restored after construction. And our goal is to negotiate for all easements that we'll need to acquire and will only use eminent domain when all reasonable alternatives have been exhausted.

Once construction in the initial property restoration is done, Thornton will monitor the areas and continue restoration activities until the area is restored to the property owner's satisfaction.

As this timeline shows, we're currently in the permitting and land acquisition stage of the project. We'll start design this year and we'll start construction in 2019. The goal is to have the project online delivering water to Thornton's treatment plants by 2025.

For construction along Douglas Road, the design will start shortly after affirmative approval and construction would follow starting in mid-2020.

The final paving would occur in 2021 after an approximate 12-14 months pipeline construction period.

Thank you for your time this evening, and I'd be happy to answer any questions.

MR. DOUGHERTY: Thank you, Mr. Koleber.

Are there any questions for Mr. Koleber from the Planning Commissioners?

Commissioner Carraway.

MR. CARRAWAY: Yeah, just in terms of my understanding of some of the concerns, obviously there's the concern of inconvenience and the noise and the traffic issues and all that, and you know, that's obviously pretty obvious to everybody. But what I haven't heard mention of there's also concerns that I've heard just relating to this whole issue of buy and dry, and the whole issue of just the health of the Poudre River.

Are those issues, the buy and dry issues, and just the basic health of the Poudre River -- and by the way, I totally get that you're not taking any more water out of the river than what's been diverted previously, but my question is: Are these latter two issues that I'm mentioning, the buy and dry issue, health of the Poudre River, were those given any thought? Were there any discussions about ways that those could be addressed in a creative, positive manner, that just brings -- you know, that tries to bring the various parties together to just talk about those very important issues?

MR. KOLEBER: Absolutely. We've been

committed since the mid-1980s to being a good steward of our properties. Once we've bought those properties, we've only taken those out of production that we need for the short-term water supply for the City of Thornton. The remainder will be remained -- or be retained in irrigated agriculture until we need that water down in the City.

When those properties are taken out of irrigated agricultural production, we go through an extensive effort to make sure that they are converted into a self-sustaining dry land grass cover so that there are not weed problems, dust problems, or anything else. And we work with the local farmers to cut the hay on those properties, lease them for grazing, or whatever we can do to keep them in the agricultural community.

We are, in essence from the mid-1980s until we'll need the last amount of water, it'll be a 20-year transition from when we bought those farms until we'll need all the water off of those farms. So we're being a good steward in the meantime so the buy and dry aspect of that, we believe we're managing in a very good fashion.

As far as the Poudre River -- I'm sorry. Did you want to?

MR. CARRAWAY: Well, just real quick on that.

MR. KOLEBER: Sure.

MR. CARRAWAY: Have you explored, for example, some type of a creative water-sharing-type mechanism where you would have a situation where the agricultural lands wouldn't be completely dried up, that they could use water for ag purposes in certain years, other years the water goes to Thornton?

MR. KOLEBER: We have considered that. Our decree does not allow it. The Water Court specifically prohibited us from moving water on and off our properties. Once we have it off, we're not allowed to put our water back on. We can, however -- and we've had some discussions with others about bringing other water onto those farms, particularly if they're a very high producing, very productive farm, we'd like to get water back on those. But it can't be the water that we have that's going to Thornton.

To your second point, we have had lots of -- very good constructive conversations with -- the Poudre runs through a group. I'm a member of that group. And we have looked at ideas like as we transition our farms from irrigated to non-irrigated, there's about a 7-year time period there where you can't put the water on the farms, but we can't take it to Thornton. That would be

a great opportunity to try to work with folks to get the water going into the river.

We're working and our attorneys are working on the Poudre River odd plan, which would allow water to be donated for in-stream purposes on the Poudre to help the environment along the Poudre. That's something we're committed to, we're working hard at, and we hope that we can be successful with.

MR. CARRAWAY: Yeah, just real quick follow-up on that last point, so what you're talking about then is the potential of something that would help with base flows on the Poudre, and -- but that I understand, that's something that you're talking about, you're having discussions about, but that's not part of the mitigation that you have laid out for this process?

MR. KOLEBER: It's not because right now it's not legally available to us.

MR. CARRAWAY: Okay.

MR. KOLEBER: We still have to go through the Water Court process to get that augmentation plan approved, so that we can use that kind of a mechanism.

MR. CARRAWAY: Okay. And just one last question, just in regard to the ditch system, you know, I've had discussions with people about this, and people that are much more knowledgeable about water issues

than I am, and they were just questioning whether or not the current ditch structure is sufficient to where if it were improved in an appropriate manner, that you could actually get the water over to Weld County through the ditch system without a pipeline. Is that something that has been explored at all?

MR. KOLEBER: Well, that could work, except the problem for Thornton is that that would then bypass the Water Supply and Storage Company Reservoirs, and those reservoirs are a key component of managing a water supply because the water comes off during a few months during the summer. We have to stage it for delivery across the entire year and then from year-to-year when we have dry years and wet years. So that Water Supply and Storage Company Reservoir storage needs to be in line for our pipeline.

MR. CARRAWAY: Okay. All right. Thanks.

MR. DOUGHERTY: If I may, I'd like to keep us on track here. We need to be asking questions about the actual 1041 and the pipeline application itself.

Commissioner Jensen?

MR. JENSEN: You mentioned, Mr. Koleber, that if you were to pull the water -- that you could not pull the water off the lower Poudre because protections are not in place on the lower Poudre to allow that to

be a municipal water supply.

Did I quote you correctly, or?

MR. KOLEBER: That's one of a number of reasons, yes.

MR. JENSEN: Okay. What are the mitigations that would have to have been done or would need to be done on the Poudre River through town if that was going to be a water supply conveyance to be able to pull it further downstream?

MR. KOLEBER: I'm speculating that it would need to be advanced waste water treatment, storm water treatment along the way, storm water detention, that's not really something we looked at.

MR. JENSEN: Okay.

MR. DOUGHERTY: Any other questions for Mr. Koleber?

(No audible response.)

MR. DOUGHERTY: And just to clarify, the reason you did not look at that is because that is not allowed per your water rights, correct?

MR. KOLEBER: That and a number of reasons.

MR. DOUGHERTY: All right.

MR. KOLEBER: It's not allowed by the water rights, the quality degrades, the storage isn't available. You lose about 9 percent of your water by

running 18 miles down the river. There's a lot of different reasons why that doesn't work to meet the purpose and need of our project.

MR. DOUGHERTY: Okay. And then one more clarification, you will not be diverting any more or any less water out of the Poudre River by utilizing this pipeline; is that correct?

MR. KOLEBER: We only will be diverting the water associated with our shares, which is limited by historical future use that those water rights will divert no more than what those shares deliver.

MR. DOUGHERTY: All right. Any other questions for Mr. Koleber?

(No audible response.)

MR. DOUGHERTY: Okay. Mr. Koleber, thank you very much.

MR. KOLEBER: Thank you.

MR. DOUGHERTY: At this time we're going to take a quick 10-minute break, then we're going to jump right into public comment. And I thank you-all very much.

We'll be right back.

(Recess taken.)

MR. DOUGHERTY: Okay. Ladies, ladies and gentlemen, we are coming back to order and if you guys

are talking, the people at home can't hear us. I really want to respect your time. I apologize for having to take the break, but we've been out since 2:30 today in a hot van and then we had to rehydrate and well, you know what happens.

So we are going to try something a little bit different here on our speakers. A number of you have spoken up and signed up to be able to yield your time to someone else. We are going to start with John Barth and then when John is done, he's had enough people yield to him. He's got 15 minutes.

After that, I'm going to go through my list here and I'm going to call three people at a time so that we have seats up front here.

Again, I really don't want this to go too late for you guys, as well as for us.

Additionally, one other thing I forgot to mention earlier, if we go past 10:00 o'clock and if any of you go outside one of the doors to the building, please make sure you have somebody inside to let you back in. The door will lock behind you. I don't have any control over that.

Additionally, please remember we can either approve or deny the application. We can't change where the water comes in or goes out.

I would ask also that you speak to this application, not to any other perspective possibilities that are not a part of this application. That won't help us to make a recommendation.

John, the floor is yours.

MR. BARTH: Thank you very much. My name is John Barth. I'm here tonight appearing as an attorney on behalf of the No Pipe Dream Association. Thank you for the opportunity to present a group presentation tonight.

The No Pipe Dream Association submitted a lengthy comment letter with exhibits opposing Thornton's 1041 Application. While I don't have the time tonight to address all the issues in our comment letter, I will address some of those issues and the most important ones. However, we reserve all arguments in our comment letter even if I'm unable to address those tonight.

Tonight I'm going to unleash the elephant in the room. The elephant in the room is whether this Commission is going to comply with the requirements of 1041 and require Thornton to submit a comprehensive application for all aspects of the Thornton Northern Project, which includes return flow pipelines, additional pump stations, a separate water delivery

pipeline or whether this Commission is going to ignore what they know about the full extent of this project and allow Thornton to segment this project into small little bites, thereby minimizing the impact of each little project that it submits.

In addition to presenting the law on what 1041 requires, we also are going present a viable financial and technically feasible alternative to Thornton's Northern Project, and that's namely to move the point of withdraw of water from the Poudre east of Old Town Fort Collins. Not only is this a better alternative for the Poudre River, it also has a greater chance of community acceptance within Larimer County and thus, a higher probability of success for the City of Thornton.

Finally, while we are asking the Commission to recommend denial of the 1041 Application, if the Commission does recommend approval, we're going to ask for additional significant conditions to be included in any 1041 approval, and that would be to limit forever the scope of the Thornton Northern Project to what their 1041 Application contains, and that's the single pipeline.

I encourage you to ask questions, but I ask that you hold your questions until the end of my

presentation.

So the Thornton Northern Project is a large water delivery project, including two parallel pipelines, water delivery pipelines to Thornton, multiple pump stations, and return flow pipelines. The TNP, or Thornton Northern Project, would deliver clean water from the Cache la Poudre River in Larimer County to Thornton and pipe more polluted water from the South Platte River into Larimer County as return flows.

"The components of Thornton's water supply and Thornton's water system are operating together as an integrated project or system," and that quote is straight out of the 2015 Water Court decision.

Here's a map of the Thornton Northern Project that shows two delivery pipelines to Thornton, not one. Return flow pipelines where they take water out of the South Platte and bring it into Larimer County -- and again, this is more polluted water than is in the Cache la Poudre, and they will deliver that polluted water into your watersheds in Larimer County.

And in addition, there are pump stations throughout here for the return flow pipelines and additional pump stations for the second water pipeline.

Thornton's 1041 Application is a small sub-component of the larger Thornton Northern Project. The

Thornton water pipeline application only addresses a single water pipeline frm the WSSC Reservoir to Thornton. No other Thornton Northern Project structures are included in the 1041 Application.

While the TNP is a single integrated system, it's 1041 Application is not. What structures are excluded from the 1041 Application? First just to start, the pump station at WSSC Reservoir No. 4, they're going to do that through site plan and not through 1041, so the impacts of that have not been fully evaluated.

The second parallel waterpipeline which could require takings and eminent domain of many of the people's property that are sitting here today, the return flow pipelines from the South Platte River to Larimer County watersheds, additional pump stations, these impacts from what remains from the Thornton Northern Project are going to be far exceeding the significance of impacts of the current 1041 Application.

So impacts are excluded from the 1041 Application? Impacts to property owners from the pump station, noise pollution; zoning, which is a major issue; and traffic. Impacts to property owners from the second parallel water line, as I mentioned eminent

domain is likely. Impacts to property owners from the return flow pipelines. Impacts to water quality from highly polluted water from the South Platte River return flows into Larimer County and impacts to agricultural lands like Commissioner Carraway was asking about the drying up. This is something that should be evaluated and this permit application simply is not.

Here is a picture of Douglas Road and some of the opposition to this project and application.

Let's talk about what the purpose of the 1041 law is. The 1041 law, the purpose is to look at all impacts from large projects at one time, not to segment them out. Thornton's permitting strategy is to avoid a comprehensive assessment of all impacts by segmenting the TNP into smaller projects, thereby denying Larimer County and its citizens the comprehensive impact analysis guaranteed by the 1041 law.

Here is what the 1041 says. This first quote is right from the Colorado Supreme Court, the highest court in the state, and is an en banc decision, which means all of the justices participated in that. And what they found is that 1041 allows local governments to supervise land use which may have an impact on the people of Colorado beyond the immediate scope of the

land use project. That's the whole purpose here, folks.

In adopting the 1041 statute, the Colorado Legislature recognized that there's inadequate information on land use that's lacking to decision-makers, just like you. Here we are, inadequate information. We've got a segment of the entire project that's being submitted to you and you don't know anything about the impacts to the rest of the project.

The 1041 Application violates both the letter and spirit of the 1041 law by denying information on impacts to Larimer County beyond the immediate scope of its segmented application.

What are Thornton's responses to this? Thornton argues that it can't present all information now because it doesn't know which or what structures will be constructed or when.

Well, as you saw from the map, which was part of the Water Court decision, they know what the additional structures are. They know there's going to need to be another pipeline. They know there are going to be additional pump stations. They submitted that map to the Water Court to get approval for this project. They know they're going to need those things, but they're trying to tell you, oh, we have no idea

when it's going to happen.

You need to tell them to submit that information now. This is your only chance to get that information. Once they get their toe in the door --

(Applause.)

MR. DOUGHERTY: Ladies and gentlemen, I cannot have outbursts. I will clear the room if I have outbursts.

Thank you.

MR. BARTH: -- and the way to respond to this is simply deny the permit application and tell them to come back with a complete application to satisfy the requirements of 1041.

Thornton also says that this is the only water supply addition to their system until 2065; however, documents on their own website seem to appear to show something different.

This is from Thornton's Water Efficient Plan. This is the supply addition that's represented by the Thornton Water Project Application they submitted to add some 20,000-acre feet in 2025. Well, lo and behold, what is this? This is another similar equivalent water supply addition. What's the date for that? 2034.

They're applying for their 1041 permit for

this seven years in advance. If they do the same for this, they're going to be back in 2027.

So this is important. This is your standard of review. This is how you need to look at this application from a legal standpoint. "If the proposed activity does not comply with the guidelines and regulations, the permit shall be denied." This is straight out of state law.

Your own Land Use Code has similar language. "When a 1041 Application may be approved only when the Applicant has satisfactorily demonstrated that the proposal, including all mitigation measures proposed by the Applicant, complies with all applicable criteria set forth in Section 14. If the proposal does not comply, the permit shall be denied."

The word "shall" is mandatory under your Land Use Code. So what is Thornton's burden of proof? They have the burden, not citizens, no one else. They have the burden. And they must prove that they've satisfactorily demonstrated. We believe that that term means a clear and convincing evidentiary burden of proof, not simply a bare preponderance of the evidence.

So what is your land use criteria say in Section 14 of the Land Use Code? It says that the Applicant must submit a complete and sufficient

Application. Well, this is basically incomplete just on Thornton's own cover letter of January 5th, 2018, where it says, "The source water pump station is not part of the permit application." It's not complete, deny it.

The 1041 Application must be denied because it fails to present all information on the source water pump that will be constructed as part of the TWP.

So now let's look at the very first criteria, substantive criteria in your Land Use Code. It says that the proposal must be consistent with the Master Plan. What does the Master Plan say about exporting water out of the county? It says, "Larimer County will not support" -- in other words, will not recommend in your situation -- "future transfers of existing water resources out of the county without consideration of the impacts on present and future land uses."

This Commission may not support or recommend in this case Thornton's application unless it provides information on all impacts on future land uses associated with the future Thornton Northern Project. Thornton's application fails to provide any information on future impacts associated with the remaining elements of the TNP. The Commission must recommend denial.

There is -- they got a better alternative, and that better alternative we refer to as the "Citizen's Poudre Alternative." And that is to withdraw water further downstream on the Poudre and let the Poudre be the pipeline.

What are the benefits to the county? It preserves the Poudre. You hear Thornton say, "Well, we're not going to take any more water out of the Poudre that's not already being taken." That's with this pipeline. They have a second pipeline that would have to draw additional water, so you're looking at reduced flows. You're also looking at the NIS (phonetic) pipeline staring this county down the neck, and you're going to have people running for your water and depleting the water supply in the Poudre.

So this pipe, this would help keep water in the Poudre further downstream. It would shorten the length of the pipeline. It would provide water through Old Town, and it will be fewer impacts to your residents.

The harm to Thornton? None.

Thornton's citizens -- the alternative is cheaper. It involves less infrastructure. It's feasible, and it has greater community acceptance.

This is a PowerPoint slide from one of

Thornton's own presentations. The concept one here is what is included in their application. You'll see the costs there are 400 to 500 million. The concept two here is to leave water in the Poudre further and take it out in Weld County. You'll see it's $50 million cheaper.

You'll also see the probability of success is similar, but one thing they don't look at is community acceptance. If you look at community acceptance, the probability of success is going to go way over into the green.

The citizen Poudre alternative is also feasible. In our comments we submitted a technical report by Lisa Buchanan, who is the hydrologist, and she looked at Thornton's claim that you couldn't take water further downstream. I believe Commissioner Jensen had a question about this.

Can you take it further downstream if it's not listed as a water supply use? You can. There is a segment that's further east of downtown that's still a water supply segment that they could pull out of, and in addition, if they wanted to pull further east, all you have to do is go the Water Quality Control Commission and ask for a change of that classification. It's done all the time, it's not a huge deal.

MR. DOUGHERTY: You have two minutes.

MR. BARTH: She also finds that the water quality near the reclamation plant in Fort Collins is similar to what they would pull out of the reservoir. So downstream diversion is feasible.

So here are the conditions that if you -- we're asking for denial, but if you don't deny, here are two conditions we ask you to impose in the alternative.

If Thornton is not going to submit full information on the full aspects of the TNP, then you ought to say, "Well, all right, we'll grant your permit, but don't come back again. This was your application. You had your chance for a full TNP application to tell us all of the impacts. Since you failed to do that, this is the only pipeline, this is the only structure associated with this project that we're ever going to approve."

The second alternative is to tell Thornton that since they're promising that they won't need to do anything more until 2065, is to say, "Fine. Don't come back until 2066. We're not going to accept anymore 1041 Applications for any other aspect of this project until then."

Any questions?

MR. DOUGHERTY: All right. Planning Commissioners questions for Mr. Barth?

Thank you, Mr. Barth.

Go ahead, Commissioner Carraway.

MR. CARRAWAY: Yeah, I'd just like if you could clarify from a legal standpoint your understanding of the power that the County has in regard to this issue of mitigation? Just how -- you know, I want to just go back to the question I asked Mr. Lafferty, and he talked about this issue of a connection or nexus between the project itself and, you know, any mitigation that's being asked for.

What's your understanding of that?

MR. BARTH: I agree with both of you. I agree that there needs to be some nexus. You can't pull something out of this sky and say, you know, we want you to pay us $10 million, with no relationship to the project.

But the questions you were asking were excellent. And they were mitigation questions, and you are fully entitled as a Planning Commission and as a County to require mitigation, including mitigation to the Poudre. So your questions were right on. You absolutely have a ton of discretion, as long as it's connected to the project, and down the road you're

going to get deference from the courts if you do the right thing.

If you, you know, completely ignore the law or you impose a requirement that's completely arbitrary, you're not going to get deference on that. But if you, you know, tailor your mitigation as we have proposed with our proposed amendments or conditions to say, "You're not coming back, because you've essentially violated 1041. You came in for a piece of this. Or you've asserted that you're not going to need any more water until 2065, don't come back until then."

Those are directly related. They're directly related to promises that they've made to you, and so you have a ton of discretion on mitigation and conditions.

MR. DOUGHERTY: Other questions for Mr. Barth?

Commissioner Jensen.

MR. JENSEN: What I didn't see you address, Mr. Barth, was the storage aspect for the City of Thornton. I think in their presentation they spoke very clearly that those reservoirs are an integral part of this process because of we all know what happens in the late summertime on the Poudre River and what happens in the early spring on the Poudre River. I

would think that storage would be a critical part of that, and I did not hear you address that in your alternative.

Can you speak to that, please?

MR. BARTH: Sure. So I am not an expert on their water system, and I'm not an expert in water law, Colorado water law, but what I can tell you is from reading the Water Court decisions, they have numerous reservoirs for storage. They have a significant percentage of the WSSC water rights. They have storage capability in the WSSC 4, they have other reservoirs further downstream. They also have rights to the various canals.

So what we would like to see, is we would like to see that explored. Give us a map, show us all your storage rights, show us the connections between the canals, and let's roll up our sleeves and work out an alternative that realy mitigates, helps the Poudre, and is acceptable to the community. Thus far, we have not had that approach with Thornton.

So I believe, given the amount of storage rights that they have and the variety of storage rights and the canal access, that this could be done.

MR. JENSEN: Thank you.

MR. DOUGHERTY: Commissioner Gerard?

MR. GERARD: Yes, sir. Have you looked at how many acres are going to be dried up with this water decree?

MR. BARTH: So that is a great point, and if you go back to that Master Plan requirement, that's exactly what it's pointing to. It says if you're taking water out of our county, you need to look at the impacts on agriculture. That's not in their application anywhere. And they've already dried up that land. They've dried up a bunch of it in order to be able to divert this water.

Where is that analysis? Mr. Koleber stood up and said, you know, well, we're doing the right thing. And we're, you know, make sure we don't get weeds and dust and stuff. Where's the analysis? This needs to be in this permit application.

So it's just a screaming deficiency with the application.

And I'd also like to just kind of respond to you and to Mr. Jensen --

MR. GERARD: Can you answer my question, though? Do you know how many acres?

MR. BARTH: I don't know exactly how many acres. I think the number of acres may be referred to in the application, I just can't remember what it is.

MR. GERARD: Okay. Thank you.

MR. BARTH: But there was an important aspect about the timing of the water use. Remember, their historic water use that was agricultural was only used a couple of months out of the year. High flows, you use it to irrigate crops. They've changed that.

Now they're using water year-round and storing that water year-round. So you've completely changed the hydrologic dynamics in the Poudre River by this change, and I'm not telling you that you can then question that because the Water Court has approved that change.

But we need to all know what the impacts of that are, and how it's going to change the Poudre, how is it going to change the ecology, how it's going to change the properties that have been dried up. And again, it's not in the application.

MR. DOUGHERTY: Thank you, Mr. Barth.

Any other questions for Mr. Barth?

(No audible response.)

MR. DOUGHERTY: Thank you very much, sir.

MR. BARTH: Thank you.

MR. DOUGHERTY: All right. Now we have, Roberta Norman is going to be up first, then we're going to have Patty Clifford and Mark Hyden (phonetic).

And we've actually got them up on the screen.

I would ask for Roberta to come on up and speak, please, and then Patty and Mark to please come sit on the chairs up in front here, so we can be as efficient as possible with timing.

And Roberta will have three minutes, as time was deferred to her.

Come on up, please.

MS. NORMAN: Yes, hi. My name is Roberta Norman. And I say where I live?

MR. DOUGHERTY: We don't need that. Thank you.

MS. NORMAN: No, not necessary, okay.

I'm very disappointed in what I've heard so far from the Planning Commission because I see you as thinking yourselves as victims and you're not, and we're here to empower you to do what the citizens are asking.

In the Land Use Code under Purpose of the Code, 2.3.1, and I quote -- this is taking it out of that, is: "To preserve, protect, and improve the health, safety and general welfare of Larimer County residents."

This is about Larimer County. It's not about Thornton. It is -- to say that the State has --

the Water Courts have said that the point of diversion is Reservoir 4 and cannot be changed, you know that's not true. We know that's not true. And will it take Thornton a little more time to get it changed? Yes, but is it going to take less time than building 20-plus -- a pipeline of 20-plus miles that's not needed? Their pipeline, as you know, passes the Poudre right down there by Windsor. They can start their pipeline diversion there.

It's going to take less time to get the Water Courts to change that diversion source and everything, but not as much time as it's going to take to build a pipeline 20-plus miles to get there, and it certainly is not going to interrupt as many people's lives.

And since the Commissioners are charged with preserving, protecting and improving the health, safety, and general welfare of Larimer County residents," allowing 26 miles of disturbance and impact to roads and private property when it's not necessary is not in the best interest of Larimer County residents.

The pipeline application aptly supports because it shows that pipeline crossing the Poudre. It can come out there.

And the $100 million that it takes for that

20-plus miles to go from Reservoir 4 down to the Poudre River down at Windsor, they could use that for building a wonderful reservoir for their residents in Thornton.

And I think that the Larimer County Commissioners should not consider and not be involved with Thornton's concerns. Those concerns being water quality, Government permits, time restraints, having to create reservoirs and having land already purchased in Larimer County. That has nothing to do with the 1041 and it has -- it has nothing to do with what the Commissioners should be doing.

They, again, should be --

MR. DOUGHERTY: Thank you. Thank you, Ms. Norman.

MS. NORMAN: Is it up? Okay. Thank you.

MR. DOUGHERTY: Appreciate that. Thank you.

Patty Clifford, you're up and Scott Horack (phonetic), you will be on deck after Mark Hyden.

MS. CLIFFORD: Hi. I'm Patty Clifford and we live in Wooded Creek. We've been there about 22 years in the house we're in right now.

When we were in Boulder, we built homes and Boulder had a moratorium on building more homes, and I think that Thornton should put a moratorium on this 50,000 people they're bringing in. And you know, those

50,000 homes that they're building in Thornton, they will all have two cars.

Do we want 100,000 more cars on I-25? So you know, I just think it's kind of crazy.

Anyway, that's all I have to say.

MR. DOUGHERTY: Thank you, Ms. Clifford.

All right. Mr. Mark Hyden, you're up and I'd ask Elaine Spencer to make her way on down for after Scott Horack.

MR. HYDEN: Well, it's clear this is a pretty complicated process here and I'm no lawyer, and I'm not -- I don't have a crystal ball. I don't know where this is headed in the future in 20 years or 40 years, and I'm not sure anybody in this room does.

And I'm here to address the 1041 Application as it's currently in front of the Commissioners, and the process that has taken place with that in regards to our perspective, meaning Eagle Lake.

I'm the president of the homeowners association at Eagle Lake and to us, the whole pipeline issue revolves around two specific points. One, public versus private property and the process that has taken so far to reach a decision in front of the Commission.

We fought hard and were supported by surrounding HOAs when the original Thornton corridor

was revealed to us about November of '16 when we saw it was coming straight out of Reservoir 4 going through Eagle Lake, then through private land off of Douglas Road, and it continued up through Woody Creek across Highway 1 into more private land on the other side of Highway 1.

We all wanted a solution that took advantage of public right-of-ways. Existing Thornton land and we wanted the pipeline to stay out of people's private property and backyards.

Both the County and Thornton listened to our suggestions and objections. They County allowed Thornton to use, as has been referenced, public right-of-ways and Thornton studied new routing for the pipeline that did exactly what came out of the meetings that we held with them, and that is utilization of traditional utility right-of-ways. Thornton owned land while not crossing private property, better known as the "Douglas Road option."

The anti-Douglas Road group protested this route over fears much like our own. That private land would be taken in the process, especially with the proposed widening of Douglas Road. But the process worked.

Through public meetings, private meetings

between Thornton and residents along Douglas Road, plus interaction with the County and the Transportation Department over the widening of the road, both the County and Thornton have listened and reacted to residents' concerns, much like they did with the original routing proposal through Eagle Lake.

The 1041 permitting process was delayed so Thornton could research utility locates under Douglas Road that did not require the taking of anyone's private property, and that process clearly demonstrated the pipeline could fit under the existing roadway.

There's not going to be a single house, tree, or fence lost in the pipeline route, if it goes completely under Douglas Road, as the residents there had feared and been told would happen.

The process also worked when Larimer County listened and reworked the road plan that Mr. Peterson showed us tonight with the improvement of Douglas Road that rightly reduced the width and the intrusion of the road into people's existing yards.

Contrary to what the propaganda has been, Thornton and Larimer County have been accommodating to all residents in the process. They've made changes based on resident input. They've protected private property rights with both the pipeline construction and

the reworking of Douglas Road.

In the eight months since the Douglas Road route was proposed, people have had their say and positive changes and results for all parties have occurred along the Douglas Road corridor.

No one has the right to call foul at this point over construction inconvenience when concerns have been met, especially on a public right-of-way. We are all impacted by it, but the sanctity of people's private land has been preserved in this process.

Thank you for listening and for addressing the County and Thornton people's concerns about the land and the private versus public aspect of it. The only thing left in our mind is for you to propose the route to the County Commissioners as a sensible solution for all parties.

MR. DOUGHERTY: Thank you, Mr. Hyden.

MR. HYDEN: Thank you.

MR. DOUGHERTY: Mr. Horack, Scott Horack is up. Then we have Elaine Spencer and Dick Brouch (phonetic).

MR. HORACK: Thank you, Commission.

My name is Scott Horack. I'd like to speak to a couple of issues here that weren't addressed in the 1040 and one of them would be eminent domain, and

the impacts.

Well, I'm not a fancy attorney like the City of Thornton. Back in the '80s when they designed this, you know, and it was designed, you know, from the beginning and it's pretty slick how they got this through. They changed the agricultural water rights to domestic water rights, which override everything else, but what I'm concerned about is that -- and all I know about the project is that water runs downhill. And below Reservoir No. 4, there is four reservoirs that haven't been addressed. There's Lyndon Meyer Lake, there is Long's Pond, there is Richard's Lake and there's Terry Lake.

Now what's going to happen to the water flows in those now that they're all the time, that water is going to be going out through pipelines right there, where all the people that own lake front property and enjoy that property are going to be looking at basically dry land wheat.

And that will save a little bit of problem for the Planning Commission here because you can just build your road right through the lakes that were there before, now they're just storage supply. So you won't have to worry about that, you know?

And I'm being sarcastic because a lot of

things that have been said today are sarcastic, like the good faith effort by Thornton is not a good faith effort. This has been planned since the 1980s. It is very strategic. It is very deceptive, and you shouldn't approve this permit based on what Thornton says because their word is obviously no good.

But yeah, the water levels in those lakes have not been addressed. The impacts to wildlife and the surrounding areas, and in our Constitution it says, "No person shall be deprived of life, liberty or property without due process of law." And this 1040 Application is a due process of law. And it's more on an administrative level with discretionary authority, but when discretionary authority becomes discriminatory authority, and used to -- and abuse.

There was a comment here that says, well, when Thornton asked for this application, that's what they get. Well, Thornton hasn't asked for anything. They've demanded and they've bullied everybody and they've just bullied their way right through this, so.

MR. DOUGHERTY: Thank you, Mr. Horack.

MR. HORACK: Okay. Thank you.

Did you have any question?

MR. DOUGHERTY: Any questions?

(No audible response.)

MR. DOUGHERTY: Thank you.

Elaine Spencer, you're up, then Dick Brouch and then Scarlet Sparkle Delia, and I know I messed that one up.

MS. SPENCER: It's Dick Brow.

MR. DOUGHERTY: Oh, okay. Thank you.

MS. SPENCER: My name is Elaine Spencer. I live at 3605 Bayshore Road, which t-bones into Douglas Road and it's just opposite where Dick Brow has his property and where the pump station will be located.

We've lived there for 30 years and this statement expresses the unanimous opinion of our Terry Acres Homeowners Association.

We are opposed to the pipeline being placed on Douglas Road corridor for the following reasons: The City of Thornton owns land north of Douglas Road. For some unknown reasons, it has been decided early on in the planning process, without any input from people who will be affected by the construction and declining property values, that Douglas Road is the preferred pipeline for their pipe -- route for their pipeline. It isn't.

This is a massive undertaking projected to take three to five years. There are 300 people who will be directly affected, many of whom live in older

subdivisions with single entrances.

It could be a nightmare in case of an emergency, not to mention the day-by-day delays, noise disruptions and inconveniences.

While the main purpose of this hearing is not the pump station. You need to think about Thornton's input into that, which will be directly opposite where our subdivision is. As night follows day, if the Douglas Road pipeline is approved, the rationale of the pump station is finalized, the constant noise, the pumping vibrations and the truck traffic will degrade our lifestyle and property values.

We urge you to deny Thornton's pipeline request. Yes, Thornton has a right to the water which they have bought, but they do not have the right to degrade our lives, our property values, and our safety, especially when we are most definitely not consulted about this and we had absolutely no input into such a life-changing event and such a financial blow to our property values. I doubt that any of you would like to life with what Thornton is proposing to have us live with.

Thank you.

MR. DOUGHERTY: Thank you very much, Ms. Spencer.

Mr. Brow, you are up. Scarlet Sparkle Delia is on deck, and then Dennis Pierrero.

MR. BROW: My concern is the Douglas Road pipeline installation. I don't know that you guys have fully explored the safety, the fact that roads are going to have to be closed on that road, and I think your number of trips per day is old. I think if you do it currently, you'll find it's a lot more than what was up on the board.

The other thing I want to say is taking a -- granting an easement to someone to put a pipeline in is not the same as them taking your property. They're not taking private property.

I don't feel like the northern route has been given fair -- you know, looked it over good enough compared to the traffic hazards and safety that's going to come up with this thing in the road at Douglas Road.

I've heard remarks about temporary four-hour closures of Douglas Road. I don't want to be the dead guy laying out in the field that called in and had a heart attack and had to wait four hours for the First Responders to get there.

So I think you need to go back, recommend to not okay the Douglas Road one. Go back and revisit both of those. Look at the costs. Look at the private

property taking, which won't exist on the northern route.

MR. DOUGHERTY: Thank you, Mr. Brow.

MR. BROW: And go from there.

MR. DOUGHERTY: Thank you very much, sir.

All right. We have Scarlet Sparkle Delia. Would you pronounce that for me? I know I messed it up.

MS. SPARKLE DELIA: You get an A-plus.

MR. DOUGHERTY: Cool. All right. That's rare.

Thank you. You have 10-1/2 minutes if my mic can work.

MS. SPARKLE DELIA: Do I go?

MR. DOUGHERTY: Yes. Feel free.

MS. SPARKLE DELIA: Oh, okay. All right.

Well you know my name. I am a member of the Braidwood Homeowners Association. I live approximately 900 feet from the proposed 10,000 square foot pump station. My family and I moved to the neighborhood 22 months ago from Southern California. I became aware of the Thornton Water Project at our annual HOA meeting in March of 2017.

The volunteer members from our HOA that followed the Thornton Water Project developments

reported that at that meeting, they had proposed a pump station the size of approximately 1500 square feet to sit at the south end of Reservoir No. 4.

And that's not their fault. Not only was this a gross inaccurate description of the pump station, it has purposefully misled many of the area residents about the size and scope of this project in its entirety.

Thornton has illegally segmented the pump station from the 1041 Application. For example, Thornton's January 5th, 2018 cover letter to its application, states: "As discussed with Larimer County Planning staff at the pre-application conference held on May 26, 2016, the source water pump station is not part of this 1041 Permit Application, but will be separately permitted through the site plan review permit process. Information on the source water pump station provided in the application is of a general nature and is included to present a more complete scope of the Thornton Water Project. To-date, not even a preliminary design or specification has been completed for the source water pump station and Thornton will submit a site plan review application to Larimer County in accordance with the LUC Section 6."

The pump station is appurtenant to the water

pipelines. The pump station is connected to the pipeline and will include 40 million gallons per day of pumps, a three-acre building site, a 10,000 square foot building, associated equipment, and emergency back-up diesel generator, industrial fencing, power lines, and security lighting. As such, the pump station has the potential to cause adverse impacts during construction and operation, including noise, air pollution, light pollution, storm water discharges, and degraded quality of life for adjacent residents.

Thornton's failure to include the source water pump station, which is aperturent to the pipeline in its 1041 Application renders the application incomplete and its attempt to have the pump station separately permitted through the site plan review process, rather than through the 1041 process constitutes an improper segmentation of the project, which prevents consideration of all collective impacts from the proposed project during the 1041 process.

The pump station is not an approved use in a farming zoning area. The 40 million gallon per day pump station is proposed on a parcel currently zoned "farming." Under Larimer County zoning regulations, the farming zoning does not allow a large water pumping station as an authorized use. Therefore, the pump

station may not be constructed or operated on the parcel in question without a change in zoning. Any change in zoning of that individual parcel would constitute illegal spot zoning.

In addition, any change to the zoning of the propsed pump station parcel would not be consistent with Larimer County Master Plan which states in LU-4, "In rural areas, allowed uses and residential densities shall be based on the current zoning of the property."

And LU-4-S2, "Changes an existing zoning shall be approved only when the change supports rural uses and maintains the open character of the rural area."

A change in zoning at the proposed pump station parcel would not support rural uses. Instead, it would allow an industrial high-capacity pumping operation in an otherwise rural farming area. The change in zoning would also destroy the open character of the rural area as would construction of the related pipeline.

Because the pump station parcel may not be rezoned from farming and Thornton's proposed use of the property does not comply with existing zoning, Thornton may not locate its pumping station at the proposed location.

Thornton does not want me or my neighbors to know the true scope of this facility until they get Larimer County approval for the first pipeline. When they come back to obtain approval by asking for illegal spot zoning to be changed from farming to industrial use, only then will they provide specifics on the pumps, potential generators, noise levels, light levels, and after that, maybe expand the size of the pump station to accommodate additional pipelines.

The potential impacts to my neighborhood include, but are not limited to noise pollution, light pollution, increased emissions, degradation of the rural landscape and degradation of our property values. These are quality of life issues.

Air pollution, what are the emissions from the pump operation? This isn't known because it's not included in the application, but I can speak to the admissions of nitrogen oxides and particulates; namely, nitric oxide and nitrogen dioxide from diesel engines that contribute to formation of smog and ozone and the worsening of respiratory diseases such as asthma, COPD or emphysema, bronchitis and aggravation of existing heart disease.

Noise pollution, what will this be? This isn't known because it's not included in the

application.

The National Fire Protection Association, 110 Section 8.4.2 references testing of emergency power supply systems. Specifically, diesel generators at a minimum of every month for 30 minutes. This testing length and frequency can vary the longer or more frequent based on the manufacturers recommendations.

And 2.6 technical committee on sound and vibration references sound produced by diesel generators, measured by sound pressure level, or DVA for reference. DVA of a quiet residential neighborhood is 45 DVA during daytime hours. 35 DVA at night. 100 feet from a busy freeway is 70 DVA. An orchestra is 92 DVA.

For a 125 kilowatt diesel generator, sound is measured at 86 DVA. In the case of the Thornton Water Project, one pump is 850 horsepower, which is equivalent to 633 kilowatts.

What type of a generator or generators wired in parallel are going to back up that level of power and be tested on at least a monthly basis -- and this is only one of the five pumps.

How could this even be proposed in a residential neighborhood? Property values? Home values in the pump ouse vicinity are anywhere from 3-

400 up to 2-plus million. Several hundred thousand dollar home value reductions due to this project is going to result in a signicant decrease in tax revenue to the County. Why would Larimer County elected officials approve such a budget cut? All of these potential impacts are to people like me. To the people in this room that live in the vicinity of this project, to our children who play on and around Starlight Drive, and in surrounding neighbors, to the families who start and end their days in this beautiful area of Larimer County.

The purposeful exclusion of the pump station from the Thornton Water Project 1041 Application has not gone unnoticed. It is perhaps the most pressing issue when evaluating the size and scale of this monumental long-term project guaranteed to adversely affect each and every one of this in ways yet unknown.

Thank you.

MR. DOUGHERTY: Thank you very much.

(Applause.)

MR. DOUGHERTY: Okay. Next we've got Dennis Pierrero, then Ryan Donovan is on deck and Ms. Karen Wagner will be third, but she's closer where she is, so she can stay sitting there if she'd like.

MR. PIERRERO: Thank you. Just a few

comments.

First is about maintaining our reservoirs. The dozens of small reservoirs in Noko are long-standing and well established water eco-systems that benefit our wildlife, including providing some very important habitats and they attract a great variety of birds, including many rareties.

The reservoirs also provide many opportunities for recreational activities. The reservoirs are clearly gems of our community; therefore, since Thornton will maintain their high quality water eco-systems in their current locations far into the future, I'm in support of this application. I would not like to see these go south.

Second, upholding private land rights. The use of public right-of-ways to harbor utility lines is a very common practice in the US and Douglas Road, my neighborhood road, currently has utility liens buried underneath it. It is how things get done.

The applicant intends to use public land where possible and for this reason, I support the application.

And lastly, process is in important. I'm instructed to follow and participate in the 1041 process, as I'm doing tonight, to guide my -- to guide

the impact on my property; therefore, I respectfully ask the County to do the same and rule on the merits of the application as is currently submitted. Taking into consideration topics and technicalities outside the scope of the project and process adds uncertainty, instability, and confusion to property owners current and future. This would not be helpful.

I ask that you please recommend approval of this application. Thank you.

MR. DOUGHERTY: Thank you, Mr. Pierrero.

Ryan Donovan is up, and then Karen Wagner is on deck and Karen Colobady is in the hole, if you will, third up.

MR. DONOVAN: Good evening, member of the Planning Commission and staff. My name is Ryan Donovan and my wife and I live at 3609 Bayshore Road, directly across Douglas Road from the pump station.

I practice in the area of water rights. I'm a water rights attorney, and I also teach water law and policy at Colorado State University.

There's been numerous gross misstatements of the law this evening on both sides, I think. Nevertheless, I felt compelled to talk after I heard the questions Mr. Carraway asked of Mr. Koleber about alternatives, particularly using the water -- or the

existing Larimer County Canal to transport the water.

I felt compelled to respond because I'm not sure that Mr. Koleber was completely accurate in his response. Certainly the pending or the current decree for Thornton's water rights limits their use and their place of use and their place of use and their points of diversion. But there is nothing under Colorado water law that would prevent Thornton from applying to store their senior water rights, which they already own, in new buckets. Those buckets can be located closer to Thornton. They can be located anywhere else, but they would significantly reduce the length of this pipeline.

I have numerous cases where my clients pending in Water Court now are doing just the same thing. I raise this as an issue because one of the Planning Commission's criteria for evaluating the plan is that the Applicant has provided a set of alternatives -- a complete set of alternatives. In this instance, I think Thornton has failed to do that. They have not examined this idea of using existing infrastructure and using existing water laws of our state to put that water in buckets, not put a pipeline 80-some miles from No. 4 down to Thornton.

And for that reason, I recommend that you recommend denying the application.

MR. DOUGHERTY: Thank you, Mr. Donovan.

Ms. Wagner, you are up, you've got 12 minutes. And thank you very much.

MS. WAGNER: Good evening. I don't know how I wound up with 12 minutes. I practiced and prepared for six.

MR. DOUGHERTY: Well, if you want to take less?

MS. WAGNER: But I'm going to talk real slowly, how's that?

(Laughter.)

MS. WAGNER: I am resident of Larimer County, of course. And I've lived in the Douglas Road area and until four years ago lived on Water Supply and Storage No. 4 in Eagle Lake in 16 years. So I'm well acquainted with the location and the geography of the area. But I also think besides the Douglas Road residents who have organized beyond belief, there are many residents throughout Larimer County along this whole 26 miles that have no idea of what's headed their way.

So first, since I have some extra minutes, I would like to thank the many, many people who spent untold hours and resources as everyday citizens trying to understand a very complicated application. And

unfortunately, it seems like that shouldn't be the job of a citizen. But it was. And so people like me spent a percentage of every day for the last six months trying to understand this project and envision a better alternative.

So, last fall some friends of mine asked for my advice regarding what was then called the Thornton Pipeline. They had heard about it from area residents who believed it was already a done deal. I agreed to help them negotiate a political system that was unfamiliar to them. I explained that the interest of citizens and of Larimer County in general are protected by the provisions of the Master Plan and the Land Use Code, both of which I worked on some 20 years ago with hundreds of other citizens.

I assured them that the member of the Planning Commission are every day citizens like them, who value the same quality of life and the natural environment that they do. To provide some peace of mind, I referred them to the stated purpose of the Land Use Code, which Ms. Clifford referred to earlier.

But I'd to repeat it because I love it. I think we did a good job on that. And it states that one of the purposes of the Code is to maintain and enhance property values by stabilizing expectations,

fostering predictability in land development, and establishing a process that efficiently applies the Code, while respect the property owner rights of Larimer County citizens.

That's what Larimer County is all about, property rights. We heard a lot about that when we worked on the Land Use Code.

Other stated purposes of the Code are to protect critical and environmental resources and promote the preservation of agriculture. You know that. I'm not telling you something that you don't know.

So I'm here tonight to ask you to consider the future impacts of the three pipeline, Thornton Northern Project, for residents all along the 26 miles of the proposed route.

And to make clear that should Larimer County approve Phase I, an additional 48-inch parallel pipeline and a 72-inch return flow pipeline, plus ditch exchanges, will be lining up for approval.

Thornton's own 2018 Water Efficiency Plan says that they'll need all their water in just 16 years. Mr. Koleber didn't say that tonight. They keep saying 2065, but do you really think they're going to wait till 2065? I don't.

If Larimer County approved Thornton's application for the Phase I Pipeline, you'll next be asked to consider illegal spot zoning of an agricultural property surrounded by residential for the industrial use of a pump station.

Is the Planning Commission prepared to consider an illegal spot zoning to jump start Thornton's pipeline? Really?

As citizen representatives of Larimer County, you have probably considered what the impacts would be if your home, your acreage, or farm should become pipeline central for years on end. And as someone mentioned earlier, we're not just talking about Thornton's three pipelines. We're talking about NISP (phonetic) and the County has worked with Northern Water and Thornton together on this pipeline corridor.

It's obviously to anyone with a passing familiarity with Thornton's plans that the project represents zero benefits to Larimer County and only hardships for County residents. Should construction start, residents are rightfully concerned that their property values will plummet and their quality of life will be severely diminished.

At minimum, the pipeline project will eliminate the beauty, privacy and sound proofing of

material landscaping. Residents may lose the enjoyment of their front or backyards and find a construction zone a few short yards from their doors.

When completed, the Thornton Northern Project will take homes and properties by eminent domain along its 26-mile course through Larimer County. The years of construction and road closures -- and we are talking years -- could affect residents' health and may force some to give up homes where they've lived and raised their families.

The 300-plus homes with single access from Douglas Road alone will experience unforgiving inconvenience for residents and home businesses, as well as delayed access for emergency responders.

Construction of the pipeline could easily eliminate units at two mobile home parks which represent part of Larimer County's small supply of affordable housing.

Residents near the intersection of Turnberry and Douglas will face the hazards associated with threading multiple pipelines through the 100-year old still active Prospect Energy Oilfield. What could possibly go wrong?

(Laughter.)

MS. WAGNER: On behalf of the citizens of

Larimer County, I ask you to deny Thornton's 1041 Application because it is incomplete, lacking in critical detail, and segments a massive project that will be detrimental to thousands of Larimer County residents for decades to come.

The Planning Commission is charged with protecting the property rights of Larimer County citizens, not facilitating the water rights of a Denver suburb that plans to use eminent domain.

Vote no tonight and ask Thornton to do the right thing, which is to avoid negatively impacting any Larimer County homes, properties, and neighborhoods, and to send its water through Fort Collins and the Poudre.

That which is an option that the City of Thornton has already determined will save their taxpayers 50 to $100 million. The less costly citizen's Poudre alternative can save a struggling river. They'll be making pipelines for a very long time, but they stop making rivers a long time ago.

Thank you for your consideration.

MR. DOUGHERTY: Thank you, Ms. Wagner.

Karen Colavity (phonetic) is up. Then we have Patricia Babbit, Harry Sheline (phonetic) and Penny Hillman.

MS. COLAVITY: Hello. My name is Karen Colavity. I'm actually a resident of Adams County and I know personally how Thornton operates.

Thornton, my dad and our family owned a property in an unincorporated Adams County for over 50 years. It just so happens that in the year of 2014, my dad died. Thornton had hoped to annex his -- asked to annex his property for years before that. I've noticed in some of the documents that Thornton has provided tonight that 2014 seemed to be a magic year for Thornton to see that it could take over a lot of things.

We hired a personal representative to represent our estate. Unfortunately that personal representative, who actually happens to be public administrator here in Larimer County, where they seem to be some connections, instead of treating our family fairly, started working hand-in-hand with Thornton.

Our property that had been in the family for 50 years and in 2008 had been appraised at $2.3 million, we knew that property values had gone down through the recession, but when we asked for a proper appraisal, so we would know how to take care of the estate, this person brought appraisers for 600,000 and it was sold to a church, the Mayor of Thornton presides

over.

MR. DOUGHERTY: Thank you, Ms. Colavity.

All right. Next we have Patricia Babbet (phonetic), then Harry Sheline (phonetic) and Penny Hillman.

MS. BABBET: I just want to say that a lot of my concerns have been addressed, especially by Elaine and Dick, Scarlett, Karen Wagner and Karen Colavity. I also am very aware of the situations where Thornton has been taking over a lot of property either through eminant domain or I would call "elder abuse."

And I'm just concerned of how things are working with this pipeline, as well. And one of the first things that was on a slide says that this project will cause no significant impacts to natural or man made environments, and I just don't see how that's possible with the pump station, 2.8-acre pump station, and this huge pipeline and I think we need to get a clear definition of what "significant" and "negative" and "mitigate" all mean because it's just not making any sense at all to me.

Thank you.

MR. DOUGHERTY: Thank you very much, Ms. Babbit.

Harry Sheline is up, then Penny Hillman, and

then Doug McAllister.

MR. SHELINE: I'm going to turn my time back in. My points have been made.

MR. DOUGHERTY: Thank you very much, Mr. Sheline.

Penny Hillman -- and I am going to ask please for Doug McAllister and Robert Kitchell to please come up front. That way we can go ahead and keep this moving along.

Thank you.

MS. HILLMAN: I've been writing new remarks, so I'm going to have to like shuffle through these, if you'll bear with me.

Repaired part of my remarks: There are so many critical unanswered questions and unresolved issues that should have been addressed long before this matter was brought before the Planning Commission. In March I wrote a letter, which hopefully is in your planning packet, to Thornton, Larimer County, Northern Water, recommending they hold a joint public hearing so the residents of Larimer County could have their questions and concerns openly answered and addressed before Thornton Amended 1041 was filed.

In my letter I requested the courtesy of a response. I heard nothing from Mr. Koleber, nothing

from Mr. Barnes of Thornton. I heard nothing from Northern Water. The only response I received was from Mr. Helmick saying, "We not intend to hold any further public meetings."

In January, Larimer County held a public information meeting for Douglas Road. Todd Bloomstrum faced some fierce fire at that meeting, but did a terrific job of listening to Larimer citizens and it appears facilitating supplements to Thornton's 1041 that directly addressed concerns voiced at that meeting.

Mark Peterson, in a letter dated March 14th, noted serious deficiencies in Thornton's submitted supplement of March 9 and sent it back for inclusion of additional information.

This is what it looks like when your County advocates for its citizens and I want to publicly thank them both for their work tonight.

As similarly formatted, public information meeting with Thornton and Larimer County had the potential to resolve contentious issues and facilitate the process of conflict resolution without the costly time intensive -- costly and time intensive lawsuits that are sure to result from voting prematurely on Thornton's 1041 permit.

I ask the Planning Commission to find Thornton's 1041 Application currently incomplete in order to allow time for Larimer County and Thornton to hold a series of joint public information meetings with the goal of reaching a mutually agreeable resolution with those who will be bearing the burden of Thornton's Pipe Dream, the citizens of Larimer County.

Now I'd like to address Mr. Koleber's remarks this evening wherein he stated the best overall score was Douglas Road because that is flat not true. By Thornton's own metrics as shown in Appendix A, Alternate Analysis of their 1041, it is not Douglas Road that received the best overall score, it is the North three route, which is County Road 56. I can forward that to you first thing in the morning if it's not easy for you to access.

Furthermore, the six component of Thornton's evaluation, which is entitled, "Coordinated Project Opportunities," was artificially inflated for Douglas Road, falsely multiplied by three, claiming that Thornton would lessen the impacts on the community by coordinating installation of their pipeline with the reconstruction of Douglas Road and the installation of the NIST (phonetic) pipeline.

If we are not going to deal in truth, what is

the point of any of this?

MR. DOUGHERTY: Thank you, Ms. Hillman.

MS. HILLMAN: Thank you.

MR. DOUGHERTY: Mr. McAllister and then Mr. Kitchell.

Yes. Go ahead, Commissioner Jensen.

MR. JENSEN: Ms. Hillman, we did get your letter, just so you want to know that it was part of our packet and we were provided an additional copy of that today also, just so that you know that we got that.

MS. HILLMAN: Appreciate it. Thank you very much.

MR. DOUGHERTY: All right. Mr. McAllister.

MR. MCALLISTER: Okay. In 2006 my wife and I bought some property on Woodridge Road and Douglas Road, right on the corner. The north side of the fence is along Douglas Road.

In 2006 we also opened Terry Lake Assisted Living where we take care of eight residents, average age between 85 and 98.

Now to say there isn't going to be an impact on this road, there is going to be an impact on this road and the impact is going to be on those elderly people because there's going to be dust and there's

going to be noise, and there's going to be a disruption of their quality of life because they can't go out like they did today on a beautiful day like this and sit outside with all the noise going on and everything else that's going to go right along, right outside the fence line.

Not only that, when this construction begins, it's possible that we may not even have any more opportunity for resident families to bring their parents there because of the situation that's going on.

So it will impact eight residents.

I don't know if I'm going to be able to keep it open. I don't know what impact it's going to have on that as far as getting people in and out. The nuisance it's going to be for the resident families and that kind of thing -- and I know it's only eight families, but I know also that there's a lot of people represented here that's lives are going to be affected that live in that area and it isn't going to affect everybody else in Larimer County and they probably don't care.

In 2006, I knew nothing about anything that's going to go on on Douglas Road and probably the people that built that house in 1969 didn't know either, and that was 30 years or so before Thornton even got water

rights for that.

So I really propose that they have an alternative route, the route that they planned on in the very beginning because they came in when this was already established and now they're just trying to ram that right through, which we really don't approve of, we don't want, and we hope that as a citizen of Larimer County and not Thornton, as representatives of the citizens of Larimer County, you will take that into consideration because we are the ones that are living in Larimer County, not the people in Thornton.

Thank you.

MR. DOUGHERTY: Thank you very much, Mr. McAllister.

Mr. Kitchell, you are up. After that we are going to take a quick break. I've been given a few notes that we need one, and it'll be a 10-minute break.

MR. KITCHELL: Good evening. I thought I had six minutes, but apparently three, so I'll have to compress things a bit here.

My name is Robert Kitchell, K-I-T-C-H-E-L-L. My wife and I live at 412 Terry Point Drive. We have done so for 25 years and our backyard backs up to Douglas Road. So we have a personal interest in the project.

As well, I'm a retired civil engineer and I have designed a number of pump stations and pipelines such as this over the years.

As addressed earlier, the Colorado Supreme Court in its 1996 decision describes the Thornton Northern Project as a three-phase project. Phase I is the Thornton Water Project, the subject of the 1041. Phase II includes a parallel 48-inch pipeline. And Phase III includes construction of a 72-inch return pipeline to convey flows to the Larimer County Canal.

This pipeline does not use Douglas Road corridor.

The alignment of the proposed pipeline is shown schematically in the recently submitted supplements as of early April. It's clear that Thornton has crafted it's current 1041 Application to only include Phase I of the Thornton Northern Project.

MR. DOUGHERTY: Mr. Kitchell, I hate to interrupt, but you do have six minutes, and I'm going to ask Mr. Lafferty to add three more. I just looked through here, so I want to make sure you have the time that you are supposed to have.

MR. KITCHELL: There is a God. Thank you.

(Laughter.)

MR. DOUGHERTY: Well, gotta be fair.

MR. KITCHELL: By way of background, the 1041 Permit Application, Section 2A2, general description TWP components in part included typically a 50-foot permanent easement for the water pipeline and an additional 40-foot temporary easement for construction will be purchased from property owners, except for the TWP will be constructed in road right-of-way.

The foregoing language describes a pipeline corridor which in concept and application is quite different from a typical utility occupied a road right-of-way. However, Thornton's recent supplements show the single 48-inch pipeline alignment within the 60-foot wide Douglas Road right-of-way, which does not meet the definition of a pipeline corridor.

It should be noted that approval of pipeline corridor would encourage the use by other utilities and projects, such as the Northern Integrated Supply Project. As indicated, the proposed pipeline alignment is schematic and the routing varies back and forth between the eastbound and westbound lanes. This in itself would not leave room for a second parallel pipeline, in my opinion.

In addition, there is an existing L-Co water district pipeline under Douglas Road that would have to be relocated. In the development services team

recommendations, Item 3 states that the pipeline alignment shown in the 1041 Application is considered conceptual in nature and demonstrates that the proposed lane can be located within the existing Douglas Road right-of-way west of County Road 11.

As you may imagine, I disagree with the assessment regarding use of the term "demonstrates."

Further, the supplements do not show cross-sections, typical or otherwise. Typical depth of burial of a water line or other wet utilities is five to seven feet. For this size pipeline, a trench depth of about 12 feet would be required. This would require trench shoring, bracing and blocking, given the limited room within the right-of-way for construction.

I'd like to contrast and compare other recommendations of the Development Services Team to the specific requirements of the Larimer County Rural Area Road Standards, that would have to be met during construction. The requirements of the standards are extensive, although some discretion is granted to the engineer.

Standards: Traffic flow during peak hours, no interference with traffic flow on arterial or collector roads such as Douglas Road shall be permitted between the hours of 7:00 a.m. and 8:30 a.m. or from

4:30 p.m. to 5:30 p.m., unless authorized in writing by the engineer.

Standards: End of day lane conditions, asphalt road. When work has stopped for the day, all lanes of an arterial or collector road shall be open to traffic unless approved by the engineer. A traffic lane shall be considered satisfactorily open only if it is paved with hot or cold mixed paving except when an alternative temporary service is allowed by the County as a condition of the permit.

Recommendations, Item 4, are somewhat softer than the County Road standards. In the interest of time, I won't go through them.

There's reference to the growth management area in Larimer County and for those who don't know, the Fort Collins CMA boundary is Douglas Road in our area.

Standards: Excavation. Trenches shall be excavated along the lines and grades established and in no case shall it be more than 200 feet in length or trenched and backfilled in non-continuous sections and so forth.

Again, the recommendation is contained in Item 12. Thornton shall construct the pipeline in phases, subject to phasing plans to be approved.

It is anticipated that work will only be allowed sequentially within one-mile segments for the alignment west of County Road 11.

Now in the interest of time, which is about up, it's quite clear that a second, parallel 48-inch pipeline would not be constructed within the Douglas Road right-of-way. This would necessitate a new routing.

In conclusion the deliberate approach of Thornton to not reveal the full extent of the Thornton Northern Project in its 1041 Permit Application would foreclose the option of a second parallel 48-inch pipeline as called for in Phase II, require a new pipeline corridor with a different routing when a second pipeline is needed.

And thank you for your time.

MR. DOUGHERTY: Thank you, Mr. Kitchell.

We are going to take a quick, ten-minute break, and we'll see you back here shortly.

(Recess taken.)

MR. DOUGHERTY: Now I'm going to ask for Janet Carabello, Georgia Locker, and Rick Steadman to please come on up.

MR. LAFFERTY: And Chairman Dougherty, Matt Lafferty real quick.

MR. DOUGHERTY: Yes, sir.

MR. LAFFERTY: Margaret Ho, Item No. 31, and Item 46, Belinda Koonce, both have decided not the speak, so you can strike those.

MR. DOUGHERTY: Excellent. Thank you very much.

All right. That tells me now that we are down to about 33 minutes of public comment left. So Janet Carabello, you are up. Janet is no longer here.

Okay. Then Georgia Locker, you are up. Then we have Rick Steadman, and then Sandy Hellsner.

MS. LOCKER: As a resident of Fort Collins, I am aware that the City of Thornton has bought water rights from the Poudre River and wishes to build three pipelines in the future to carry the water from Fort Collins to Thornton and back.

As I understand it, most of the farms from which Thornton bought the water in Weld County and they're presently receiving the required water to the farm via a ditch north of Douglas Road. The Poudre River is the reason that Fort Collins was built in this place. To it's 160,000-plus residents, it's part of our identity. We value it for its life-giving water, it's possibilities for recreation and its beauty. Yet, to my knowledge, no persons living in Fort Collins have

been contacted about this project, nor have there been any public meetings to discuss this by either Thornton or the County -- Larimer County Commissioners.

However, taking water out of the river before it ever gets to Fort Collins and putting it through a pipeline will certainly have no benefit to any benefit any citizen of Fort Collins or Larimer County. In fact, it will have negative effects.

The Poudre River has recently received a grade of C-minus, and as the pipeline is put in, it will likely degrade it further, especially the returned water to the Water Supply Storage system of the reservoirs and ditches from Thornton.

Please consider very strongly allowing the Thornton water to run its course in the Poudre River.

MR. DOUGHERTY: Thank you, Ms. Locker.

Rick Steadman, you are up. Sandy Helser is on deck and then Lynn Nichols.

MR. STEADMAN: Members of the Commission, thank you for your attention tonight. My name is Rick Steadman and I live about 50 feet off of Douglas Road on the west side of Highway 1. Many of my points tonight have already been covered, so I will not repeat those for you.

The one point that I wanted to make sure that

the Commission was aware of is that Thornton has done a really good job of telling you how much outreach they made, down to emails and things like that. They didn't suggest how many of those emails were negative versus positive, but my bigger point is that as a resident along the Douglas Road corridor, there was absolutely zero outreach to any of the constituents on the whole Douglas Road corridor.

The first time that we were presented with any information like that was at the meeting after the No. 1 choice of Douglas Road had been made. They mentioned that met with HOAs, et cetera, et cetera. There are plenty of HOAs along the Douglas Road corridor. There was no outreach by Thornton to any of those HOAs and in fact, we did not know that that was even a possibility to talk to Douglas because one of the members of a community on Douglas Road did try to attend one of the other meetings and was denied access to that meeting.

MR. DOUGHERTY: Thank you, Mr. Steadman.

MR. STEADMAN: Thank you very much.

MR. DOUGHERTY: Sandy Hellser, then Lynn Nichols and then Jerry Palt.

MS. HELLSER: Hi. Good evening. I'm Sandy Hellser and I live at 6301 Larimer County Road 1, also

County Road 13, also County Line Road. I don't live on Douglas Road, but I wanted to mention to you that there are other residents in Larimer County that this project affects and that we, as I -- and my neighbors and I have sent a letter to the County Commissioners back in February. I resent it to Mr. Helmick to be included in your packet tonight, so I hope that you saw that.

We visited with representative from Western States. My neighbors and I held a neighborhood meeting to see how this project was going to impact us. My neighbors would prefer that the water be sent down the Poudre until it reaches down past Windsor, but in likelihood, we know that it's probably coming down our way.

I see that you've made agreements or Thornton has made agreements with the Town of Tinmouth (phonetic) to come down County Line Road until their town limit stops, and then it zigzags across our properties, and it affects our irrigation. It affects our property values. It affects our egress and ingress to our properties. And it would be our preference that it stays in the right-of-way of the road versus zigzagging across our portion of County Line Road.

MR. DOUGHERTY: Okay. Thank you very much, Ms. Hellser.

Lynn Nichols is up, Jerry Palt, and then Scott Glick.

MS. NICHOLS: Hi. I just wanted to revisit why Douglas Road was chosen as the pipeline route. As Rob said, the pipeline route was changed from a mile north through Eagle Lake due to neighborhood objections. That was the result of private meetings prior to the route selection with the Eagle Lake neighborhoods. That's about maybe 200 affluent people living up in Eagle Lake, compared to a good -- that was more who have signed petitions against the Douglas Road route. We have about 600 signed petitions online with No Pipe Dream and 400 more that I believe are in your packet from a paper one.

Since a precedent has been set to change the route due to neighborhood objections, I ask you to reject this 1041 due to a large public objection. Douglas Road was not scientifically analyzed. It was selected as a reaction to Eagle Lake's objections. So the 1041 should be denied.

I also just want to point out that in a presentation in 2014 Thornton gave to their own City Council, they stated that the reason why they rejected the Poudre River route was because they wanted to avoid long federal permitting process.

Thank you.

MR. DOUGHERTY: Thank you very much, Ms. Nichols.

Jerry Palt, then Scott Glick, and then Jim Camben.

MR. PALT: Mr. Chairman, thank you. Commissioners and overworked staff of the County, thank you for allowing us to speak. My name is Jerry Palt. I'm president of the Hill Community Association and also president of the Cobb Lake Preservation and Recreation Association.

I'm here tonight. I represent combined membership of 167 families. You don't hear a whole bunch from us in this presentation. We are east of I-25. A lot of discussion, and rightly so, from the fine citizens along Douglas, but we feel impacts, too, and I'm here. We've met as our group and united in our resolve in opposition to this proposal

And we'd ask you to vote no.

We got not outreach from the Applicant. We saw maps about mailings and all that. He didn't show any maps from over there. We got our first notice after reading in the paper. We got a notice back in January, you know, for a February meeting, and got a map associated with this and limited information.

We were elated to read in the papers that the Commissioners had decided to reject that proposal for the lack of specificity. Well, we were excited to hear that, but we were very disappointed to get our new notice in April with exactly the same map.

And as it relates to County Road 56, which our properties and our lake directly abutt, the Applicant is asking for a quarter mile swath to do whatever they want to construct this pipeline. There's no schedule provided. There's no specificity where they would be. Some of the things that could impact our community are we have two main entries. That's one of our main entries to the Hill Community Association. Mature landscaping, fencing, entry structures.

As it relates to the lake, we have only one access to Cobb Lake and that is directly off of County Road 56.

We have Osprey nests constructed within 100 feet of County Road 56. And we have no idea what these impacts would be.

I heard the Applicant say, and I think maybe a staff comment that, you know, environmental concerns, wildlife concerns were discussed and no major concerns were identified. Well, I want to tell you that we are responsible for managing collectively 1300 acres of

open space, conservation space, and preservation space, both on land and water in this lake in this adjacent community.

We have -- we're really not that well-known jewel in Northern Colorado in terms of the wildlife.

We have all kinds of wildlife, but we're really known --

MR. DOUGHERTY: Thank you, Mr. Palt.

MR. PALT: -- for our birds.

MR. DOUGHERTY: Thank you very much. Appreciate it.

MR. PALT: Thank you.

MR. DOUGHERTY: Next up is Scott Glick, then we have Jim Camben and Patricia Corb (phonetic). I'd ask you two to please come up and sit up front here so we can keep this going.

Thank you.

Mr. Glick, the floor is yours.

MR. GLICK: Most of the things I wanted to talk about have been stated, but just a few things if you're looking for conditions. The first one would be No. 25 in your packet here which talks about pump station to be designed be consistent with the character of the neighborhood. The sizes and things like that, compatibility is a huge issue in the Land Use Code.

It's one of those nebulous terms.

10,000 square feet probably isn't compatible. Industrial lighting and things like that, especially close proximity to Douglas Road instead of back further by the base of the dam on Reservoir No. 4.

The next one would be No. 6. No. 6, you talk about Thornton be responsible for arranging pay for cost utility relocations. If they came up with a way to not relocate utilities, especially Elko's (phonetic) water line, which is more than 50 years old, concrete asbestos pipe, it's outlived it's usefulness and it's very soft. Compaction vibration could cause unintended consequences and damage that pipe at the cost of Elko water users.

And No. 2, you have the term "significant," "Significant alterations throughout should be evaluated by the County." You don't define "significant" and that takes the public process out of that significant, whatever that definition is. That should be a little bit more defined.

No. 10, we talked about how long this could take. As Mr. Palt said, there's no schedule here. Highway 287 is gone for four years and it's still not done and we don't want to be inconvenienced that long.

And I should have another minute and a half

because my neighbor ceded his time for me, but that's all right. I'll not have the due process that I'm deserved.

Thank you.

MR. DOUGHERTY: Thank you, Mr. Glick.

All right. Next we have Jim Camben and then Patricia Corb and then Nancy Terry.

MR. CAMBEN: Hi. My name is Jim Camben. I live in Terry Point with my wife and about 100 other families. We're part of the 311 families on Douglas Road that have only one access in and out from our homes. That is Douglas Road.

So that means during the duration of this project, we may or may not be able to leave our home at all or in any case, if we can, we'll be delayed every single time we do.

In addition to that, the utilities that are located along Douglas Road are the only utilities that we have access to, so when the inevitable construction mistake occurs and water line is cut or electric line is cut or something else is cut, we will be without power.

The requirements are that the construction be done under traffic, which means allowing normal traffic flow with constraints during construction. Well, there

will be plenty of constraints since they need to dig at least a 12-foot trench that's 9-feet wide with 2 feet on either side to put a trench wall in. And then they're going to dig that out, put the pipe in and move this thing forward slowly as they go along.

They're estimating that this will take a year or so, but our guess is that it will take a lot longer. So during that entire time, we will be massively inconvenienced, in addition to the 6,000 people every year who turn right onto Douglas Road when they're southbound on Highway 1. That's 6,000 cars per day that are going to have to find some other route.

Due to all the questions that have been raised with this 1041 Application, the incompleteness of it, the -- oh, non-transparency and dare I say "dishonesty" of it. In Terry Point we were never contacted. There was no outreach to us.

I really would hope that you would recommend that this be returned to them for further definition.

Thanks very much.

MR. DOUGHERTY: Thank you, Mr. Camben.

Patricia Corb and then Nancy Terry and then Sean Shelly (phonetic).

MR. CORB: Mark Corb, my wife and I exchanged time because I was at another meeting.

MR. DOUGHERTY: Okay.

MR. CORB: So our statement is presented jointly on behalf of ourselves and we live right at the corner of Highway 1 and Douglas Road.

Let's get to the concern on the table. Distrust. Thornton's Water Project was borne in deceit. The farms and the water purchased were not purchased on the premise that the land would revert to dry land and the water would be conveyed away from supporting agriculture or population growth in Larimer and Weld Counties. That was not so stated.

The proposal was to take Larimer County water to Thornton via pipeline at 54 is not Thornton's first proposal. As you heard from others, 56 was a primary consideration.

Thornton's original 1041 Application was so deficient in detail that it ran roughshod over the impacted property owners. The supplemental information has helped some, especially representing that the pipeline would be held totally within the existing County Road 54 boundary.

But all of these additional pages are not a certainty. Throughout, Thornton has refused to take seriously its obligation to be a good neighbor, to be cognizant of the ways of which its diversion of water

from the Poudre River Watershed to provide environmental, aesthetic, and cultural benefits to the peoples of the communities along the Poudre River.

A simple solution, so stated by many, is to leave the flow in the river and change the point of diversion. Like other alternatives, this may have economic costs, but the 2014 study done by Thornton does not indicate that such costs outweigh the benefits to our way of life.

And then there is the coziness of Thornton and Larimer County Planning and Engineering. Larimer County stands to gain a major road upgrade, largely financed by Thornton. See Conditions 4 and 5.

Even worse, the conditions proposed by the Planning Department leave the reality of construction up to the -- I call them "elite" of the two governmental engineering departments, again without input from the affected citizens. Because plans are still conceptual, incredible discretion is granted to the County Planning and Engineering Departments without any citizen input. This is exceedingly dangerous and potentially damaging to all of the neighboring property owners. See Conditions 2 and 3.

We believe that the plan as submitted and amended remains incomplete and lacking in specificity

and ought to be rejected on its merits. However, the best you could do is send it back for the kind of detail that would avoid the kind of conflicts that are inherent when there is inadequate engineering study ahead of time, as was evidenced by the demand of the County Planning Department to have them go back and do pothole testing to locate where they would actually put the road -- or the pipeline.

We ask you to disallow the request. Thank you.

MR. DOUGHERTY: Thank you, Mr. Corb.

Nancy Terry and then Sean Shelly and Christine Craft.

MS. TERRY: Hi. I'm Nancy Terry. I live at Eagle Lake and I've been there for 26 years. I accept as fact -- I'll just focus on the 1041. I accept as fact that Thornton owns 47 percent of the stock in -- water stock in Water Supply and Storage and that the Water Court gave them the diversion point at the south end of Reservoir No. 4.

And of the ten plans that Thornton has looked at, I do think Douglas Road is the best because it is in the right-of-way, a public right-of-way instead of plowing through people's yards and through wetlands and mature landscaping. So I think of the choices that

Douglas Road is the best.

MR. DOUGHERTY: Thank you, Ms. Terry.

Sean Shelly, then Christine Cracked and the Jason Kinable.

MR. SHELLY: Yes. Sean Shelly, thank you. Thank you for taking the time and volunteering for what you're doing tonight. Appreciate that.

I just wanted to let you know that I do live on Eagle Lake South and there have been no private meetings that I'm aware of. I was aware of this project happening in December of 2016 when it was in the newspaper and we reached out to both the -- first, we reached out to Thornton because they were having the meeting, and then we reached out to the County when Thornton told us this is what the restrictions were.

And so we reached out to the County. We've had meetings in our community. We haven't had Thornton people in our community meetings. We've had other communities. Woody Creek was involved quite a bit, Christine Cracked and her area was involved.

So this idea that you hear about secret meetings and stuff like that is a -- well tell you for what it is, but our involvement with the County people has been -- the people that actually worked on this, has always been -- they've given us good feedback and

they've told us where to look and where to look at, and it's been positive in that respect.

And our interaction with Thornton has been the same. We don't necessarily agree with everything that Thornton does or how they do it, but they are trying and you either have to believe them, or you don't. And so it's up to you to decide whether you're going to believe people or not.

Thank you.

MR. DOUGHERTY: Thank you, Mr. Shelly.

Christine Cracked, then Jason Kinable and Gloria Edwards.

MS. CRACKED: Hi. My name is Christine Cracked, it's spelled with a C-H-R-I-S-T-I-N-E, and the last name is with a K.

I just wanted to thank you, Mr. Chairman, and Members of the Planning Commission for the opportunity to speak today.

Thornton's acquisition of valuable water in Larimer County is truly a huge disappointed to residents, and I hope that we, as a County moving forward, work a little harder on trying to preserve our precious land and water.

But knowing that Thornton is legally able to take the water out of the County, I still ask you to

preserve the rights of the rights of the residents in protecting their properties and their homes.

The ideal alternative would be running water farther down the Poudre and taking it out at Windsor, like people have already discussed. However, knowing that this is our opportunity to express ourselves and knowing that that may not be an option, I wanted to request that if a pipeline is required that you ask Thornton, as they've proposed here tonight, to leverage the use of existing roadways where utilities already exist, that they utilize their Thornton owned lands as best they can.

And as we heard earlier through this hearing, I would ask to get a little more clarity on this concept of understanding the big picture. That's something that I was not made aware of. I don't know. I'm seeing one side, I'm not seeing the other, so perhaps during the question and answer period, we can get a little more clarity and understand the truth behind the multiple phases of this project.

If, in fact, there is intention to create more pipelines, I would ask that we ask Thornton to tell us if it is correct that they wouldn't need to do anything else until '65 and take a moratorium for that period of time and accept no additional applications.

So with that, let's assume that a pipeline is required. I am opposed to plowing cross-country through existing properties and neighborhoods as the impact to home and landowners would be catastrophic. It would include the disruption of underground currently stable water tables, the destabilization of structural foundations, the loss of years of investment and enhancements to homes and properties, drops in market value of properties, alterations and sub-irrigated farm land, destruction of sensitive wildlife habitat and conservation developments and more.

MR. DOUGHERTY: Thank you, Ms. Cracked. Appreciate it.

Jason Kinable, are you still here?

(No audible response.)

MR. DOUGHERTY: All right. Gloria Edwards, then Mark Hyden, then Lauren Sager. And if I called your name, please come on up front.

MS. EDWARDS: Good evening. My name is Gloria Edwards. I am a coordinator for a wildfire information network that is hosted by Colorado State University and is part of a nationwide wildfire information network, and I'm here based on my knowledge with that group and also as a private citizen that lives one lot away from Douglas Road.

I'd like to honor you for all your effort and time in this tonight and all your review with our information packets, and honor all the participants that took time out of their personal life today.

I'm here to implore the County Commissioners to take a comprehensive landscape view and reject this 1041 Application. One point that continues to come up is that this water has been diverted from the river for over 100 years, but we're not in the conditions of 100 years ago.

Thousands of people are dependent on just two watersheds, the Big Thompson and the Cache La Poudre River characterized by declining forest health, reduced and over-allocated flows, imminent and repeated wildfires, subsequent erosion and drastic population growth.

Our decisions have to be waived by factors beyond this 1041 process and consider the context of future pipeline, northern integrated supply project, and related infrastructure, and the quality of return flows and associated cumulative impacts.

I'm running out of time.

This pipeline is the first of a series of impacts and subsequent crisis management of mitigation issues that will definitely arise. Please reject this

1041 and anything elss undermines the Larimer County commitment to excellence.

Thank you.

MR. DOUGHERTY: Thank you, Ms. Edwards.

Mark Hyden, Lauren Sager -- yes?

MR. HYDEN: I already spoke earlier. I didn't know where that came from.

MR. DOUGHERTY: Okay. Thank you.

Lauren Sager, Mike McGlocklin (phonetic), Teresa Rose.

MS. SAGER: I wrote for a local newspaper and I've been covering this story. And I believe I understand both sides of the story pretty well. And the black hole in my understanding at this point is how Larimer County can benefit from this? You know, why would Larimer County want to do this for Thornton?

And that's the one thing that I just haven't been able to get through and so some day I'd kind of like to find out and that's about all.

Thank you.

MR. DOUGHERTY: Thank you very much, Ms. Rose.

Is there anyone in the audience who did not get a chance to speak, did not get a chance to sign up?

(No audible response.)

MR. DOUGHERTY: Thank you. At this -- oh, please come on up, ma'am.

MS. SALLO: My name is Nan Sallo. I had no intention of doing this.

MR. LAFFERTY: I'm sorry. Could you speak into the mic a little better?

MS. SALLO: Yes, thank you.

MR. DOUGHERTY: And please spell your last name for us.

MS. SALLO: Salo, S like Sam, O-L-L-O.

MR. DOUGHERTY: THANK YOU.

MS. SOLLO: I thank you. You're in a difficult position.

The biggest issue facing the American West in Colorado is water. You have this opportunity to do this right. You have the opportunity. I feel bad for people about construction, but construction comes and goes. Water is our issue.

Thornton is crying for our water. We have the opportunity to make sure that everything is done in a way that makes sure that our quality of life, because we chose Larimer County, not Thornton, is preserved and that there's water and things for everybody to enjoy in the future.

You get to be good stewards. Please take

that opportunity to make sure this legislation sets a precedent for good relationships and water use in the future. We depend on you.

Thank you.

MR. DOUGHERTY: Thank you, Ms. Sollo.

Ma'am -- no, I'm sorry. We had somebody else with their hand up.

(Laughter.)

MR. DOUGHERTY: Come on up.

Is there anyone else? If so, please come on up and sit in the front here, if you have not yet spoken and want to.

MS. BRICKMAN: Hi. My name is Lucy Brickman, and my question is -- I know that we're only supposed to be looking at this phase that's in front of us today, but don't we also have to look at the phases that are coming? Because if we approve the pipeline, but then deny the pump house, wouldn't there be a legal battle where they would come back for the money that it cost them to build the pipeline?

So even though I think you're only looking at one phase, you almost have to look at every aspect of it, which would also include the pump house. And I guess tonight is the first time I ever heard anything about the return pipe.

So are we looking at the fact that we will have Douglas be one pipeline? And then another pipeline goes where?

MR. DOUGHERTY: These are questions we're going to have to think about, as well.

Thank you very much.

Anyone else?

(No audible response.)

MR. DOUGHERTY: Going once, going twice.

Ma'am, are you coming up to speak?

MS. SHELLY: Yes.

MR. DOUGHERTY: All right.

MS. SHELLY: And like her, I didn't plan on doing this, okay?

MR. DOUGHERTY: Well, okay.

MS. SHELLY: But I do want to thank everybody here.

MR. DOUGHERTY: And your name, please?

MS. SHELLY: My name is Rebecca Shelly and I live in Eagle Lake. And I am a member of the Save the Poudre, okay?

But I -- when I moved to our part of the world, I didn't know the story of this water. I just knew about the beautiful water and the area of the landscape around us and the wetlands or the deer or all

the animals come and play, and I saw it in my yard, okay?

And I love it, and I know that several people from all over Terry Lake and everywhere come there and enjoy it. That's just one side of what I'm thinking.

I do want you to look at this very carefully and perhaps it does need a lot more -- you need a lot more information. But those reservoirs were there and we have all benefitted from them and enjoy them immensely. And I just want that to be remembered that that is -- you know, it's in the back of our houses. However much you paid for your home, it's your home and you worked hard to get it.

And I just want people to recognize that all over the area, that we're in this together and somehow, there's got to be something good and wise come out of this.

So thank you.

MR. DOUGHERTY: Thank you, Ms. Shelly.

Going once, going twice. I know you're tentative. Have you spoken already? Okay.

FEMALE SPEAKER: I have, but when can we ask a question about the presentation that the Planning Commission put on? When do we get to ask a question about that?

MR. DOUGHERTY: You don't. Public comment is about public comment. If you had had a question when you were up for public comment, that could have been something that could have been asked. Trust me, we have a ton of questions up here and Thornton will be able to come back up and answer our questions, as well, and yours.

So folks, thank you. At this point I'm going to close public comment and I am going to invite Mr. Koleber back up. If he would like to rebut anything that he had heard, and also to answer our questions.

MR. KOLEBER: I just got some random notes. I'm going to try to go through these best I can.

There was a comment about that irrigation water comes during one season and municipal use is all season long, so that's really kind of an incapability, but the diversion from the river will continue as it always has during the irrigation season. The water then goes into reservoirs and it's stored, then it's sent to the municipality to cover the year-long demand.

So the diversions from the river will stay the same. They won't change because it's going to municipal use.

So that was one point I had.

There was some comments about three pipelines

and additional diversions coming on. There was a graph showing about how water conversation plan, those bars that you saw were segments of water associated with this pipeline only and only our Water Supply and Storage Company shares. We have an initial block that will come online in 2025. One in about 2035, and one later. Again, we won't need anything past or anything more past 2065.

And in regards to looking out that far, and other pipelines and things, what they're referring to is our water rights decree. It gives us the permission to divert water. It doesn't give us permission to build pipelines, doesn't give us permission for anything associated with construction. It's only a water rights decree associated with diverting water.

If we're going to build additional pipelines, we would come back to the process. We would look at the impact. Some of those future pipelines are associated with returns from the South Platte River back up to the Larimer County Canal, not to the Poudre River, so that other water would go in. That's intended to serve other farmers and re-irrigate lands so that we can continue to keep some farms in irrigation.

All of those pipelines would be subject to

additional regulation. Addressing the concerns and communities at the time, looking down the road 50-plus years and trying to speculate on what the community concerns will be and how to address those, are things that -- again, I think that's speculation and we can address that more fully at the time that that's proposed.

MR. DOUGHERTY: Those would be additional 1041 Applications, correct, for pipelines?

MR. KOLEBER: Correct, or whatever the regulations are at the time. They might be more stringent. I can't speculate on what that would look like at the time, but yes, 1041-type regulations is what I would envision that would be applied to our project at that time.

MR. DOUGHERTY: And none of those would be a given? They would not be expected, grandfathered or able to be put into place without going through another hearing?

MR. KOLEBER: That's correct.

MR. DOUGHERTY: Thank you.

MR. KOLEBER: I don't know if there's any other questions. That was the main points that I had that I wanted to make sure were clear about that graph in particular, and those bars that were shown as

representatives of additional pipelines. Those are just additional blocks of this same water.

MR. DOUGHERTY: Commissioner Jensen is jumping, ready to go.

MR. JENSEN: Can you please explain why this pump, pumping station was not part of this 1041 Application?

MR. KOLEBER: When we had our pre-application meeting with staff, they suggested that that was going to go through a separate permitting process. My understanding now -- and I maybe would call on Mr. Helmick, that the permit or the pump station is part of this permit and it's subject, in addition to the permit regulations, a site plan review.

MR. HELMICK: That's correct. The staff has always taken the position this is an appurtenance to the pipeline and, therefore, is a part of this 1041 Application.

There will be a subsequent site plan application for the -- prior to the construction of the structure, which will have to show that it does, in fact, meet all standards, regulations, and ordinances of Larimer County: Noise, air quality, all of those things would be part of that review, the detailed review.

MR. JENSEN: I just wanted to clarify that, that this was not left out of this Plan. That it is an additional requirement over and above the 1041 for the pumping station to meet additional requirements of a special review, per our Land Code.

MR. HELMICK: It's our position that Director Terry, Director Gilbert's letter asking for additional information. I specifically identified the additional information necessary to make a determination as a part of the 1041 Application. That information was supplied. It is a part of the supplemental materials provided by the City of Thornton and it was evaluated by staff as a part of this request.

MR. KOLEBER: Thank you.

MR. DOUGHERTY: Go ahead, Commissioner Miller.

MR. MILLER: I was curious. We've heard several people state to the fact that you're going to need more than one pipeline to do what you need to do with this water.

Is that correct? Are you going to have two pipelines go down Douglas Road?

MR. KOLEBER: Short answer is no. The additional pipelines would be to be fully implement a Water Court Decree when we get to the point where we

need that additional water, but that's not -- all we're requesting right now is one pipeline that will be used only for delivery of the water associated with our Water Supply and Storage Company and Jackson Ditch Company shares. That's all.

MR. MILLER: Okay. Is I keep hearing, or I heard, too, that you're going -- you're planning to deliver polluted water into Larimer County. Is that something you plan to do down the road?

MR. KOLEBER: As part of the Water Court Decree, the Water Court allows us, nobody else, just the Water Court allows us to take water off of the South Platte River. The idea is that we would pump that water up to the Larimer County Canal and do one of two things with that.

The first thing would be that we supplied that water, which would be suitable for agricultural use, to farmer farther down on the Larimer County Canal and in exchange, we would take the water that was going past our reservoirs into our pipeline. So it's just a water trade, instead of -- well, it's just a water trade. So they get the water from the Platte, instead of the water from the Poudre.

MR. MILLER: Okay.

MR. KOLEBER: This other part of that is we

would pump water that's Thornton's coming down the South Platte River. We would pump that up to the Larimer County Canal and we would re-irrigate -- the extent we could at the time -- Thornton's farms. Again, we can't re-irrigate it with our -- we can't re-irrigate those farms with our Water Supply and Storage Company shares. We could re-irrigate those with other water from down on the river.

But that's, again, more than 50 years in the future.

MR. MILLER: Okay. I've only got two more questions.

MR. KOLEBER: Sure.

MR. MILLER: It was stated that -- or a question was raised by one of the residential people that they were wondering if what you're going to be doing with your reservoirs? Will they lower the lakes downstream or downline from the current reservoirs when you start pumping like this?

MR. KOLEBER: The reservoirs -- there are four reservoirs in close association by where our pump station would be. Water Supply and Storage Company No. 3, No. 4, Rocky Ridge including the reservoir.

The way municipal systems operate is that they generally will try to carry water from year to

year, so our analysis from back 2012, 2013, something like that, showed that the water levels on average would stay higher in those four reservoirs. The other three reservoirs, Richards Lake, Lyndon Myer, Long Pond, those are operated by making trades with other ditch companies.

So in those reservoirs in particular, we trade with the Larimer and Weld Canal and they give us water back out of Cobb or Douglas Reservoir. That's a system-wide operation for the Water Supply and Storage Company not really associated with Thornton's Pipeline Project.

MR. MILLER: Okay. All right. Thank you.

And my last question is: Where are you currently pulling water to feed to Thornton from the Poudre supply line?

MR. KOLEBER: At the Larimer County Canal headgate.

MR. MILLER: Okay. Up by Horsetooth?

MR. KOLEBER: No. It's just up by Ted's place.

MR. MILLER: Okay.

MR. KOLEBER: Just a little ways up river from where 287 crosses the Poudre.

MR. MILLER: Okay. All right. Thank you.

MR. DOUGHERTY: Other questions from the Planning Commissioners?

Commissioner Gerard.

MR. GERARD: I'll ask the question that maybe I think all of us are kind of thinking.

What would happen if your pumping station wasn't approved in the future and you've got this water line ready to go?

MR. KOLEBER: Well, we wouldn't start construction on our water line until we have also gone through the site plan review process and public input on the pump station. So those would be approved concurrently so we could design and construct them concurrently. We wouldn't have one without the other.

MR. GERARD: Why didn't you wait and do both of them at the same time?

MR. KOLEBER: I think because it was -- the site plan review process was a separate process. We wanted to make sure that the County was okay with the pipeline where we proposed it to be, before we worked through the process of designing a pump station.

MR. GERARD: Okay. And then one more question, just so I completely understand. Right now you're trying to get a corrido, but once you have a corridor approved by the County Commissioners, then you

go back and decide the exact location of the pipeline and easement; is that correct?

MR. KOLEBER: Correct. Either in the right-of-way or in an easement.

MR. GERARD: Okay.

MR. KOLEBER: And after that, once we have it identified, the corridor concept goes away.

MR. GERARD: So the lines on the map go away, and everything narrows to the 50-foot easement -- well, it narrows to the 50-foot plus the construction easement if it's off of right-of-way and then it ends up narrowing to 50 feet if it's off the right-of-way?

MR. KOLEBER: Correct.

MR. GERARD: Okay. Thank you.

MR. DOUGHERTY: Other questions?

Mr. Koleber, I've got a couple of questions.

MR. KOLEBER: Yes.

MR. DOUGHERTY: We heard something about four-hour closures, and I'm sticking with basically west of Highway 1 on Douglas Road. We heard about four-hour closures. We heard on our site trip today that there was always going to be one lane opened, but we also had heard that there's a possibility of a requirement to have two lanes while not under construction or off hours.

Can you tell me a little bit more about that?

MR. KOLEBER: Well, that kind of detailed traffic planning and construction staging would happen as we get into design and we can make sure that we can meet all of the County's conditions as we complete the design and the project planning, so that those conditions are met.

MR. DOUGHERTY: And see, I've got a small problem with that --

MR. KOLEBER: Okay.

MR. DOUGHERTY: -- because we're trying to talk about affecting private properties and property rights and citizens and to not have that information doesn't -- I mean, that makes it really hard for me to see how they're going to be affected.

Another piece is access to private properties. While I have seen quite a bit of interesting ways for people to access private properties with the debacle that 287 has been, so I know that there will be access but, you know, I'd really like to know a little bit more about that, you know. I need to know that there's going to be a lane always open or things along those lines.

MR. KOLEBER: If that's a condition of approval for the permit, there will always be a lane

open.

MR. DOUGHERTY: Commissioner Helmick or -- okay.

MR. HELMICK: I was going to address that because those are specific conditions that are coming from Public Works or Engineering and so we would be identifying or working with Thornton to handle this as we would any construction project in terms of identifying, based on the project needs, what we've just said here that we would entertain or potentially allow maximum closures up to four hours on an infrequent or as-needed basis because there are potentially aspects of construction that are going to require some limited closure, but we're not going to -- we're going go -- insofar as possible, we're going to, you know, develop -- work with them to develop a plan that maintains, you know, accessibility that minimizes impact on people, but we know there are going to be some impacts.

MR. DOUGHERTY: Is there any way to tighten that up? I mean, you know, having a partial closure and then having an emergency vehicle not be able to get through -- we know what it's like inside the City of Fort Collins with the trains. It's not acceptable to me to know that there's a possibility an emergency

vehicle could not be able to access as neighborhood.

MR. KOLEBER: And again our -- even on our construction projects that we do in the County, it's a stipulation or requirement that the contractor has to be able to ensure accessibility, that you know, emergency responders can get to properties.

MR. DOUGHERTY: Okay. All right. Commissioner --

MR. KOLEBER: So we don't have the specificity to get to that level of detail at this point in time.

MR. DOUGHERTY: But this is standard with all projects within the County. Okay.

Commissioner Jensen.

MR. JENSEN: Mr. Koleber, just one more question and it's addressing several comments that people made that there wasn't enough specificity in this Application. The difference between an application and a design process, I get that you get much more detail, but it begs the question without doing the design work to come in front of Larimer County and ask for a 1041 Application to be approved without that specificity. Explain to me how and why you don't put the cart before the horse in doing that.

MR. KOLEBER: I think it comes down to going

out, acquiring easements, designing a pipeline and then coming in for a permit, there could potentially be things that we haven't considered yet that we would need to consider and could be part of a 1041 process.

By going with a corridor, we know those conditions, we know what the County's looking for when we go out to acquire easements, plan the design, everything else and we can accommodate those as we plan and design the project. If we did all that up front, we might miss something and have to start all back over again.

MR. JENSEN: Of the -- of this corridor that you're asking for, how much of that easement do you currently own and how much do you need to go out and acquire still? And in that acquisition, are you considering eminent domain as a way to get that property in Larimer County?

MR. KOLEBER: So we haven't acquired any easements yet in Larimer County. We do have access to road right-of-way in Timnis (phonetic), as was mentioned earlier, and so part of the alignment we've narrowed down. Douglas Road would be narrowed down where we wouldn't need easements. If we can use other areas -- County Road 56 was mentioned earlier as a potential route around the north side of Cobb Lake, in

particular, the road would be probably the best route, an area down just north of 392.

Ms. Hellser was here talking about wanting to stay in the right-of-way. So those would be where we want to be in the right-of-way.

When we go out to acquire easements, again, our goal is to negotiate for the easements everywhere we can until we exhaust all reasonable alternatives. And with a corridor, we can move the pipeline alignment to accommodate landowner concerns, infrastructure. I was talking with a resident during one of the breaks about irrigation wells. With a corridor, we can put the pipeline around irrigation wells. We don't have to mess with those. So that's what the reason is for the corridor and I hope I answered your question. I think I may be lost parts of that and I apologize.

MR. JENSEN: Well, the last part of that was: your use of eminent domain to acquire that easement, how would you apply that or is that part of your plan?

MR. KOLEBER: We would use that as a last resort. We want to try to negotiate the easements. Even if we use eminent domain, we still pay fair compensation, we work with them as best we can.

MR. JENSEN: Okay.

MR. DOUGHERTY: Just to tag on to that,

somebody had made a comment earlier, have you used eminent domain in Larimer County at all?

MR. KOLEBER: No.

MR. DOUGHERTY: Thank you.

I had one other question pertaining to the change of routes and I understand it was very, very preliminary. The route through Eagle Lake, was that changed -- I guess, I don't when to lead, but why did you change from that, was it private property, was it wetlands, what facilitated that?

MR. KOLEBER: We never really had a route through Eagle Lake or anywhere. We had a corridor from Douglas Road about a half mile north. There was a map during my presentation that showed a balloon over by West No. 4 and then going east. That was where we were looking for an alignment when we had our public meetings.

After we had our public meetings, then the Eagle Lake residents went back to the County and talked to them about the direction that we had received to not count on county line -- or, I'm sorry -- on county road right-of-way for construction.

After that, we had our meetings with Larimer County staff that said, "Go out and do this alternatives analysis that can now include the Douglas

Road alignments or any other county road rights of way and look at the alignments that the residents have suggested during our open houses." And so that's how we came up with those 10 alternatives is the feedback that we had from the residents.

We looked at all of those including Douglas Road both in and out of the right-of-way and that's how we came up with Douglas Road. It wasn't because we had an alignment specifically through Eagle Lakes and there was an uproar. We didn't have that. We had a corridor that we were working with at our open houses.

MR. DOUGHERTY: Thank you.

Any further questions?

Commissioner Cox.

MS. COX: Do you not consider the proposal by the Save the Poudre Committee that that is a reasonable approach to take it further down from the Poudre, the request that they're making?

MR. KOLEBER: To take it --

MS. COX: Is that not considered a reasonable alternative?

MR. KOLEBER: Which one, all the way down to Windsor?

MS. COX: Uh-huh.

MR. KOLEBER: I don't.

MS. COX: Could you tell me why?

MR. KOLEBER: Yeah. There are a number of reasons why. It was already mentioned that our Water Court Decree currently allows us only to divert at the Larimer County Canal.

MS. COX: But could you go back and request that?

MR. KOLEBER: We could, but there's a high likelihood that our water rights would be further reduced if we did that and so there's an issue there. Running the water down the Poudre River, you lose -- for that 18 miles roughly of stream, you'll lose about 9 percent of your water. That's what the State charges you in losses to run the water down there. So out of the average 14,000-acre feet that we plan on running, that's tens of millions of dollars' worth of lost water.

We would lose the use of the reservoir storage that's there in the Water Supply and Storage Company system. We just put the water right back into the Poudre, ran it down. Those reservoirs, have no value.

Could we build other reservoirs? Certainly, but we invested, we've already purchased this reservoir storage. Building additional reservoir storage

somewhere else, as you've probably seen with NISP and other places, is not an easy prospect. The cost to not only construct a treatment plant that could treat that water, but then operate it, additional power and chemical costs are very expensive and it's really a safety issue for our residents. That water is below three wastewater treatment plants, urban runoff where you have oil coming off parking lots and all sort of things. That water is not as safe to drink as upstream. It's not a water supply classified stream in Windsor and there's -- without that water supply classification, you don't have the protections upstream.

Yes, we could go to the Commission, the Water Quality Control Commission, and ask for a water supply designation, but having everybody upstream from that including the wastewater plants increase their treatment could be decades before that happens.

MS. COX: It could be, but what if that was your only alternative? What if you're denied and that was an alternative? You would then pursue that alternative, correct?

MR. KOLEBER: We would take a step back and look at all other alternatives.

MR. DOUGHERTY: Any other questions for Mr.

Koleber?

MR. GERARD: Yeah, I've got one.

MR. DOUGHERTY: Commissioner Gerard.

MR. GERARD: So what does your -- what does this easement look like if it goes through my property? Is it -- what am I not allowed to do with this property? Do you own the property completely or is it a right-of-way or how does it work?

MR. KOLEBER: We just -- the easement gives us the right to put a pipeline under the ground. Once we're done, you can farm over the top, put non-permanent structures over the top. All we ask is you don't build things like houses and garages, put in vegetation with deep roots that might get down and affect the pipeline or impact the ability to do maintenance on the pipeline. But other than that, the use is pretty much the same as what you had before.

MR. DOUGHERTY: All right. Commissioner Cox?

MS. COX: Could you explain a little more clearly the slide that showed where there was a 50 million to $100 million benefit to Thornton to go this other alternative route than the one that you guys have chosen? Why --

MR. KOLEBER: It was on a different presentation, but that didn't look at the value of lost

water, the value of lost storage, the cost for treatment, additional cost for treatment capacity both initial capital costs, but also long-term O&M costs so that was just purely pipeline and pump stations.

Plus one thing I had mentioned before, the way the Water Supply and Storage Company Reservoir operates, the water comes into Thornton on its shares at about 70 million gallons a day -- and this is when all of our shares are converted, not sort term -- and then the reservoir storage buffers that so we can build a 40-million-gallons-a-day pump station. If we were to take that water down the Poudre River and have to take it as available, we'd have to build a much larger 70-million-gallons-a-day pump station and a much larger pipeline going south. And so those kinds of size impacts weren't included in those figures.

MS. COX: Okay. But somewhere you guys talk about being good stewards, correct?

MR. KOLEBER: Yes.

MS. COX: So if you're -- I mean, from a neighbor perspective, that was much more beneficial to your neighbor.

So how do you balance what's beneficial to your neighbor and the cost to you? How did you determine that that was --

MR. KOLEBER: And really it was cheaper to go downstream because you weren't building pipelines, but that's -- the issue really is all of the other costs. And the way we balance that is: it's really a safety issue. Providing safe drinking water for our residents is really the overlying factor on all of this. Fort Collins, Greeley, Elko, North Weld, all of those districts divert water upstream from Fort Collins because that's the prudent safe place to divert water for providing a drinking water supply.

MR. DOUGHERTY: Any other questions for Mr. Koleber?

(No audible response.)

MR. DOUGHERTY: Thank you very much.

MR. KOLEBER: Thank you.

MR. DOUGHERTY: I think we may have some questions for staff.

Commissioners? Yes, no, maybe?

(No audible response.)

MR. DOUGHERTY: Well, I've got a couple.

So we're talking about a 1041 here, but we're also talking about the fact that the pumping station is a part of this Application.

Can one of you address the FA-zone and whether or not this pump would be allowed in that zone

and also about spot zoning and things that were brought up?

MR. HELMICK: The 1041 Application is for a 26-mile-long, 48-inch pipeline and all of the appurtenant facilities.

MR. DOUGHERTY: Okay.

MR. HELMICK: Pump station, water tank, blow-offs, access ways, all of that's the package. All of that trumps zoning, so ignore the FA-1 zoning and the pump station. There's no correlation between the two. This is a public facility subject to 1041 and the pump station is allowed through that process. Don't look at zoning.

MR. DOUGHERTY: Okay.

MR. LAFFERTY: An analogy, Commissioner Dougherty, would be similar to that of placing trailheads in Larimer County and other things. Those are uses that are not prescribed by zoning, but are generally covered through a location and extent process or through a 1041 process and that's why we have those processes. They supersede zoning and therefore, we're allowed to look at them through those processes without having to change zoning and do what-not.

MR. HELMICK: To follow on Matt's previous presentation, a power line is not -- a transmission

power line is subject to 1041 as is the substation. Neither of those are identified in zoning -- in most of the zoning districts in the County. Same general premise, a power line and a substation.

MR. DOUGHERTY: Okay. I'd like to ask one of you just to quickly go over again the outreach because I've heard a number of times tonight that folks did not get notification on this. I'd like you just to give us a quick one. I know you had the page up before with the red line around it showing the map area.

MR. HELMICK: Their early outreach looked mostly north of Douglas Road. We identified an issue after one of the neighborhood meetings and said, "Well, drawing a line through the middle of Terry Point wasn't very smart nor through Terry Shores." So subsequent outreach incorporated all subdivisions accessing off of Douglas Road or within that corridor so that's -- and all notice subsequent to the receipt of the Application incorporated all of these properties as well. So early days, yes, some of the folks in Terry Point and Terry Shores may not have received notice of one of those meetings. That was not intentional. It was just an artifact of how we drew the line.

Ultimately we notified over 2600 property owners in Larimer County both in unincorporated Larimer

County and in all of those cities that this pipeline goes through that -- but for within that quarter-mile corridor.

MR. DOUGHERTY: Thank you.

Any other questions for staff from the Planning Commissioners?

MR. JENSEN: Yes.

MR. DOUGHERTY: Commissioner Jensen.

MR. JENSEN: In the review criteria that we have to look at, compatibility and harmonious is part of this.

Can you explain that? And I would assume we then have to look at -- even though we're going to see a special review for the pumping station, we still have to consider the compatibility and harmonious nature of that in this Application with the neighborhood, correct?

MR. HELMICK: No. Actually harmony and compatibility are not a standard for 1041 review.

MS. COX: Right.

MR. HELMICK: They are in the zoning review and in the subdivision review, but they are not a standard of review in a 1041 review. And you will not see a special review for the pump station. That is an administrative process. We may tell Thornton that they

need to do some public outreach on the design, but it is not -- you won't see the pump station again. So the standards review are a master plan: reasonable, siting and design alternatives, conformance with the standards of review, average impact or effect on or adequately mitigate those impacts, affecting historic sites, impacts public health and safety, no significant risk from natural hazards, adequate public facilities, mitigate construction impacts, benefits outweigh losses to natural resources and agricultural land and a reasonable balance between the cost of the applicant mitigates significant adverse the benefits achieved by that mitigation as well as then the recommendations of staff and referral agencies. Compatibility is not one of the questions.

Our review looked at a pipeline, not a water supply. We didn't look at alternatives for water supply. We looked at the alternatives proposed for a pipeline. That's what the Code provides for.

As pointed out earlier, there are questions about how broad the reach can be? Well, without knowing the criteria the City of Denver had in their 1041 Regulations, it's almost impossible to know what the Supreme Court decision was really based on from my standpoint. We evaluated the request. The law

requires we adopt criteria for the Application. We reviewed the request pursuant to our locally-adopted criteria of review.

MR. DOUGHERTY: Commissioner Carraway?

MR. CARRAWAY: Yeah, I just want to clarify. I'm confused because earlier it seemed like the question was asked about the pumping station. I guess I just misunderstood, but I'd understood that would come back through the process. And then I think I just heard you say, in other words, that that would be a special review process which would come before --

MR. HELMICK: Site plan review, not special review.

MR. CARRAWAY: But now -- okay. So I just heard you say it's just an administrative review. So we're done with the pump station after tonight, right?

MR. HELMICK: In our evaluation, what we looked at is a six to 10,000-square-foot building and information they provided to us. They're proposing to pursue a redundant power supply so a diesel generator would ideally not be part of that.

I would note that within a mile of this -- of where they're proposing a pump station, there are structures in excess of 10,000 square feet. So a structure that size -- in fact the house immediately

adjacent to this property, based on a rough estimate, is 12,000-square-feet footprint, so a footprint of a structure that big is not out of character for the neighborhood whether it is --

(Loud audience noise.)

MR. DOUGHERTY: Folks, excuse me please. Folks, excuse me, please. Thank you.

MR. HELMICK: So it is an administrative review site plan for the pump station. From our perspective, we believe we had enough information to make an evaluation at the level of the 1041 request knowing the site plan was going to happen to be able to evaluate the proposal.

MR. DOUGHERTY: Commissioner Cox?

MS. COX: (No audible response).

MR. DOUGHERTY: Okay.

MR. CARRAWAY: To me, it just seems like that's incomplete.

MS. COX: Yeah.

MR. CARRAWAY: If this is part of this and we do not have specificity of Phase I of what they intend to do immediately, it's incomplete. Tell me how I'm wrong.

MR. HELMICK: We have a footprint. We know that there's height limit in a zoning district so, I

mean, it's a 50x120-foot building with four pumps inside it and some other stuff.

MR. CARRAWAY: But, Rob, you just told us we have to ignore the zone district. I'm sorry, I'm just --

MR. HELMICK: We would attempt to apply the height limit of 40 feet.

MR. CARRAWAY: Okay.

MR. LAFFERTY: That's universal throughout the county.

MR. HELMICK: And that's the universal height limit throughout the county. So in none of our regulations across the board do we evaluate aesthetic. Aesthetic is not a part of any Code language in Larimer County. So we have a footprint of a building in a location proposed. That's no different than a lot of stuff.

I mean, we don't look at -- someone proposes a dog kennel. You look at the fact that there's a footprint on the site plan that shows there's a dog kennel there. You don't look at anything else.

MR. LAFFERTY: We look at noise --

MR. HELMICK: Noise.

MR. LAFFERTY: -- we look at light --

MS. COX: Yeah.

MR. LAFFERTY: -- we look at impact, we look at --

MR. HELMICK: And those are all standards in the Code that are --

MS. COX: And compatibility.

MR. HELMICK: -- subject to the site plan review.

MR. LAFFERTY: The site process requires compliance with all of those things administratively. That's the only difference. It doesn't require us to go to hearing. And if they choose to not follow the body of regulation of those standards, then they would have to come forward to the Board of County Commissioners and appeal those standards. And so it's black and white in that case. There is no give or take about whether it's compatible or not. You meet the standard, that's it, or appeal that standard.

MR. CARRAWAY: During the site plan review, what is the public comment available during the site plan review and what is the appeal process for the neighbors in question if they have issues with that?

MR. HELMICK: The normal code standard is: there is no public comment nor is there any public appeal, but if you want to modify reality, the Code, for this particular to include either some public

outreach and/or some potential for appeal, we can figure out how to craft that language for you if you want.

MR. LAFFERTY: The site plan process in the Larimer County Land Use Code was intended to address non-residential uses except for four-plexes, you know, things -- larger apartment complexes, things like that, but basically was to look at commercial industrial type uses in commercial and industrial type settings where the zoning already exists and what-not and then we just look at it as a setting. So those are considered use-by-right activities and as such, we only apply the standards to it. There is no public notice, there is no public review, there's none of that. It's just an administrative review to make sure that standards are complied with.

I think it would be fair in this instance, given that this is not in an industrially-zoned property or any of those types of things and that there might be some things that if the Board felt that it was necessary, that there'd be some at least public notice. And if there was -- and the director would still have the right to administratively approve this, but if somebody felt that the director was operating outside of their limits or the purview of approving it, then

they can appeal that to the Board of County Commissioners for a decision. I don't think that that's out of your realm to ask that question here tonight. I think that that would be fine. It's not normal, but --

MR. CARRAWAY: Yeah. One more thing, just please for the folks in the audience and those that may still be awake on TV, the -- or those that may still be awake in the room here, the other option that was what we had prior to us accepting the 1041 process in Larimer County was location and extent. Address or please tell us why or what the differences would be, if we were still under and L&E, this meeting would be drastically different and we wouldn't have a seat at the table anymore with that.

Can you please talk about that process and why 1041 exists and what it would look like if we did not have a 1041 in Larimer County.

MR. HELMICK: Prior to the adoption of 1041, location, extent review was the only review that Larimer County had for public facilities. That is a master plan review by the Planning Commission with 30 days to review, 30 days. Submit the Application, decision rendered within 30 days by the Planning Commission, no Board of County Commissioners review or

decision.

The Planning Commission decision could impose conditions or requirements on an applicant. However, the taxing entity responsible for the project by a majority vote can tell the County to go pound sand on a 1041 and do as they see fit.

MR. LAFFERTY: On an L&E?

MR. HELMICK: And that's it. Huh?

MR. LAFFERTY: On an L&E.

MR. HELMICK: On an L&E. On a 1041, the entity is considered a person and a person is required to obtain a permit to engage in the activity. Thornton is a person. The Board of County Commissioners has the authority to say "Yes" or "No" or impose conditions on their request. The Board, in adopting 1041, did it with some trepidation, understanding that the ability to say "No" was a big stick and it was principally a big stick to make those public entities act in good faith with Larimer County and Larimer County citizens.

MR. LAFFERTY: And that's why our 1041 Regulations have review criteria. It is to keep us honest and have to answer the questions and keep those agencies coming and talking to us having to prove up why we think that should be. So if you don't find that somebody complies with one of the review criteria,

that's the merits for denial of an application.

The 1041 process, just so you guys are aware, it didn't just come into being. It's been around in state statute for a number of years. Larimer County has -- as the statute is written, all counties or agencies that are subject to state statute have the option to implement them in their jurisdiction. They could choose not to. We could have chose not to implement 1041 regulation on waterline projects in Larimer County and this would have just been -- slipped right through under an L&E with very little scrutiny or opportunity to drill into the details on it.

And that's what happened, if we all recall, with the Greeley waterline and that left our Planning Commission in an awkward position and it felt really unaddressed for our community. They felt that they did not get an opportunity to dispel their concerns on that. And so we chose to adopt this Regulation so that we could have this exact hearing so that we could have the detailed evaluations that are staff performs on these things and make sure that we're making the right decisions. If this isn't the right decision, then I think that's -- you-all need to make the decision.

MR. CARRAWAY: I just want to, you know, expound on that a little bit. This body -- several

years ago when we were looking at 1041s, we spent two years looking at this. This was not an overnight decision to implement 1041 in Larimer County, but I think -- and I'll speak for the Commission at the time. There was an overriding desire and need and responsibility that we felt that we had to have a seat at the table and that's why these Regulations were brought about, it's why we put them on what put them on and I just -- I want people to understand that this was something that we decided to do in Larimer County for just this purpose. This is exactly why we did this process.

MR. DOUGHERTY: Commissioner Cox?

MS. COX: I'd like to ask Mr. Koleber something, too.

So there was a proposal that if we were to consider this pipeline, that there would be two conditions, one condition being that you would be limited to a single pipeline forever, and the other condition was that you would not -- you know, if there was some other type of need that Thornton had, they would not come back to the table till '66.

Are those acceptable conditions to you?

MR. KOLEBER: If the condition is a pipeline under this 1041 permit, yes, that's an acceptable

condition. We would come back for another permit and review --

MS. COX: I think you know that's not what they were asking for, okay?

MR. KOLEBER: Okay. I just -- let me clarify --

MS. COX: So let's just be square.

MR. KOLEBER: Yeah.

MS. COX: Okay.

MR. KOLEBER: I think --

MS. COX: They were asking -- you know what they were asking --

MR. KOLEBER: Yes.

MS. COX: -- that you were not coming back under another 1041 or any other type of -- that we're just talking about a single pipeline coming out of Larimer County for Thornton and that was the end of the story between Larimer County and Thornton.

MR. KOLEBER: No, because we have a Water Rights Decree and future plans way down the road that we may need to implement depending on the Thornton growth, density, growth in the entire North Colorado -- Northern Colorado area, so that's not something that I could just unilaterally give up a water right and that's in essence what I'd be doing there.

As far as coming back in 2066, that's our current planning horizon and just like transportation plans and everything else, those change. I believe that 2065 is a good date, but I don't believe that I could commit the City to say "No" to any future plans in Northern Colorado. If we grow faster or get more dense than what we expect, we would come back and go through the process and request again for the County to review our plans.

MS. COX: Thank you.

MR. DOUGHERTY: Do you have questions for staff or?

MR. LAFFERTY: I have a comment just before we get too long --

MR. DOUGHERTY: Yes, sir.

MR. LAFFERTY: -- and it just only goes to when you make your motion. When you choose to make a motion depending upon which way it goes, if you choose to act in favor of this, the pump house was a hot topic. I think that we could formulate a, quote, "condition," to add to this Application that would allow for the public notice, any evaluation of the site plan process. So we'll notice them. They can come in and look at the plans and do that and then, of course, we'd allow an opportunity for appeal if they choose to

do that. So if you want me to come up with a condition, I can do that right now.

MR. CARRAWAY: I think that would be appropriate please.

MR. HELMICK: I would like that too.

(Voice from the audience.)

MR. DOUGHERTY: I think it was just mentioned that there would be public comment; is that not correct, Matt?

MR. LAFFERTY: I don't know why we wouldn't allow people to make a public comment, but if -- I think we need to be careful with that. If Thornton decides to paint the building sky blue, I think Rob makes a good point, our Code doesn't regulate pretty. We're not going to be able to say just because you made a comment, we can address the problem. We can only address people's comments that relate to us administering our Code requirements.

MR. DOUGHERTY: Okay. Thank you.

Any other questions for staff?

Commissioner Carraway.

MR. CARRAWAY: Yeah. Just because we were talking about 1041, I just think it's important to note that Weld County has also -- it'll be a 1041 process for the Thornton pipeline in Weld County.

MR. HELMICK: I think actually it's use by special review in Weld County.

MR. CARRAWAY: That's not my understanding.

MR. HELMICK: But there is an ongoing review process of some part in Weld County, yes.

MR. CARRAWAY: Okay.

MR. DOUGHERTY: Any other --

MR. LAFFERTY: Weld County is not a statutory county. Weld County is a home-ruled county and they may not have adopted 1041 regulations because they're not subject to the State standard, so they may be using an alternate approach to the review process. That's what we're saying.

MR. DOUGHERTY: Other comments or questions for staff?

(No audible response.)

MR. DOUGHERTY: All right. I think I'm going to close it and open it up for discussion amongst ourselves.

And, Commissioner Jensen, you had talked a little bit about going through some of the review criteria for us.

MR. JENSEN: Yeah, we touched on the --

MR. DOUGHERTY: Mic.

MR. JENSEN: We touched on the review

criteria a couple of times, but just for us, we'll go through this very quickly again. There are 12, not 14, as originally stated.

The proposal is consistent with the Master Plan and applicable intergovernmental agreements affecting land use and development. That's Criteria 1.

Criteria 2, the Applicant has presented reasonable siting and design alternatives or explained why no reasonable alternatives are available.

No. 4, the proposal will have a -- will not have a significant adverse effect on or will adequately mitigate significant adverse --

MR. DOUGHERTY: You skipped No. 3.

MR. JENSEN: Oh, I'm sorry, I missed one.

The proposal conforms with adopted county standards, review criteria, mitigation and requirements concerning environmental impacts, including but not limited to those contained in Section 8 of this Code. Mr. Helmick has spent time with that and did a very good job explaining Section 8 to us, so I won't go through those again.

The proposal will not have a significant adverse effect on or will adequately mitigate significant adverse effects on the land on which the proposal is situated and on lands adjacent to the

proposal.

The proposal will not adversely affect any sites or structures listed on the state or national registers of historic places.

The proposal will not negatively impact public health and safety.

The proposal will not be subject to significant risks from natural hazards including floods, wildfire or geological hazards. Adequate public facilities and services are available for the proposal and will be provided by the Applicant and the proposal will not have a significant adverse effect on the compatibility --

MR. DOUGHERTY: Capability.

MR. JENSEN: -- capability, sorry, of local government to provide services or exceed the capacity of service delivery systems.

No. 9, the Applicant will mitigate any construction impacts to country roads, bridges and relates facilities. Construction access will be re-graded and re-vegetate to minimize environmental impacts.

No. 10, the benefits of the proposed development outweigh the loss of any natural resources or reduction of productivity of agriculture lands as a

result of the proposed development.

The proposal demonstrates a reasonable balance between costs to the applicant to mitigate significant adverse effects and benefits achieved by such mitigation.

And No. 12, the recommendations of staff and referral agencies have been addressed to the satisfaction of the County Commissioners.

Those are the 12 review criteria that we have to look at this with.

And I'll go ahead and make a statement. When asked, Mr. Koleber, if they looked at the protections that would be necessary to the lower Poudre to be used as a municipal water supply, we were told that they did not look at this. There were alternatives presented to us. I just do not feel that they were thoroughly vetted and I think that it appears to me that there could be other alternatives.

The lack of specificity in some of this, which I think could have been addressed to allay some of the concerns of the neighbors and of Larimer County as a whole were not done and so I really don't think that this is as complete as it should have been and I would not support passing this at this time.

MR. DOUGHERTY: Commissioner Cox?

MS. COX: I would like -- I would propose -- I would like to make a motion, then have discussion.

MR. JENSEN: And then have discussion?

MS. COX: Yes.

MR. JENSEN: Okay.

MS. COX: And I would like to make a motion.

MR. DOUGHERTY: All right. Go right ahead.

MS. COX: I'd like to move that the Planning Commission recommend to the Board of County Commissioners denial of the 1041 Application. Let me give you the number.

MR. DOUGHERTY: 18-ZONE2305.

MS. COX: Thank you.

So I'll lay that motion right there.

MR. DOUGHERTY: I have a motion.

Do I have a second?

MR. LAFFERTY: I'll second.

MR. DOUGHERTY: The motion is seconded. I'll open it up for discussion.

Commissioner Cox, would you like to --

MS. COX: The reason I moved to do that is: I also -- I'm looking at the review criteria and the No. 2 and -- pull my notes here -- and No. 11.

I also concur with Commissioner Jensen that I don't feel that the alternatives were fully -- I'll use

his term -- "vetted," nor that a reasonable balance has really been applied here.

I think it was really looked purely from Thornton's position. I think the neighborhood meeting where the County has presented that let's do things in the right-of-way, very good. So I think that addressed one very specific situation.

But from an overall alternative and a true good corridor and to really understand which neighbors, which people are really ultimately going to be affected by not being able to stay in a right-of-way or not, I just -- I'm used to seeing -- in fact, I dealt with a pipeline situation where it was very clear all along the pipeline what was going to have to be purchased, what was going to have to be not purchased, what was going to be in right-of-ways, what wasn't going to be in right-of-ways. I don't understand how people that are along this pipeline corridor are going to understand their impact to them without having much more specificity than I'm seeing today.

So I just don't see them meeting the criteria for No. 2 and No. 11.

MR. DOUGHERTY: Commissioner Carraway, did you want to weigh in?

MR. CARRAWAY: Well, first I just want to say

I think that -- you know, I certainly understand the City of Thornton has purchased these water rights over several decades. These are your water rights. You have a right to your water rights and I totally get that. But I agree with the comments that have been made. I think there's a tremendous amount of lack of specificity.

I think that more than anything else, I really feel like the City of Thornton has missed an opportunity to be creative, to look at other alternatives, to work with different interests and to bring people together in a way that can be done and I really believe an opportunity has been missed.

I think the issue about water law to me is very concerning. I think the only water law expert we heard from tonight was through public comment, Mr. Donovan, and he stated there were gross misrepresentations of Colorado water law on both sides. That's very disturbing to me.

And I also think we're operating under an assumption that water law is irrelevant, that some of the issues that would come under water law are irrelevant and I'm not sure that I believe that's accurate.

So for all those reasons, I think that, you

know, most -- first and foremost, I think just the level of mitigation is wholly inadequate and that this is not in the best interest of the citizens of Larimer County.

MR. DOUGHERTY: Commissioner Gerard, thoughts?

MR. GERARD: (No audible response).

MR. DOUGHERTY: No? Commissioner Miller?

MR. MILLER: I really struggle with the whole thing tonight. I do want to see the waterline go through. I don't think it was well planned. I was very disappointed that the pipe -- or that the pump station wasn't included that we could look at that.

I think Douglas Road is a good alternative. However, there's just a lot of unfinished business that I saw, too, and so I've got to agree with everyone except with the fact that I'm just not quite convinced that I'm going to vote "Yes" for this denial.

MR. DOUGHERTY: Thank you.

Commissioner Jensen, anything else you want to add?

MR. JENSEN: Well, I struggled a little bit with this and I'm not sure where I'm going to land either because I saw a lot of positives to this waterline. At the risk of going against what some of

the other Planning Commissioners have mentioned, I saw a formula for stopping future waterlines. I heard about future waterlines that had nothing to do with this project and, I'm sorry, I've been told -- I was told directly by another organization that there is no waterline going through this road last week.

We can't say no more work on a project until 2065, I'm sorry. That's like telling somebody that you can never have another permit to do an addition to your home. Things change. Future 1041 applications would have to be approved. This is -- what I saw was this was probably the best alternative because it was not taking any private property.

I do think -- at least from what I saw, I do think that the lack of specificity of where this pipeline was going to go within a right-of-way actually gave a lot more ability for the applicant to mitigate and bypass found deterrents to go along up the hill at Cobb Lake the roadway instead of having to go into either the reservoir up there or the wetlands.

I really thought that there was -- this was a good project and it was laid out and it was a project that, when it was complete, nobody would know was there and that was the thing that got me. I don't like people saying there was going to be eminent domain when

obviously it is a last resort, but I don't like fearmongering and I saw some of that with this. But I don't know where this is for me right now. It's not taking any more water out of the Poudre.

And just the fact that there are groups of people who say, "I don't want this," well, there's a lot of things I don't want. There's certain cars I don't like seeing driving down the road. I don't have that right just to unequivocally say, "No." So I don't know where this is going to go at this point, but we have -- Commissioner Gerard, go right ahead.

MR. GERARD: Yeah, it just occurred to me --

MR. JENSEN: Do you have your mic on?

MR. GERARD: It occurred to me as we were talking about this -- and I do struggle with the specificity part of it, but I understand also the corridor concept and being able to move it and I've seen that done. I'm an excavator. I've put pipelines in the ground and this isn't a project that I would work on, but this is -- I understand how that works and I understand the necessity to do that.

But I think everybody in here tonight, me included, that isn't on a well for their house has exactly the same system feeding their potable water to their home. There's a reservoir probably somewhere,

there's a diversion off the river, there's a water tank, there's a water treatment plant and maybe not quite to this scale, but there's a pipeline system that feeds the water to their house. It goes down a road or it goes down a right-of-way, it goes through somebody's property.

I myself have laid pipelines through people's property that have had -- given easements or sold easements, right-of-ways and other types of pipelines. And the fact they're in Thornton, I mean, it's not like they're Russians.

(Laughter.)

MR. GERARD: They are our neighbors and they speak the same language. They've got a little bit more of a southern accent than we do, but they're people just like us. They need water. And clean potable water is important to all of us. It's not just something that we get here or we have here.

And I think that -- I think the staff has done an excellent job. And I've got to say, based on what I know about Weld County -- what Weld County is doing, that the staff has done a great job of allowing us to put this line in the right-of-way. If we don't do that, we have a right-of-way and then we're forced to take property from the neighbors as well and I think

that's kind of what they're doing in Weld County. I'm not sure, but that's kind of what I heard.

So I'm very pleased that the staff has done that. That's a big concession. It's a big deal to tear up the roads. It's a maintenance issue. But I don't feel like that I have a right to stand in the way of this anymore than someone would have a right to stand in the way of me getting water at my house.

And somebody had to give up somewhere something to see a water tank that feeds my home and several other thousands of homes around me and someone's got a pipeline going through their yard. I know I have electric lines that went through my property that someone else uses that I don't use. So it's kind of the part of living together, I guess, that we have to put up with each other, even people from Thornton.

So I'm going to vote "No" on the denial.

MR. DOUGHERTY: Thank you.

Commissioner Jensen?

MR. JENSEN: Commissioner Gerard, I agree you and you're -- it's absolutely right. I've been very consistent with my time on this Commission to ask for additional information, to get more specificity. When the ranch master plan came in front of us, I asked that

it go back and we find out more about the economic impact that we had for Larimer County. I did exactly the same thing when the Parks Master Plan came in front of us and I'm doing it here. I just don't think that there is enough specificity for us to sit here with the opposition that we have and say that it's complete.

I commend the staff. You guys have done a phenomenal job. In the last six months, this Planning Commission has probably seen some of the biggest and most contentious issues that have come before us and you guys are hanging in there.

Rob, thank you very much for that.

But I think to be consistent in what we saw tonight, there's just not enough there for me to say that we can move forward.

Somebody ran a pipeline to my house. I've stood in ditches and laid pipeline myself. I've run equipment and dug the holes the put those pipelines in. I've fixed that cement pipe that Alco has their water running in, in the middle of the night, you know, stood chest deep in sewage fixing a sewer line, too. So I've been in the trenches, no pun intended. So I get what it takes to get there.

With the issues in this, without being convinced that every other option was looked at and

dismissed or conveyed to Larimer County, I think we land on the side of the people of Larimer County and say, "City of Thornton, go back and give us more information." We need more information. That's my stance.

MR. DOUGHERTY: Commissioner Cox?

MS. COX: Commissioner Jensen pretty much said it for me. I was not saying by the motion I was making that it's denial forever. It was that the way this 1041 and the information that we have in front of us, I just don't think it's -- I'll use the term "ripe" enough that we should be making a decision to see -- that we should make a recommendation at this point. I think it needs more work.

MR. LAFFERTY: Chairman Dougherty, so having heard what you guys are just talking about, it might be more of a prudent decision or recommendation, if you will, to ask the Board of County Commissioners -- because the Board of County Commissioners -- we have to finish this and then we have to go to the Board of County Commissioners. That's what the rules are. The Board has to act on it.

This Board can tell the Board that at this point, you're inclined not to support it as it stands because you don't have adequate information.

Therefore, you ask that the Board table the project to some future date and direct the Applicant to provide additional details and go back through the public hearing process.

MR. CARRAWAY: I'm in favor of that.

MS. COX: Yeah.

MR. LAFFERTY: But you need to -- what you need to do is: give the Board of County Commissioners some indication of what details you want them to -- the town to address. We just can't be, "Well, we want them to address more." You've got to give them some direction.

MR. DOUGHERTY: Okay. But, Mr. Lafferty, a recommendation of denial and our comments here at the end, shouldn't that give them some direction?

MR. LAFFERTY: Maybe.

MR. DOUGHERTY: I mean --

MR. LAFFERTY: But what I heard from you all is that you're not wanting to send just a denial recommendation for it. You were sending forward a recommendation that you might support this alternative if you had the proper -- you had the right amount of detail in front of you. And so I would say that maybe you reconsider your vote. You don't have to. It's up to you guys. It's just an option that is a different

way of saying something before --

MR. DOUGHERTY: Well, I can ask the person who made the motion if she's like to make a friendly amendment to it or --

MS. COX: I don't necessarily need to make that in a motion. I think if -- I think we can make the motion and then make the comments like we've done in the prior, which is, here's the -- we could have a good discussion about the criteria that we want to maybe ask the Board to take -- to look at.

MR. HELMICK: From the staff point guy's perspective, I'm hearing an awful lot of "I need specificity," but I'm not hearing what you --

MR. LAFFERTY: That is --

MR. HELMICK: -- you need more specificity on.

Is it the alternatives?

MS. COX: Yes.

MR. LAFFERTY: Alternatives.

MR. HELMICK: Is the corridor widths?

MR. LAFFERTY: I think putting this pipeline in the road is the right thing to do.

MS. COX: Yeah.

MR. HELMICK: I agree.

MR. LAFFERTY: I think that the corridor

plan --

MS. COX: But which roads?

MR. LAFFERTY: -- is conceptually the right thing to do.

What I did not get was when I asked a direct question about the options of what -- of why we would have to look or why they could not consider taking water out in Windsor or on the other side of Fort Collins, why it cannot be used for water -- municipal water supply, the answer was, "We did not look at it." That tells me immediately that all of the options were not looked at.

MR. DOUGHERTY: But I have a problem with that because you just gave two different answers. You think that the waterline in the road is correct, yet --

MR. LAFFERTY: No, no, no, I -- he's asking for specificity. He's asking for what would we like them to look at. There are alternatives out there. We talked about one thing tonight. We did not explore the additional alternatives and why they were not -- why they could not be used other than here we are in Douglas Road and the 10 other whatever it was options that we looked at.

Here's Option 1, here's what we looked at and why we could not do that. Here's Option 2, this is

what we looked at. We could not do that. And bring it down to a reason why Larimer -- why Douglas Road is the only and best option left when right off the bat a question was asked about why it couldn't be -- why the water couldn't be used for municipal out on -- in Fort Collins, was told "We didn't look at it." That tells me that they were not totally vetted in the options or it was not an option. But I think I heard it was an option.

So I want to see what those options were, why they were considered to start with, why they were dismissed to end with and why ultimately Douglas Road corridor is the only option left.

MR. DOUGHERTY: Commissioner Carraway, you had some comments?

MR. CARRAWAY: Yeah, I just -- you know, it's 11:00 o'clock at night and I think the idea that we need to outline, you know, what exactly we're looking for is kind of crazy. I mean, I think the burden is on the City of Thornton and I think we should vote on the motion the way it is.

MR. LAFFERTY: I'll end the question then.

MR. DOUGHERTY: Well, are you calling the question?

MR. LAFFERTY: No, I'm asking him if he's

calling the question.

MR. DOUGHERTY: Commissioner Carraway, are you --

MS. COX: You're calling it.

MR. DOUGHERTY: -- calling the question? You want to vote?

MR. CARRAWAY: Yes.

MR. DOUGHERTY: Okay. The question has been called then and we have a motion that the Larimer County Planning Commission recommend to the Board of County Commissioners denial of the Thornton Water Project, File No. 18-ZONE2305. Please know, Planning Commissioners, that a "Yes" vote is to deny, to recommend denial.

Ms. Ruball, may be please have a voice vote?

MS. RUBALL: Commissioner Jensen?

MR. JENSEN: Yes.

MS. RUBALL: Commissioner Cox?

MS. COX: Yes.

MS. RUBALL: Commissioner Carraway?

MR. CARRAWAY: Yes.

MS. RUBALL: Commissioner Gerard?

MR. GERRARD: No.

MS. RUBALL: Commissioner Miller?

MR. MILLER: No.

MS. RUBALL: Chair Dougherty?

MR. DOUGHERTY: I believe that since we are missing one piece on this that it doesn't demonstrate the reasonable balance between the costs and the benefits, I am going to vote "Yes."

(Applause.)

MR. DOUGHERTY: Motion passes.

Folks, thank you all for coming this evening. We still have some work to do, so if I could please ask you, as you're filing out, please keep the chatter to a minimum for a couple of minutes?

Final report -- final item on the Agenda is the report from staff.

MR. LAFFERTY: Staff has nothing to report, but we'll be on our normal agenda with a work session next month and normal proceedings with the Planning Commission Hearing.

Next month on the work session, there will be discussion around the comp plan, so we ask that you all attend because we want --

MR. DOUGHERTY: Folks? Folks, I'm sorry, we can't hear what's going on right now. Please. Thank you.

MR. LAFFERTY: So we just ask that you all consider attending. I know it's coming the summer

months, it's fun to be outside these kind of things, but you're going to put on the comp plan and other issues are important to us so keep in mind that we do have the work session next month and it will involve discussion around the comp plan.

MR. DOUGHERTY: All right. And next, we've got a Board of County Commissioners Planning Commission work session on June 13th, Wednesday, and then we've got our next Planning Commission Hearing on June 20th.

Thank you all for your participation.

We are adjourned.

(Hearing adjourned at 9:49 p.m.)

C E R T I F I C A T E

I, Randel Raison, certified electronic court transcriber, do hereby certify that I typed the proceeding in the foregoing matter from audio recording, or the transcript was prepared under my direction, and that this is as accurate a transcript of what happened at that time and place as best as is possible, due to conditions of recording and/or duplicating.

9-23-2019
_____ _____

Date /s/Randel Raison, CET 340

WORD INDEX

FINDINGS AND RESOLUTION DENYING THE THORNTON WATER PROJECT 1041 PERMIT

The Petition of the City of Thornton for approval to allow 26 miles of 48-inch waterline, pumping facility and other appurtenant facilities in the location initially described on Exhibit "A" attached hereto has been filed with the Board of County Commissioners of the County of Larimer.

The Planning Commission reviewed the proposed 1041 permit on May 16, 2018 and having duly considered the same recommended that it be denied.

On July 9, 2018, July 23, 2018, August 1, 2018, December 17, 2018, January 28, 2019, February 4, 2019 and February 11, 2019, in the County Board Hearing Room of the Larimer County Courthouse, Fort Collins, Colorado, the Board of County Commissioners conducted public hearings on the 1041 Permit Application. The Board of County Commissioners, having heard the testimony and evidence adduced at said hearing and having considered and carefully weighed the same, now makes the following findings:

I. Notice and Property

1. The 1041 Permit request upon the route described on Exhibit "A" was advertised in a local newspaper of general circulation.

2. Written notice of the initial hearing was delivered or mailed, first class, postage prepaid, to landowners within 500 feet of the proposal.

3. The general characteristics of the property are as follows:

a.	Location:	New water line easement and construction along approximately 26 miles in the County in new easements of 50 feet, and/or in existing ROW
b.	Area:	New water line easement and construction along approximately 26 miles in the County in new easements of 50 feet, and/or in existing ROW
c.	Proposed Land Use:	48-inch waterline, pump station, 1 MG tank and appurtenant facilities
d.	Existing Zoning:	Various
e.	Adjacent Zoning:	Various
f.	Adjacent Land Uses:	Residential, agricultural
g.	Services:	
	Access:	County Roads 54, 56 & Larimer County Road 1/Weld County Road 13
	Water:	N/A
	Sewer:	N/A
	Fire Protection:	Several authorities
h.	No. Trips Generated by Use:	Construction activity

II. Nature of the Application

1. C.R.S. Sections 24-65.1-101 *et seq.* titled Areas and Activities of State Interest was adopted by the Colorado General Assembly in 1974 and is generally referred to as "1041 powers." This statute provides:

> (2) It is the purpose of this article that:
>
> (a) The general assembly shall describe areas which may be of state interest and activities which may be of state interest and establish criteria for the administration of such areas and activities;
>
> (b) Local governments shall be encouraged to designate areas and activities of state interest and, after such designation, shall administer such areas and activities of state interest and promulgate guidelines for the administration thereof; and
>
> (c) Appropriate state agencies shall assist local governments to identify, designate, and adopt guidelines for administration of matters of state interest.

C.R.S. Section 24-65.1-204, Colorado Revised Statutes, states components of water facilities "shall be constructed in areas which will result in the proper utilization of existing treatment plants and the orderly development of domestic water systems…of adjacent communities;" and "emphasize the most efficient use of water…including recycling and reuse of water."

2. As authorized by this statute, Larimer County adopted 1041 regulations in 2008. (Larimer County Land Use Code (LUC), Chapter 14 attached as Exhibit B). Among the areas and activities regulated by Larimer County are transmission pipelines:

> Siting and development of new or extended domestic water or sewer transmission lines which are contained within new permanent easements greater than 30 feet or within new permanent easements greater than 20 feet that are adjacent to existing easements. Domestic water transmission lines include those used to transport both raw and treated water. This designation shall not include the maintenance, repair, adjustment or removal of an existing pipeline or the relocation, replacement or enlargement of an existing pipeline within the same easement or right-of-way, provided no additional permanent property acquisitions are required. The designation shall also not include the addition,

replacement, expansion or maintenance of appurtenant facilities on existing pipelines. LUC 14:4 (J).

3. In the 1980's the City of Thornton, Colorado, (Thornton) purchased farms and water rights in Larimer County and other counties for municipal purposes, including provision of drinking water to the residents of the City. To further this purpose, Thornton pursued court proceedings in District Court Water Division No. 1, State of Colorado, Consolidated Cases Nos. 86CW401, 86CW402, 86CW403, and 87CW332, and ultimately obtained a decree dated March 9, 1998. This decree imposed on Thornton a number of conditions and restrictions for use of the water rights.

4. The City of Thornton now seeks approval of a 1041 permit for the construction of a 48-inch diameter water line, a 40 million gallon per day pumping facility, one million gallon above-ground water tank and other appurtenant facilities.

III. Procedural History

1. 2014-May 2016: Thornton begins preliminary discussions with County Community Development, Engineering and Health Department staff about its proposed pipeline project, including possible alignments and corridors.

2. May 2016: A pre-application conference for a 1041 permit is held with Thornton and County staff. Public outreach through a series of mailings and open houses begins in late 2016 and continues through 2017.

At the time of the pre-application conference and during the initial development of alternatives the location of public facilities such as this are not contemplated to be located within a County Right of Way (ROW). At some of the early public meetings there is significant concern about proposed alignments through subdivisions. As a result, County staff meets with Thornton and its consultants and encourages them to review multiple alternatives in the western most area of the proposed corridor (the Douglas Road Corridor). At that time County staff also indicates that alignment in the existing ROW will be considered. In the case of Douglas Road there are sections which are designated on the Transportation Master Plan for future improvement. Although, no plans for improvements to this section of road are contemplated in the near term, if those plans change and improvements are scheduled to be made earlier, Thornton will need to coordinate its work in the ROW with Larimer County.

In the "Douglas Road Corridor" (CR17-Turnberry) the original alignment identifies a ¼ mile. This is subsequently reduced to a 500-foot-wide corridor. This creates a significant concern for many property owners in the area--specifically, that their homes, improvements and/or landscaping will be at risk with the final easements and construction.

For the balance of the segments, the alignment is still 500 feet to ¼ mile in width. The intent is to allow for easement negotiation which would avoid property conflict and not require revisiting the application. There may be locations which will require or necessitate the use of roadway ROW.

3. January 5, 2018: Thornton submits its application for 1041 approval of water conveyance pipelines and a pump house. The application is initially scheduled for hearing with the Larimer County Planning Commission in February and March 2018. However, the hearings are postponed to allow additional information requested by the County to be developed and submitted by Thornton. That additional information specifically relates to the proposed alignment in Douglas Road.

4. May 16, 2018: The Planning Commission holds a public hearing to consider Thornton's application. At the conclusion of the hearing the Commission votes 4-2 to deny the application. The Commission's decision and a summary of the information presented was set out in the Commission's minutes.

5. July 8, and 23, and August 1, 2018: The Board holds public hearings to consider Thornton's application. Thornton identifies its proposed route and/or corridor for its pipelines and location of a pump station. The proposed locations are shown on Exhibit C (referred to as the Douglas Road Route). Thornton testifies why the proposed project meets the applicable review criteria. Many area residents appear and testify in opposition to the project. Residents, including owners of properties south of Douglas Road, assert Thornton had no to minimal outreach or notice to them and they had little or no opportunity for input into the project in advance of the hearings. Citizens further testify that negative impacts from the project, including impacts of construction on area properties and landscaping, limitations on the future use of property, restricted and limited access for them and for emergency and school buses, and unwanted and unneeded improvements to Douglas Road are untenable. Citizens opine that the project fails to meet the County's 1041 review standards, including standards 2, 4, 8 and 9.

The Board makes initial verbal findings that Thornton has inadequately engaged the public in an effort to reach a preferred alternative and address adverse impacts from the project, that the Douglas Road route brings with it many adverse impacts as described by citizens, and that insufficient information has been presented as to alternative routes (including routes initially presented to the Thornton City Council), the pros and cons of other routes and why the other routes are not viable. In lieu of denying Thornton's application, the Board elects to continue the hearing to December 17, 2018 and directs Thornton to engage in a public outreach process to better address area residents' concerns and to present alternative project routes at the December hearing.

6. August through November 2018: A working group (Group) is formed to examine the project. A public engagement webpage (larimerwaterprojects.org) is also created and two

public meetings are held. The Group reviews possible alignments. Matters discussed by the Group include alternative alignments for the pipelines. The Group also questions the legal and practical feasibility of using the Poudre River and canals for conveyance of the water. About half of the Group advocate for an alignment that would require Thornton to use the Poudre River in lieu of pipes to convey the water for a portion of the project.

7. December 10, 2018: Thornton submits Supplement 3 to the Application. The route for the pipeline is now proposed to be from Reservoir 4 to a pump station north of Douglas Road, then north to the southeast corner of the Braidwood community following optional routes along the west shore of Reservoir #4 or Lake Vista Drive to Travis Road, then north to the dam for Reservoir 3, then east to the east shoreline of Reservoir 3 to the north edge of the Eagle Lake subdivision, then east to Highway 1, then south east to CR 56 then following the ROW for CR 56 to I-25. The proposed location is shown on Exhibit D (referred to as the County Road (CR) 56 Route). Thornton states that this route is a 500 feet wide corridor anywhere within which the pipes will potentially be laid. The location for the pumphouse remains the same.

8. December 17, 2018, January 28, 2019, February 4, 2019 and February 11, 2019: The Board holds public hearings to consider Thornton's Supplemental Application. (The Board also considers Thornton's additional supplemental materials entitled "City of Thornton Rebuttal Statement(s)). After considering all information provided by Thornton and the public, the Board votes to deny Thornton's application.

IV. Standards of Review and Findings

1. In order to approve a 1041 application, the Board must find that Thornton has met each of the twelve review criteria set out in LUC 14:10 (B) and (D)(1-12). The Board finds that Thornton has or has not met each of the twelve review criteria as follows:

i. *The proposal is consistent with the master plan and applicable intergovernmental agreements affecting land use and development.*

Not met.

The Larimer County Master Plan (Master Plan) is a policy document that establishes goals, visions and a long-range framework for the unincorporated area of Larimer County. The Master Plan identifies as one of its missions: "Larimer County is developing the Partnership Land Use System to maintain and enhance our county's quality of life and to be fundamentally fair to all our citizens and to respect their individual rights.

The Master Plan has many themes and principles implicated by Thornton's application, including:

a. Natural and cultural resources shall be identified, conserved and protected, and long-term cumulative impacts shall be monitored;

b. Agriculture will remain a viable long-term segment of Larimer County's economic, cultural and social fabric;

c. Logical settlement patterns that reflect the existing character of Larimer County and protect existing neighborhoods will be supported;

d. The planning and development review process shall be fair, open and predictable, and meet the needs and interest of the community without infringing on the rights of individuals.

e. Agriculture shall be recognized as an important economic, cultural and environmental resource value-provider for the County;

f. Agricultural land and water in Larimer County shall be protected through incentives, voluntary participation and measures to strengthen viable agriculture.

Thornton's proposed pipeline route is a yet-to-be-determined location within a 500 foot to ¼ mile wide corridor. The Board's ability to assess specific impacts to private property along the route is unreasonably limited because of the breadth of the corridor. Testimony was provided about the pipeline potentially splitting a private property in two, going through front or backyards, and traversing through significant amounts of private property.

The CR 56 route will have "[m]ost of the alignment . . . constructed in private easements . . . ." Unless an owner is willing to sell his/her private property to Thornton, Thornton will be required to acquire the property by eminent domain—a process generally disfavored by property owners.

Within these private easements, Thornton has noted that property owners will not be permitted to construct permanent structures or other improvements or install landscaping with deep roots that may interfere with the pipeline and its future maintenance. Testimony from private property owners along potential pipeline routes expressed concern about short-term construction impacts in addition to long-term impacts from maintenance crews on private property. One citizen noted concern about her children being exposed to strangers and equipment on her private property.

Thornton's water currently flows through the Water Supply and Storage Company (WSSC) canal system and is used to irrigate farms in Larimer County. Thornton owns approximately 47% of the water shares in the WSSC. Much of the remaining water in WSSC is also owned by municipalities, and WSSC expects that most of the water will be removed from farms in Larimer County in the future. While the fate of Thornton's application does not rest on

how other municipalities use their water in the future, the Board finds it important to have information about and consider the cumulative impacts of irrigated farmland turning to dryland. A significant reduction in the amount of irrigated farmland is concerning to the Board and conflicts with the goals of the Master Plan. The long-term viability of Larimer County's agricultural communities, and the economic, cultural and environmental impacts of drying up irrigated farmland are valid considerations under the Master Plan. As these impacts are not adequately described or analyzed by Thornton, the Board cannot conclude that Thornton's proposal is consistent with the Master Plan.

ii *The applicant has presented reasonable siting and design alternatives or explained why no reasonable alternatives are available.*

Not met.

Prior to applying for a 1041 permit from Larimer County, Thornton considered and presented to its council, a number of possible alternatives for conveyance of its water. Several of the pipeline routes had water being withdrawn from Reservoir 4 and proceeding east to the County line, then south through several corridors east and west of I-25, as well as the possibility of withdrawing water from other points along the Cache La Poudre River including as far as Windsor.

In its initial application materials, Thornton discussed its broad analysis of alternatives to convey the water to the City. These were then refined based on conversations with all of the affected jurisdictions to three generalized corridors all which commenced at Water Supply and Storage Reservoir 4 (WSS 4) thence east to the Weld Larimer County line thence south following alignments proceeding south to the City. Thornton defined three distinct corridors to review. Thornton examined the three alternatives from which the Douglas Road Route was chosen and presented to the Board. The Board was not convinced that this Route was the best option. Douglas Road is a high traffic generator. For some adjacent residential subdivisions, Douglas Road serves as the only access out of the subdivision. The Thornton project would take approximately 2-5 years to complete during which traffic would have to be diverted causing considerable inconvenience to area residents. There were no guarantees that the pipeline construction would remain within the right-of-way. Additionally, there would be safety and emergency access conflicts during construction. Area residents opposed the resulting improvements to Douglas Road (widening it) which they believed would increase traffic and speeds.

Thornton's Supplemental Application was based on the CR 56 Route. This Route was problematic in its imprecision, identifying a 500-foot corridor in some places where the pipeline might ultimately be installed. The corridor of 500' to ¼ mile in width prevents meaningful evaluation of the two alternatives presented. Impacts can vary

significantly depending where within this corridor the pipeline is actually located, and at a minimum Thornton should identify where the 50' wide permanent pipeline easement will be located. Without this level of specificity, the siting alternatives proposed by Thornton are not reasonable and cannot be sufficiently evaluated by the Board.

With respect to design, Thornton identified the use of tunneling rather than open-ditch construction as the primary method of installation and proposes to bore under certain sensitive areas. Some alternative design options were mentioned, such as lake taps to avoid private property and other construction disruptions, but were not presented as design alternatives.

The Board finds Thornton failed to present reasonable siting alternatives. Thornton self-selected two routes and then summarily concluded other possible alternatives (including those presented to the Thornton City Council) were not feasible. At the August 1, 2018 hearing, the Board specifically mentioned interest in the Shields Street alternative. Options vetted and rejected by Thornton have positive attributes which, in combination with the two alternatives presented, could lead to a route that satisfies the approval criteria by better mitigating adverse impacts and ensuring the orderly and efficient development of Thornton's water pipeline.

iii. The proposal conforms with adopted county standards, review criteria and mitigation requirements concerning environmental impacts, including but not limited to those contained in Section 8 of this Code.

Not met.

8.2. Wetland Areas:
Thornton proposes to bore under all designated wetland areas. Wetland areas that are affected by the proposal are non-jurisdictional. A Nationwide Permit from the Army Corps of Engineers may be required for the City to confirm that no jurisdictional wetland areas are affected by construction.

8.3. Hazard Areas:
There are hazard areas, flood plains on the Poudre and Big Thompson Rivers and Boxelder Creek identified along the preferred route. The City of Thornton proposes to bore under these river corridors.

8.4. Wildlife:
Thornton's environmental analysis for the preferred route identifies that there were possible conflicts with wildlife both listed and other species of concern, including disruption of nesting birds. The Board is not convinced that mitigation, including avoidance, seasonal limitations or prohibitions on activities is adequate.

8.8. Irrigation Facilities:
There are multiple irrigation ditches which will need to be bored or cut with this proposal. Thornton may be required to obtain agreements or licenses associated with this activity. The Board would seek alternative alignments that eliminate or reduce impacts on irrigation ditches.

8.11. Air Quality Standards:
Given the potential disturbed area of this request, an Air Quality permit will be necessary which permitting will require compliance with the standards.

8.12. Water Quality Management Standards:
Thornton will need to obtain a storm water quality permit for the construction impacts.

iv. The proposal will not have a significant adverse affect on or will adequately mitigate significant adverse affects on the land on which the proposal is situated and on lands adjacent to the proposal.

Not Met.

Portions of Thornton's proposed routes are in areas with significant residential development. There will be adverse impacts to thirty-six properties on the east side of Reservoirs 3 and 4. There will be adverse impacts on eight homes and private properties along County Road 56 and eight homes and private property in Eagle Lake. There will be typical construction impacts to vegetation in the project area or adjacent to the pipeline. There will also be impacts on groundwater and drainage in the area of any bore or cut. The pipelines will not be able to be installed solely within County public right-of-way. This will necessitate acquisition of private property which may result in eminent domain proceedings. Neighbors are unclear as to whether Thornton will acquire their property as an easement or as a fee interest. There are rattlesnakes in the area of the proposed CR 56 Route. These snakes will likely be driven into adjacent subdivisions as a result of construction. Noise and visual impacts from the pumphouse are of concern. Well established trees exist along the east side of Reservoir 4. These trees will be lost or their health threatened as a result of construction. These impacts will significantly impair residents' quality of life and use of their properties.

The Douglas Road route would require an unreasonably lengthy construction cycle, up to four years, which neighbors of the route testified would cause significant disruption to their homes and daily lives. Traffic detours along this route would funnel additional traffic to some intersections that are already overburdened. The added detour traffic would further degrade the function of these intersections to an unacceptable level.

The CR 56 route would have less impact on traffic because current volumes are much lower than Douglas Road. However, the CR 56 route will have a greater detrimental impact on private property because less public right of way is available. Also, as the pipeline moves north from Reservoir No. 4, the Braidwood Neighborhood and Eagle Lake neighborhoods will suffer significant disruption to private property. Further along this route, a private property will be bisected by the pipeline between the house and the barn. The sheer size and uncertainty of the proposed 500' to ¼ mile wide corridor prevents the Board and private property owners from reasonably considering all impacts. This uncertainty is, in itself, a significant impact of this project.

The particular impacts on the Braidwood and Eagle Lake neighborhoods could potentially be mitigated through use of a lake tap to tunnel the pipeline under certain reservoirs, but Thornton did not propose this as an available mitigation option. Robin Dornfest, an engineer with Lithos Engineering, was hired as a consultant to Larimer County and concluded lake taps, while more expensive and having certain risks, are feasible for Thornton's project and are increasingly more common for water conveyance projects in Colorado and across the United States.

Thornton's application addresses a single 48" water pipeline, however, two additional pipelines are part of Thornton's overall project plan. Thornton acknowledges the full extent of its project, which includes three phases with one pipeline per phase. Thornton believes its current 48" pipeline, phase I, is all that is relevant now. The problem with this approach is it does not account for cumulative impacts of the project as a whole. Thornton has a specific plan that includes three water pipelines in Larimer County that will collectively operate as a single water supply system. A purpose of Larimer County's 1041 permit process is to consider the broad impacts of public projects, and this purpose is also reflected in 1041 state statutes. By presenting phase I in isolation, Thornton deprives the Board and public of the opportunity to consider cumulative impacts and the effectiveness of mitigation. A route that may be appropriate for a single pipeline may be inappropriate for additional pipelines. If this information is not considered now, future pipelines may not be able to co-locate which would result in the disorderly development of Thornton's project and compound the impacts on Larimer County through multiple different pipelines in separate locations. An important factor in Thornton preferring the CR 56 route over the previously preferred Douglas Road route is that Douglas Road may be insufficient for co-location of multiple pipelines. This does not mean Douglas Road could not be a viable route, but consideration of the adverse impacts and a balancing of those impacts with benefits must be performed.

v. *The proposal will not adversely affect any sites and structures listed on the State or National Registers of Historic Places.*

Met.

The environmental analysis includes a review of all known and designated historic structures or places within the proposed alignments. There are not historic structures known to exist along or in the alignment of this pipeline that would be negatively affected by the construction of these facilities.

vi. *The proposal will not negatively impact public health and safety.*

Not Met.

Residents adjacent to Douglas Road spoke of safety concerns related to limited access from their neighborhoods which could delay emergency services. Other residents spoke of concerns arising from strangers on their property during both initial construction and future monitoring.

vii. *The proposal will not be subject to significant risk from natural hazards including floods, wildfire or geologic hazards.*

Met.

The preferred alignment has mitigated any risks principally by avoidance, or there are no risk factors associated with the preferred alignment.

viii. *Adequate public facilities and services are available for the proposal or will be provided by the applicant, and the proposal will not have a significant adverse effect on the capability of local government to provide services or exceed the capacity of service delivery systems.*

Met.

Thornton presented evidence showing it has the physical and financial capability to carry out and complete the project. The project will not impair Larimer County's ability to provide needed governmental services.

ix. *The applicant will mitigate any construction impacts to county roads, bridges and related facilities. Construction access will be re-graded and re-vegetated to minimize environmental impacts.*

Met.

Thornton has represented it will mitigate construction impacts to County roads, bridges and related facilities and that construction access will be re-graded and re-vegetated to minimize environmental impacts. Notwithstanding these representations, construction will significantly inconvenience and disrupt citizens.

Met.

x. *The benefits of the proposed development outweigh the losses of any natural resources or reduction of productivity of agricultural lands as a result of the proposed development.*

Not met.

Thornton's proposal will cause significant reduction in the productivity of agricultural lands within Larimer County. The benefits of Thornton's proposal are also significant, as clean and sufficient water supply is of critical importance. At this time, the Board finds the significant detrimental impact to agricultural productivity in Larimer County outweighs the benefits of Thornton's current proposal. Additional mitigation may help Thornton satisfy this criterion, but the current proposal falls short.

As part of Thornton's acquisition of water rights in Larimer County in the 1980's, Thornton bought approximately 21,000 agricultural acres on which its water rights were historically used for irrigation. Over time, Thornton has dried up some of the irrigated acreage to meet the needs of its growing population, leaving approximately 53% of its acreage in irrigated agriculture production in 2018. Thornton's proposal is designed to convey more of Thornton's water from these remaining irrigated acres to residents in Thornton, resulting in the irrigated farms being dried up and converting to dryland grasses. The shift of irrigated farmland to dryland grass will significantly reduce the agricultural productivity of those lands and will, unless sufficiently mitigated, jeopardize the long-term viability of the agricultural segment of Larimer County from an economic, cultural and social perspective.

Thornton's proposal considers any agricultural impacts to be temporary- the Board disagrees. The conversion of irrigated agricultural land to dryland grasses is not temporary and the resulting reduction in productivity of such lands is lasting. It appears Thornton's focus has been on physical impacts on agricultural lands caused by construction activity, but the Board's considerations go beyond those temporary impacts.

xi. *The proposal demonstrates a reasonable balance between the costs to the applicant to mitigate significant adverse affects and the benefits achieved by such mitigation.*

Not met.

Thornton has stated that certain functions related to other alternatives will be cost prohibitive and/or result in degradation in the quality of water. The Board is not convinced that the costs associated with an improved alignment or associated adverse impacts with such alignment will outweigh the benefits to Thornton of receiving water of sufficient quality and quantity. Thornton is currently treating water downstream of the Denver Metro area from the Platte River by ultra filtration, a 50-million gallon/day plant (the Wes Brown Water Treatment Plant. The Board finds there would be less degradation of the water through Fort Collins than through the Denver metro area.

The Board further finds that other alternative routes may result in fewer adverse impacts to the County which would reduce or equal the costs of mitigating impacts to the CR 56 Route or Douglas Road Route.

xii. *The recommendations of staff and referral agencies have been addressed to the satisfaction of the county commissioners.*

Met.

In large part the agency referral comments are directed to the need for Thornton to obtain additional permits, permissions and coordination. There is no evidence that Thornton will not seek all necessary permits and permissions and coordinate as needed at the relevant time.

2. The Board is cognizant that it may not deny Thornton the use and benefit of its water rights and that the Board's authority is limited to approving the siting and development of pipelines. The Board is not yet convinced, however, that the two proposed routes for the pipelines and the location for the pump house are the only and/or best and least impactful and that other routes are not viable.

V. Resolution

WHEREAS, the Board of County Commissioners has made its findings upon the petition and upon the recommendation of the Larimer County Planning Commission, which findings precede this Resolution, and by reference are incorporated herein and made a part hereof; and

WHEREAS, the Board of County Commissioners has carefully considered the petition, evidence and testimony presented to it, and has given the same such weight as it in its discretion deems proper, and is now fully advised in the premises;

Findings and Resolution
Thornton Water Project
1041 Permit Denial
Page 14

NOW, THEREFORE, BE IT RESOLVED that the petition of the City of Thornton for approval of a 1041 permit to allow a 26 mile 48-inch diameter waterline, pumping facility and other appurtenant facilities for the Douglas Road Route and the County Road 56 Route be and the same hereby is denied.

Commissioners Johnson, Donnelly and Kefalas voted in favor of the Findings and Resolution, and the same were duly adopted.

DATED this 19th day of March, 2019.

BOARD OF COMMISSIONERS OF
LARIMER COUNTY, COLORADO

By: _____
Chair

(SEAL)

ATTEST:

_____
Deputy Clerk

LARIMER COUNTY CLERK SEAL COLORADO

DATE: 3 14 19
APPROVED AS TO FORM:

_____
COUNTY ATTORNEY

NOTICE OF PUBLIC HEARING

TO ALL INTERESTED PERSONS:

Please take notice that on Monday, July 9, 2018, at 6:30 pm, the Larimer County Board of County Commissioners will hold a public hearing in the Hearing Room of the Larimer County Courthouse Offices, 200 West Oak, Fort Collins, Colorado, concerning the following:

Applicant: City of Thornton Water Project

Request: To locate and construct a raw water pipeline and appurtenant facilities including pump stations and storage tanks. The pipeline commences north of Fort Collins at WS&S reservoir #4 following along the alignment of Douglas Road to CR 9/Turnberry Rd. thence north to CR 56 thence east to the County line to a water tank thence south along the county line to the Weld County through Timnath, Windsor and Johnstown.

Property Description: A pipeline route commencing at Water Storage and Supply reservoir # 4 proceeding east along the Douglas Road alignment to CR 9 north to CR 56 East to the Larimer County Line thence south along the County line to the Weld County line at Johnstown.

File Name/Number: Thornton Water Project 1041, 18-ZONE2305

The File and relevant documents may be examined in the Office of Planning Services of the County of Larimer at the Larimer County Courthouse, Fort Collins, Colorado during regular business hours.

EXHIBIT "A"

Thornton Water Project

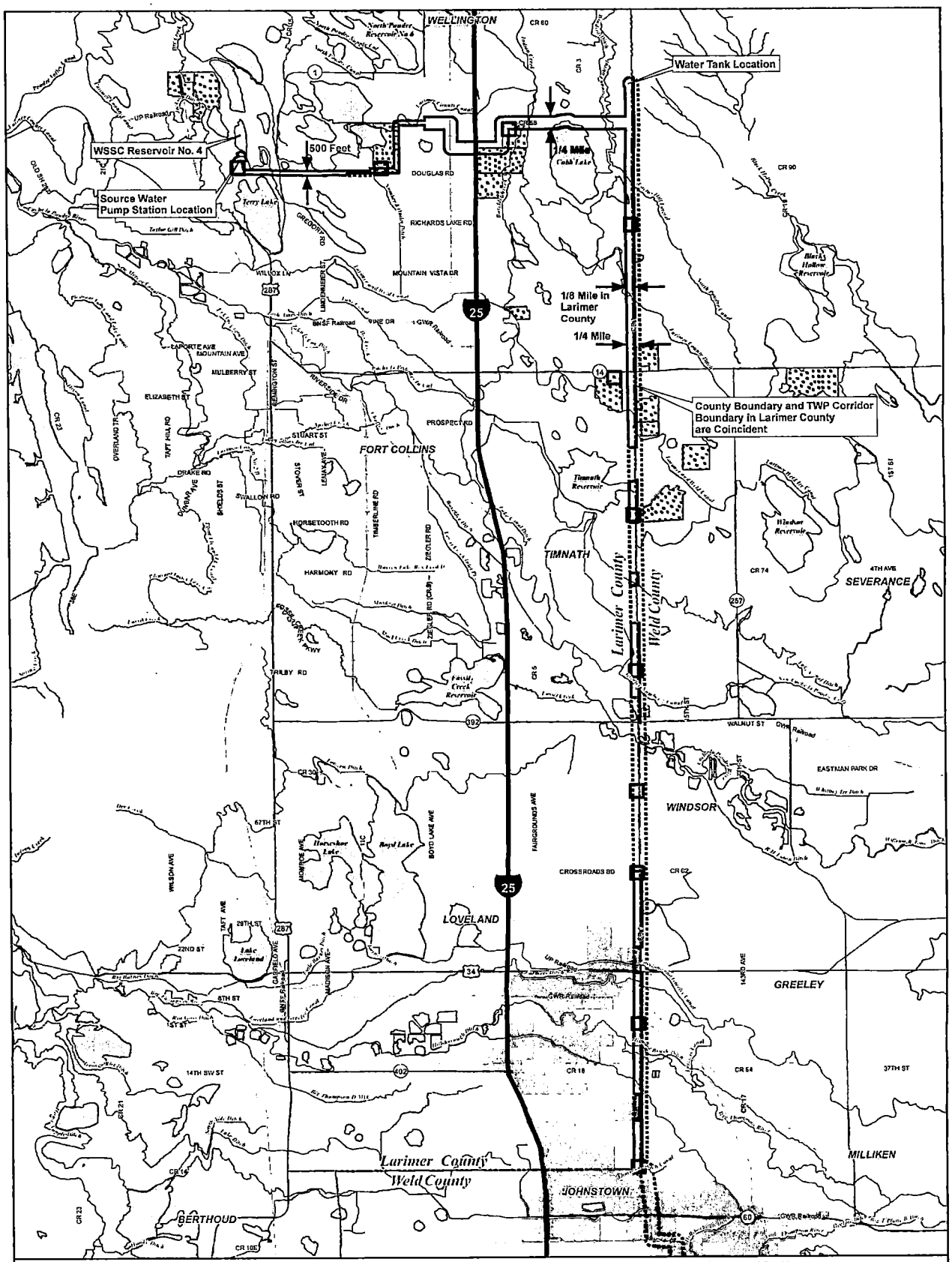

EXHIBIT "B"

17

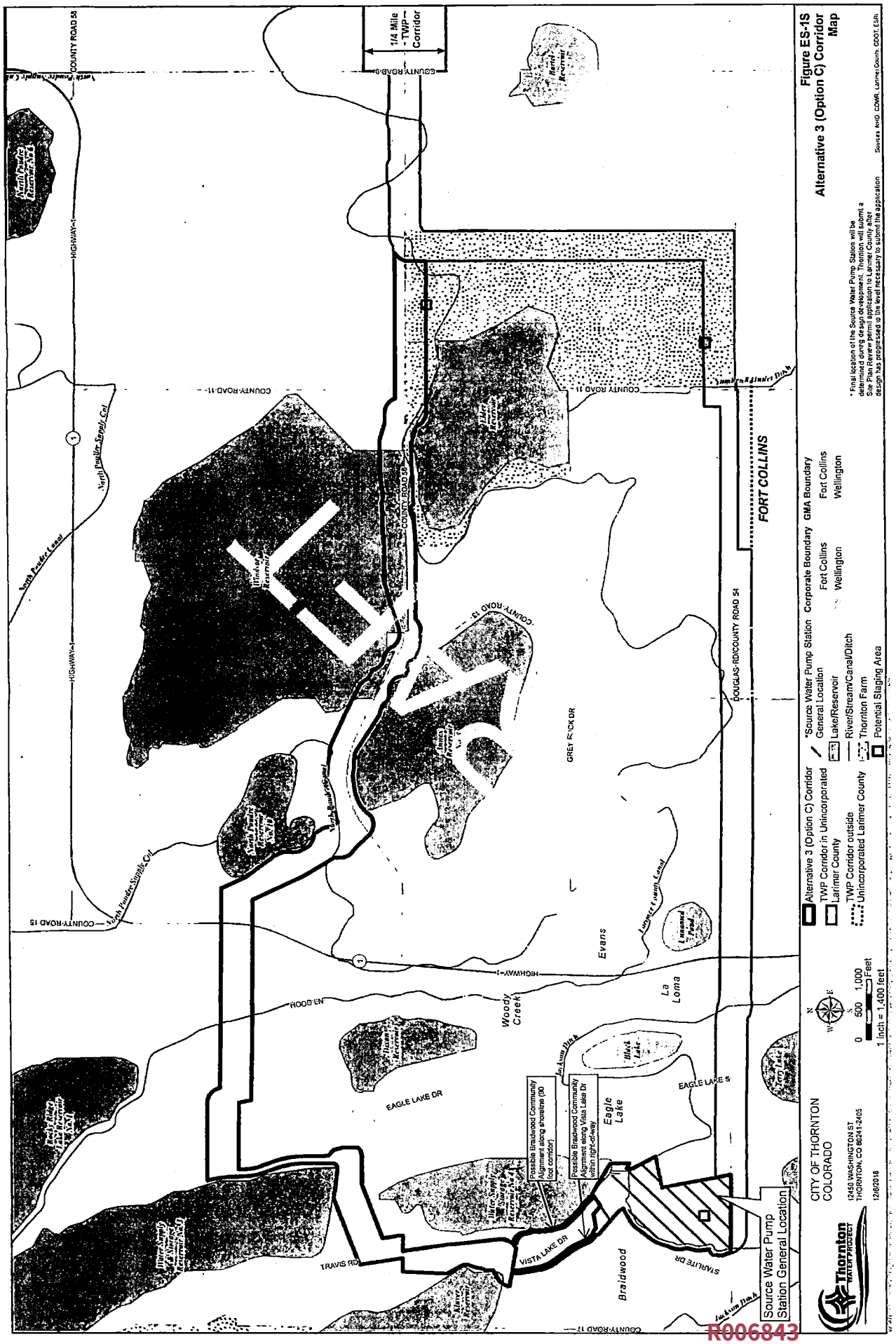
Figure ES-1S
Alternative 3 (Option C) Corridor Map
1/4 Mile - TWP - Corridor
COUNTY ROAD 38
COUNTY ROAD 9
COUNTY ROAD 11
COUNTY ROAD 13
COUNTY ROAD 15
COUNTY ROAD 17
HIGHWAY-1
North Poudre Supply Cnl
North Poudre Canal
Windsor Reservoir
Boxelder Ditch
FORT COLLINS
DOUGLAS RD/COUNTY ROAD 54
GREY ROCK DR
Evans
Lawrence Swamp Lateral
ROOSEVELT
Woody Creek
La Loma
EAGLE LAKE DR
EAGLE LAKE S
Eagle Lake
Black Lake
Possible Braidwood Community Alignment along shoreline (90 foot corridor)
Possible Braidwood Community Alignment along Vista Lake Dr within right-of-way
VISTA LAKE DR
TRAVIS RD
STARLITE DR
Braidwood
Source Water Pump Station General Location
Alternative 3 (Option C) Corridor
TWP Corridor in Unincorporated Larimer County
TWP Corridor outside Unincorporated Larimer County
*Source Water Pump Station General Location
Lake/Reservoir
River/Stream/Canal/Ditch
Thornton Farm
Potential Staging Area
Corporate Boundary
Fort Collins
Wellington
GMA Boundary
Fort Collins
Wellington
N
W
E
S
0 500 1,000 Feet
1 inch = 1,400 feet
* Final location of the Source Water Pump Station will be determined during design development. Thornton will submit a Site Plan Revision application to Larimer County for review. The design has progressed to the level necessary to submit the application
Sources: ArcGIS, CDWR, Larimer County, CDOT, ESRI,
CITY OF THORNTON
COLORADO
12450 WASHINGTON ST.
THORNTON, CO 80241-2405
12/6/2018
Thornton WATER PROJECT

EXHIBIT "C"

RECEPTION #20190014585, 3/25/2019 4:23:49 PM, 1 of 26,
Angela Myers, Clerk & Recorder, Larimer County, CO

RECEPTION #20190013639, 3/20/2019 10:38:59 AM,
1 of 17,
Angela Myers, Clerk & Recorder, Larimer County, CO

FINDINGS AND RESOLUTION DENYING THE THORNTON WATER PROJECT 1041 PERMIT

The Petition of the City of Thornton for approval to allow 26 miles of 48-inch waterline, pumping facility and other appurtenant facilities in the location initially described on Exhibit "A" attached hereto has been filed with the Board of County Commissioners of the County of Larimer.

The Planning Commission reviewed the proposed 1041 permit on May 16, 2018 and having duly considered the same recommended that it be denied.

On July 9, 2018, July 23, 2018, August 1, 2018, December 17, 2018, January 28, 2019, February 4, 2019 and February 11, 2019, in the County Board Hearing Room of the Larimer County Courthouse, Fort Collins, Colorado, the Board of County Commissioners conducted public hearings on the 1041 Permit Application. The Board of County Commissioners, having heard the testimony and evidence adduced at said hearing and having considered and carefully weighed the same, now makes the following findings:

I. Notice and Property

1. The 1041 Permit request upon the route described on Exhibit "A" was advertised in a local newspaper of general circulation.

2. Written notice of the initial hearing was delivered or mailed, first class, postage prepaid, to landowners within 500 feet of the proposal.

3. The general characteristics of the property are as follows:

a.	Location:	New water line easement and construction along approximately 26 miles in the County in new easements of 50 feet, and/or in existing ROW
b.	Area:	New water line easement and construction along approximately 26 miles in the County in new easements of 50 feet, and/or in existing ROW
c.	Proposed Land Use:	48-inch waterline, pump station, 1 MG tank and appurtenant facilities
d.	Existing Zoning:	Various
e.	Adjacent Zoning:	Various
f.	Adjacent Land Uses:	Residential, agricultural
g.	Services:	
	Access:	County Roads 54, 56 & Larimer County Road 1/Weld County Road 13
	Water:	N/A
	Sewer:	N/A
	Fire Protection:	Several authorities
h.	No. Trips Generated by Use:	Construction activity

***Re-recorded to correct Exhibits**

RECEPTION #20190014585, 3/25/2019 4:23:49 PM, 2 of 26,
Angela Myers, Clerk & Recorder, Larimer County, CO

II. Nature of the Application

1. C.R.S. Sections 24-65.1-101 *et seq.* titled Areas and Activities of State Interest was adopted by the Colorado General Assembly in 1974 and is generally referred to as "1041 powers." This statute provides:

> (2) It is the purpose of this article that:
>
> (a) The general assembly shall describe areas which may be of state interest and activities which may be of state interest and establish criteria for the administration of such areas and activities;
>
> (b) Local governments shall be encouraged to designate areas and activities of state interest and, after such designation, shall administer such areas and activities of state interest and promulgate guidelines for the administration thereof; and
>
> (c) Appropriate state agencies shall assist local governments to identify, designate, and adopt guidelines for administration of matters of state interest.

C.R.S. Section 24-65.1-204, Colorado Revised Statutes, states components of water facilities "shall be constructed in areas which will result in the proper utilization of existing treatment plants and the orderly development of domestic water systems…of adjacent communities;" and "emphasize the most efficient use of water…including recycling and reuse of water."

2. As authorized by this statute, Larimer County adopted 1041 regulations in 2008. (Larimer County Land Use Code (LUC), Chapter 14 attached as Exhibit B). Among the areas and activities regulated by Larimer County are transmission pipelines:

> Siting and development of new or extended domestic water or sewer transmission lines which are contained within new permanent easements greater than 30 feet or within new permanent easements greater than 20 feet that are adjacent to existing easements. Domestic water transmission lines include those used to transport both raw and treated water. This designation shall not include the maintenance, repair, adjustment or removal of an existing pipeline or the relocation, replacement or enlargement of an existing pipeline within the same easement or right-of-way, provided no additional permanent property acquisitions are required. The designation shall also not include the addition,

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replacement, expansion or maintenance of appurtenant facilities on existing pipelines. LUC 14:4 (J).

3. In the 1980's the City of Thornton, Colorado, (Thornton) purchased farms and water rights in Larimer County and other counties for municipal purposes, including provision of drinking water to the residents of the City. To further this purpose, Thornton pursued court proceedings in District Court Water Division No. 1, State of Colorado, Consolidated Cases Nos. 86CW401, 86CW402, 86CW403, and 87CW332, and ultimately obtained a decree dated March 9, 1998. This decree imposed on Thornton a number of conditions and restrictions for use of the water rights.

4. The City of Thornton now seeks approval of a 1041 permit for the construction of a 48-inch diameter water line, a 40 million gallon per day pumping facility, one million gallon above-ground water tank and other appurtenant facilities.

III. Procedural History

1. 2014-May 2016: Thornton begins preliminary discussions with County Community Development, Engineering and Health Department staff about its proposed pipeline project, including possible alignments and corridors.

2. May 2016: A pre-application conference for a 1041 permit is held with Thornton and County staff. Public outreach through a series of mailings and open houses begins in late 2016 and continues through 2017.

At the time of the pre-application conference and during the initial development of alternatives the location of public facilities such as this are not contemplated to be located within a County Right of Way (ROW). At some of the early public meetings there is significant concern about proposed alignments through subdivisions. As a result, County staff meets with Thornton and its consultants and encourages them to review multiple alternatives in the western most area of the proposed corridor (the Douglas Road Corridor). At that time County staff also indicates that alignment in the existing ROW will be considered. In the case of Douglas Road there are sections which are designated on the Transportation Master Plan for future improvement. Although, no plans for improvements to this section of road are contemplated in the near term, if those plans change and improvements are scheduled to be made earlier, Thornton will need to coordinate its work in the ROW with Larimer County.

In the "Douglas Road Corridor" (CR17-Turnberry) the original alignment identifies a ¼ mile. This is subsequently reduced to a 500-foot-wide corridor. This creates a significant concern for many property owners in the area--specifically, that their homes, improvements and/or landscaping will be at risk with the final easements and construction.

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For the balance of the segments, the alignment is still 500 feet to ¼ mile in width. The intent is to allow for easement negotiation which would avoid property conflict and not require revisiting the application. There may be locations which will require or necessitate the use of roadway ROW.

3. January 5, 2018: Thornton submits its application for 1041 approval of water conveyance pipelines and a pump house. The application is initially scheduled for hearing with the Larimer County Planning Commission in February and March 2018. However, the hearings are postponed to allow additional information requested by the County to be developed and submitted by Thornton. That additional information specifically relates to the proposed alignment in Douglas Road.

4. May 16, 2018: The Planning Commission holds a public hearing to consider Thornton's application. At the conclusion of the hearing the Commission votes 4-2 to deny the application. The Commission's decision and a summary of the information presented was set out in the Commission's minutes.

5. July 8, and 23, and August 1, 2018: The Board holds public hearings to consider Thornton's application. Thornton identifies its proposed route and/or corridor for its pipelines and location of a pump station. The proposed locations are shown on Exhibit C (referred to as the Douglas Road Route). Thornton testifies why the proposed project meets the applicable review criteria. Many area residents appear and testify in opposition to the project. Residents, including owners of properties south of Douglas Road, assert Thornton had no to minimal outreach or notice to them and they had little or no opportunity for input into the project in advance of the hearings. Citizens further testify that negative impacts from the project, including impacts of construction on area properties and landscaping, limitations on the future use of property, restricted and limited access for them and for emergency and school buses, and unwanted and unneeded improvements to Douglas Road are untenable. Citizens opine that the project fails to meet the County's 1041 review standards, including standards 2, 4, 8 and 9.

The Board makes initial verbal findings that Thornton has inadequately engaged the public in an effort to reach a preferred alternative and address adverse impacts from the project, that the Douglas Road route brings with it many adverse impacts as described by citizens, and that insufficient information has been presented as to alternative routes (including routes initially presented to the Thornton City Council), the pros and cons of other routes and why the other routes are not viable. In lieu of denying Thornton's application, the Board elects to continue the hearing to December 17, 2018 and directs Thornton to engage in a public outreach process to better address area residents' concerns and to present alternative project routes at the December hearing.

6. August through November 2018: A working group (Group) is formed to examine the project. A public engagement webpage (larimerwaterprojects.org) is also created and two

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public meetings are held. The Group reviews possible alignments. Matters discussed by the Group include alternative alignments for the pipelines. The Group also questions the legal and practical feasibility of using the Poudre River and canals for conveyance of the water. About half of the Group advocate for an alignment that would require Thornton to use the Poudre River in lieu of pipes to convey the water for a portion of the project.

7. December 10, 2018: Thornton submits Supplement 3 to the Application. The route for the pipeline is now proposed to be from Reservoir 4 to a pump station north of Douglas Road, then north to the southeast corner of the Braidwood community following optional routes along the west shore of Reservoir #4 or Lake Vista Drive to Travis Road, then north to the dam for Reservoir 3, then east to the east shoreline of Reservoir 3 to the north edge of the Eagle Lake subdivision, then east to Highway 1, then south east to CR 56 then following the ROW for CR 56 to I-25. The proposed location is shown on Exhibit D (referred to as the County Road (CR) 56 Route). Thornton states that this route is a 500 feet wide corridor anywhere within which the pipes will potentially be laid. The location for the pumphouse remains the same.

8. December 17, 2018, January 28, 2019, February 4, 2019 and February 11, 2019: The Board holds public hearings to consider Thornton's Supplemental Application. (The Board also considers Thornton's additional supplemental materials entitled "City of Thornton Rebuttal Statement(s)). After considering all information provided by Thornton and the public, the Board votes to deny Thornton's application.

IV. Standards of Review and Findings

1. In order to approve a 1041 application, the Board must find that Thornton has met each of the twelve review criteria set out in LUC 14:10 (B) and (D)(1-12). The Board finds that Thornton has or has not met each of the twelve review criteria as follows:

i. *The proposal is consistent with the master plan and applicable intergovernmental agreements affecting land use and development.*

Not met.

The Larimer County Master Plan (Master Plan) is a policy document that establishes goals, visions and a long-range framework for the unincorporated area of Larimer County. The Master Plan identifies as one of its missions: "Larimer County is developing the Partnership Land Use System to maintain and enhance our county's quality of life and to be fundamentally fair to all our citizens and to respect their individual rights.

The Master Plan has many themes and principles implicated by Thornton's application, including:

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a. Natural and cultural resources shall be identified, conserved and protected, and long-term cumulative impacts shall be monitored;

b. Agriculture will remain a viable long-term segment of Larimer County's economic, cultural and social fabric;

c. Logical settlement patterns that reflect the existing character of Larimer County and protect existing neighborhoods will be supported;

d. The planning and development review process shall be fair, open and predictable, and meet the needs and interest of the community without infringing on the rights of individuals.

e. Agriculture shall be recognized as an important economic, cultural and environmental resource value-provider for the County;

f. Agricultural land and water in Larimer County shall be protected through incentives, voluntary participation and measures to strengthen viable agriculture.

Thornton's proposed pipeline route is a yet-to-be-determined location within a 500 foot to ¼ mile wide corridor. The Board's ability to assess specific impacts to private property along the route is unreasonably limited because of the breadth of the corridor. Testimony was provided about the pipeline potentially splitting a private property in two, going through front or backyards, and traversing through significant amounts of private property.

The CR 56 route will have "[m]ost of the alignment . . . constructed in private easements . . . ." Unless an owner is willing to sell his/her private property to Thornton, Thornton will be required to acquire the property by eminent domain—a process generally disfavored by property owners.

Within these private easements, Thornton has noted that property owners will not be permitted to construct permanent structures or other improvements or install landscaping with deep roots that may interfere with the pipeline and its future maintenance. Testimony from private property owners along potential pipeline routes expressed concern about short-term construction impacts in addition to long-term impacts from maintenance crews on private property. One citizen noted concern about her children being exposed to strangers and equipment on her private property.

Thornton's water currently flows through the Water Supply and Storage Company (WSSC) canal system and is used to irrigate farms in Larimer County. Thornton owns approximately 47% of the water shares in the WSSC. Much of the remaining water in WSSC is also owned by municipalities, and WSSC expects that most of the water will be removed from farms in Larimer County in the future. While the fate of Thornton's application does not rest on

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how other municipalities use their water in the future, the Board finds it important to have information about and consider the cumulative impacts of irrigated farmland turning to dryland. A significant reduction in the amount of irrigated farmland is concerning to the Board and conflicts with the goals of the Master Plan. The long-term viability of Larimer County's agricultural communities, and the economic, cultural and environmental impacts of drying up irrigated farmland are valid considerations under the Master Plan. As these impacts are not adequately described or analyzed by Thornton, the Board cannot conclude that Thornton's proposal is consistent with the Master Plan.

ii *The applicant has presented reasonable siting and design alternatives or explained why no reasonable alternatives are available.*

Not met.

Prior to applying for a 1041 permit from Larimer County, Thornton considered and presented to its council, a number of possible alternatives for conveyance of its water. Several of the pipeline routes had water being withdrawn from Reservoir 4 and proceeding east to the County line, then south through several corridors east and west of I-25, as well as the possibility of withdrawing water from other points along the Cache La Poudre River including as far as Windsor.

In its initial application materials, Thornton discussed its broad analysis of alternatives to convey the water to the City. These were then refined based on conversations with all of the affected jurisdictions to three generalized corridors all which commenced at Water Supply and Storage Reservoir 4 (WSS 4) thence east to the Weld Larimer County line thence south following alignments proceeding south to the City. Thornton defined three distinct corridors to review. Thornton examined the three alternatives from which the Douglas Road Route was chosen and presented to the Board. The Board was not convinced that this Route was the best option. Douglas Road is a high traffic generator. For some adjacent residential subdivisions, Douglas Road serves as the only access out of the subdivision. The Thornton project would take approximately 2-5 years to complete during which traffic would have to be diverted causing considerable inconvenience to area residents. There were no guarantees that the pipeline construction would remain within the right-of-way. Additionally, there would be safety and emergency access conflicts during construction. Area residents opposed the resulting improvements to Douglas Road (widening it) which they believed would increase traffic and speeds.

Thornton's Supplemental Application was based on the CR 56 Route. This Route was problematic in its imprecision, identifying a 500-foot corridor in some places where the pipeline might ultimately be installed. The corridor of 500' to ¼ mile in width prevents meaningful evaluation of the two alternatives presented. Impacts can vary

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significantly depending where within this corridor the pipeline is actually located, and at a minimum Thornton should identify where the 50' wide permanent pipeline easement will be located. Without this level of specificity, the siting alternatives proposed by Thornton are not reasonable and cannot be sufficiently evaluated by the Board.

With respect to design, Thornton identified the use of tunneling rather than open-ditch construction as the primary method of installation and proposes to bore under certain sensitive areas. Some alternative design options were mentioned, such as lake taps to avoid private property and other construction disruptions, but were not presented as design alternatives.

The Board finds Thornton failed to present reasonable siting alternatives. Thornton self-selected two routes and then summarily concluded other possible alternatives (including those presented to the Thornton City Council) were not feasible. At the August 1, 2018 hearing, the Board specifically mentioned interest in the Shields Street alternative. Options vetted and rejected by Thornton have positive attributes which, in combination with the two alternatives presented, could lead to a route that satisfies the approval criteria by better mitigating adverse impacts and ensuring the orderly and efficient development of Thornton's water pipeline.

iii. The proposal conforms with adopted county standards, review criteria and mitigation requirements concerning environmental impacts, including but not limited to those contained in Section 8 of this Code.

Not met.

8.2. Wetland Areas:
Thornton proposes to bore under all designated wetland areas. Wetland areas that are affected by the proposal are non-jurisdictional. A Nationwide Permit from the Army Corps of Engineers may be required for the City to confirm that no jurisdictional wetland areas are affected by construction.

8.3. Hazard Areas:
There are hazard areas, flood plains on the Poudre and Big Thompson Rivers and Boxelder Creek identified along the preferred route. The City of Thornton proposes to bore under these river corridors.

8.4. Wildlife:
Thornton's environmental analysis for the preferred route identifies that there were possible conflicts with wildlife both listed and other species of concern, including disruption of nesting birds. The Board is not convinced that mitigation, including avoidance, seasonal limitations or prohibitions on activities is adequate.

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8.8. Irrigation Facilities:
There are multiple irrigation ditches which will need to be bored or cut with this proposal. Thornton may be required to obtain agreements or licenses associated with this activity. The Board would seek alternative alignments that eliminate or reduce impacts on irrigation ditches.

8.11. Air Quality Standards:
Given the potential disturbed area of this request, an Air Quality permit will be necessary which permitting will require compliance with the standards.

8.12. Water Quality Management Standards:
Thornton will need to obtain a storm water quality permit for the construction impacts.

iv. The proposal will not have a significant adverse affect on or will adequately mitigate significant adverse affects on the land on which the proposal is situated and on lands adjacent to the proposal.

Not Met.

Portions of Thornton's proposed routes are in areas with significant residential development. There will be adverse impacts to thirty-six properties on the east side of Reservoirs 3 and 4. There will be adverse impacts on eight homes and private properties along County Road 56 and eight homes and private property in Eagle Lake. There will be typical construction impacts to vegetation in the project area or adjacent to the pipeline. There will also be impacts on groundwater and drainage in the area of any bore or cut. The pipelines will not be able to be installed solely within County public right-of-way. This will necessitate acquisition of private property which may result in eminent domain proceedings. Neighbors are unclear as to whether Thornton will acquire their property as an easement or as a fee interest. There are rattlesnakes in the area of the proposed CR 56 Route. These snakes will likely be driven into adjacent subdivisions as a result of construction. Noise and visual impacts from the pumphouse are of concern. Well established trees exist along the east side of Reservoir 4. These trees will be lost or their health threatened as a result of construction. These impacts will significantly impair residents' quality of life and use of their properties.

The Douglas Road route would require an unreasonably lengthy construction cycle, up to four years, which neighbors of the route testified would cause significant disruption to their homes and daily lives. Traffic detours along this route would funnel additional traffic to some intersections that are already overburdened. The added detour traffic would further degrade the function of these intersections to an unacceptable level.

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The CR 56 route would have less impact on traffic because current volumes are much lower than Douglas Road. However, the CR 56 route will have a greater detrimental impact on private property because less public right of way is available. Also, as the pipeline moves north from Reservoir No. 4, the Braidwood Neighborhood and Eagle Lake neighborhoods will suffer significant disruption to private property. Further along this route, a private property will be bisected by the pipeline between the house and the barn. The sheer size and uncertainty of the proposed 500' to ¼ mile wide corridor prevents the Board and private property owners from reasonably considering all impacts. This uncertainty is, in itself, a significant impact of this project.

The particular impacts on the Braidwood and Eagle Lake neighborhoods could potentially be mitigated through use of a lake tap to tunnel the pipeline under certain reservoirs, but Thornton did not propose this as an available mitigation option. Robin Dornfest, an engineer with Lithos Engineering, was hired as a consultant to Larimer County and concluded lake taps, while more expensive and having certain risks, are feasible for Thornton's project and are increasingly more common for water conveyance projects in Colorado and across the United States.

Thornton's application addresses a single 48" water pipeline, however, two additional pipelines are part of Thornton's overall project plan. Thornton acknowledges the full extent of its project, which includes three phases with one pipeline per phase. Thornton believes its current 48" pipeline, phase I, is all that is relevant now. The problem with this approach is it does not account for cumulative impacts of the project as a whole. Thornton has a specific plan that includes three water pipelines in Larimer County that will collectively operate as a single water supply system. A purpose of Larimer County's 1041 permit process is to consider the broad impacts of public projects, and this purpose is also reflected in 1041 state statutes. By presenting phase I in isolation, Thornton deprives the Board and public of the opportunity to consider cumulative impacts and the effectiveness of mitigation. A route that may be appropriate for a single pipeline may be inappropriate for additional pipelines. If this information is not considered now, future pipelines may not be able to co-locate which would result in the disorderly development of Thornton's project and compound the impacts on Larimer County through multiple different pipelines in separate locations. An important factor in Thornton preferring the CR 56 route over the previously preferred Douglas Road route is that Douglas Road may be insufficient for co-location of multiple pipelines. This does not mean Douglas Road could not be a viable route, but consideration of the adverse impacts and a balancing of those impacts with benefits must be performed.

v. *The proposal will not adversely affect any sites and structures listed on the State or National Registers of Historic Places.*

Met.

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The environmental analysis includes a review of all known and designated historic structures or places within the proposed alignments. There are not historic structures known to exist along or in the alignment of this pipeline that would be negatively affected by the construction of these facilities.

vi. *The proposal will not negatively impact public health and safety.*

Not Met.

Residents adjacent to Douglas Road spoke of safety concerns related to limited access from their neighborhoods which could delay emergency services. Other residents spoke of concerns arising from strangers on their property during both initial construction and future monitoring.

vii. *The proposal will not be subject to significant risk from natural hazards including floods, wildfire or geologic hazards.*

Met.

The preferred alignment has mitigated any risks principally by avoidance, or there are no risk factors associated with the preferred alignment.

viii. *Adequate public facilities and services are available for the proposal or will be provided by the applicant, and the proposal will not have a significant adverse effect on the capability of local government to provide services or exceed the capacity of service delivery systems.*

Met.

Thornton presented evidence showing it has the physical and financial capability to carry out and complete the project. The project will not impair Larimer County's ability to provide needed governmental services.

ix. *The applicant will mitigate any construction impacts to county roads, bridges and related facilities. Construction access will be re-graded and re-vegetated to minimize environmental impacts.*

Met.

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Thornton has represented it will mitigate construction impacts to County roads, bridges and related facilities and that construction access will be re-graded and re-vegetated to minimize environmental impacts. Notwithstanding these representations, construction will significantly inconvenience and disrupt citizens.

Met.

x. *The benefits of the proposed development outweigh the losses of any natural resources or reduction of productivity of agricultural lands as a result of the proposed development.*

Not met.

Thornton's proposal will cause significant reduction in the productivity of agricultural lands within Larimer County. The benefits of Thornton's proposal are also significant, as clean and sufficient water supply is of critical importance. At this time, the Board finds the significant detrimental impact to agricultural productivity in Larimer County outweighs the benefits of Thornton's current proposal. Additional mitigation may help Thornton satisfy this criterion, but the current proposal falls short.

As part of Thornton's acquisition of water rights in Larimer County in the 1980's, Thornton bought approximately 21,000 agricultural acres on which its water rights were historically used for irrigation. Over time, Thornton has dried up some of the irrigated acreage to meet the needs of its growing population, leaving approximately 53% of its acreage in irrigated agriculture production in 2018. Thornton's proposal is designed to convey more of Thornton's water from these remaining irrigated acres to residents in Thornton, resulting in the irrigated farms being dried up and converting to dryland grasses. The shift of irrigated farmland to dryland grass will significantly reduce the agricultural productivity of those lands and will, unless sufficiently mitigated, jeopardize the long-term viability of the agricultural segment of Larimer County from an economic, cultural and social perspective.

Thornton's proposal considers any agricultural impacts to be temporary- the Board disagrees. The conversion of irrigated agricultural land to dryland grasses is not temporary and the resulting reduction in productivity of such lands is lasting. It appears Thornton's focus has been on physical impacts on agricultural lands caused by construction activity, but the Board's considerations go beyond those temporary impacts.

xi. *The proposal demonstrates a reasonable balance between the costs to the applicant to mitigate significant adverse affects and the benefits achieved by such mitigation.*

Not met.

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Thornton has stated that certain functions related to other alternatives will be cost prohibitive and/or result in degradation in the quality of water. The Board is not convinced that the costs associated with an improved alignment or associated adverse impacts with such alignment will outweigh the benefits to Thornton of receiving water of sufficient quality and quantity. Thornton is currently treating water downstream of the Denver Metro area from the Platte River by ultra filtration, a 50-million gallon/day plant (the Wes Brown Water Treatment Plant. The Board finds there would be less degradation of the water through Fort Collins than through the Denver metro area.

The Board further finds that other alternative routes may result in fewer adverse impacts to the County which would reduce or equal the costs of mitigating impacts to the CR 56 Route or Douglas Road Route.

xii. *The recommendations of staff and referral agencies have been addressed to the satisfaction of the county commissioners.*

Met.

In large part the agency referral comments are directed to the need for Thornton to obtain additional permits, permissions and coordination. There is no evidence that Thornton will not seek all necessary permits and permissions and coordinate as needed at the relevant time.

2. The Board is cognizant that it may not deny Thornton the use and benefit of its water rights and that the Board's authority is limited to approving the siting and development of pipelines. The Board is not yet convinced, however, that the two proposed routes for the pipelines and the location for the pump house are the only and/or best and least impactful and that other routes are not viable.

V. Resolution

WHEREAS, the Board of County Commissioners has made its findings upon the petition and upon the recommendation of the Larimer County Planning Commission, which findings precede this Resolution, and by reference are incorporated herein and made a part hereof; and

WHEREAS, the Board of County Commissioners has carefully considered the petition, evidence and testimony presented to it, and has given the same such weight as it in its discretion deems proper, and is now fully advised in the premises;

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Findings and Resolution
Thornton Water Project
1041 Permit Denial
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NOW, THEREFORE, BE IT RESOLVED that the petition of the City of Thornton for approval of a 1041 permit to allow a 26 mile 48-inch diameter waterline, pumping facility and other appurtenant facilities for the Douglas Road Route and the County Road 56 Route be and the same hereby is denied.

Commissioners Johnson, Donnelly and Kefalas voted in favor of the Findings and Resolution, and the same were duly adopted.

DATED this 19th day of March, 2019.

BOARD OF COMMISSIONERS OF
LARIMER COUNTY, COLORADO

By: _____
Chair

(SEAL)

ATTEST:

_____
Deputy Clerk

LARIMER COUNTY CLERK SEAL COLORADO

DATE: 3/14/19
APPROVED AS TO FORM:

_____
COUNTY ATTORNEY

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NOTICE OF PUBLIC HEARING

TO ALL INTERESTED PERSONS:

Please take notice that on Monday, July 9, 2018, at 6:30 pm, the Larimer County Board of County Commissioners will hold a public hearing in the Hearing Room of the Larimer County Courthouse Offices, 200 West Oak, Fort Collins, Colorado, concerning the following:

Applicant: City of Thornton Water Project

Request: To locate and construct a raw water pipeline and appurtenant facilities including pump stations and storage tanks. The pipeline commences north of Fort Collins at WS&S reservoir #4 following along the alignment of Douglas Road to CR 9/Turnberry Rd. thence north to CR 56 thence east to the County line to a water tank thence south along the county line to the Weld County through Timnath, Windsor and Johnstown.

Property Description: A pipeline route commencing at Water Storage and Supply reservoir # 4 proceeding east along the Douglas Road alignment to CR 9 north to CR 56 East to the Larimer County Line thence south along the County line to the Weld County line at Johnstown.

File Name/Number: Thornton Water Project 1041, 18-ZONE2305

The File and relevant documents may be examined in the Office of Planning Services of the County of Larimer at the Larimer County Courthouse, Fort Collins, Colorado during regular business hours.

EXHIBIT "A"

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14.1. - PURPOSE AND INTENT

The purpose of this section is to facilitate the identification, designation and regulation of areas or activities of state interest consistent with applicable statutory requirements.

(Res. No. 11182008R012, Exh. A, 11-18-2008)

14.2. - APPLICABILITY

These regulations shall apply to all proceedings concerning the designation and regulation of any development in any area of state interest or any activity of state interest which has been or may hereafter be designated by the board of county commissioners, whether located on public or private land.

(Res. No. 11182008R012, Exh. A, 11-18-2008)

14.3. - DESIGNATION PROCESS FOR MATTERS OF STATE INTEREST

A. The board of county commissioners may in its discretion designate and adopt regulations for the administration of any matter of state interest.

B. *Public hearing required.*

1. The board of county commissioners shall hold a public hearing before designating any matter of state interest and adopting regulations for the administration thereof. No less than 30 calendar days but no more than 60 calendar days before the designation hearing, the board shall publish notice in a newspaper of general circulation in the county.
2. The planning commission shall hold a hearing and provide a recommendation to the board on the proposed designation prior to the board hearing. Notice of any hearing before the planning commission shall be published no less than 14 days before the planning commission hearing date in a newspaper of general circulation in the county.

C. *Criteria for designations.* At the public hearings(s), the planning commission and board of county commissioners shall consider such evidence as they deem appropriate, including, but not necessarily limited to testimony and documents addressing the following considerations.

1. The intensity of current and foreseeable development pressures.
2. The reasons why the particular area or activity is of state interest, the dangers that would result from uncontrolled development of any such area or uncontrolled conduct of such activity, and the advantages of development of such area or conduct of such activity in a coordinated manner.
3. Applicable policies of the Larimer County Master Plan and any duly adopted intergovernmental agreements affected by the area or activity under consideration.
4. The extent to which other governmental entities regulate the area or activity proposed to be designated.
5. The testimony, evidence and documents taken and admitted at the public hearing.
6. The recommendations of staff and the planning commission.

D. *Adoption of designation and regulations.*

1. At the conclusion of the hearing, or within 30 days thereafter, the board may, by resolution, adopt, adopt with modification, or reject the proposed designation and accompanying guidelines or regulations.
2. Each designation order adopted by the board shall, at a minimum:
   a. Specify the activity or area of state interest to be designated;
   b. Specify the boundaries of the designated area of state interest, if applicable;

EXHIBIT "B"

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c. State reasons why the designation is appropriate in light of the review criteria considered at the public hear above section; and

d. Specify the regulations applicable to the designated matter of state interest.

(Res. No. 11182008R012, Exh. A, 11-18-2008)

14.4. - DESIGNATED MATTERS OF STATE INTEREST

The board of county commissioners, having conducted a public hearing consistent with the requirements of Section 24.65.1-404 C.R.S. and having considered the intensity of current and foreseeable pressures on and within Larimer County; the dangers that would result from uncontrolled conduct of such activity or development in an area of state interest; and the advantages of conduct of such activity in a coordinated manner, does hereby find and declare the following to be matters of state interest. A 1041 permit shall be required prior to any of the following activities, unless specifically exempted.

A. Siting and development of any electrical power plant with a generating capacity of 50 megawatts or more, or any addition to an existing power plant which increases the existing design capacity by 50 megawatts or more. This designation shall not include use of temporary generators at an existing electrical power plant in an emergency situation.

B. Conversion of an existing electrical power plant to a new type of fuel or energy, but not including a change from coal to natural gas, and also not including a change in start-up fuel.

C. Siting and development of a nuclear power plant of any size, or any addition thereto.

D. Siting and development of a wind power plant in which there are more than three wind towers or where any wind generator tower exceeds a hub height of 80 feet, or any addition thereto increasing the existing design capacity of the facility by ten percent or more or expanding the area of the plant.

E. Siting of electric transmission lines and appurtenant facilities that are designed to transmit electrical voltages of 69,000 volts or greater, whether erected above ground or placed underground.

F. Any existing transmission line upgrade that involves expanding an easement or right-of-way or increases the height of transmission structures by more than ten feet.

G. Siting of an electrical substation or transition site designed to provide switching, voltage transformation or voltage control required for the transmission of electricity at 69,000 volts or greater.

H. Siting and development of new pipelines designed for transmission of natural gas or other petroleum derivatives of ten inch diameter or larger. This designation shall include appurtenant facilities such as compressor stations, pipe valves and other mechanical controls that are part of the pipeline project. This designation shall not include the maintenance, repair, adjustment or removal of an existing pipeline or the relocation of an existing pipeline within the same easement or right-of-way. The designation shall also not include the addition, replacement, expansion or maintenance of appurtenant facilities on existing pipelines.

I. Siting and development of new or expanded storage facilities of 50,000 cubic feet or more of natural gas or 35,000 barrels or more of petroleum derivatives.

J. Siting and development of new or extended domestic water or sewer transmission lines which are contained within new permanent easements greater than 30 feet or within new permanent easements greater than 20 feet that are adjacent to existing easements. Domestic water transmission lines include those used to transport both raw and treated water. This designation shall not include the maintenance, repair, adjustment or removal of an existing pipeline or the relocation, replacement or enlargement of an existing pipeline within the same easement or right-of-way, provided no additional permanent property acquisitions are required. The designation shall also not include the addition, replacement, expansion or maintenance of appurtenant facilities on existing pipelines.

K. Site selection and construction of a new water storage reservoir or expansion of an existing water storage

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reservoir resulting in a surface area at high water line in excess of 50 acres, natural or manmade, used for the storage, regulation and/or control of water for human consumption or domestic use and excluding a water storage reservoir used exclusively for irrigation. A water storage reservoir shall also include all appurtenant uses, structures and facilities, roads, parks, parking, trails and other uses which are developed as part of the water storage reservoir. This designation shall not include the maintenance and operation of irrigation ditches, canals or laterals nor shall it include the normal maintenance and operation of a reservoir solely used for irrigation or a reservoir serving both irrigation and domestic customers.

L. Siting and development of any solar energy power plant, including solar energy collectors, power generation facilities, facilities for storing and transforming energy and other appurtenant facilities, that together disturb an area greater than five acres, or any addition thereto that expands the disturbed area. This designation shall not include roof mounted solar systems located on existing permitted principal and accessory buildings.

(Res. No. 11182008R012, Exh. A, 11-18-2008; Res. No. 08182009R001, Exh. A, 8-18-2009; Res. No. 01192010R004, 12-21-2009; Res. No. 01192010R00S, 1-4-2010; Res. No. 08042015R001, § 1, 8-4-2015)

14.5. - EXEMPT DEVELOPMENT ACTIVITIES

A. *Statutory exemptions.* These regulations shall not apply to any development in an area of state interest or any activity of state interest if any one of the following is true as of May 17, 1974.
   1. The specific development or activity was covered by a current building permit issued by the county.
   2. The specific development or activity was directly approved by the electorate of the state or the county, provided that approval by the electorate of any bond issue by itself shall not be construed as approval of the specific development or activity.
   3. The specific development or activity is on land which has been finally approved by the county, with or without conditions, for planned unit development or land use similar to a planned unit development.
   4. The specific development or activity is on land which was either zoned or rezoned in response to an application which contemplated the specific development or activity.
   5. The specific development or activity is on land for which a development plan has been conditionally or finally approved by the county.

B. *Specific exemptions.* The regulatory provisions of this section shall not apply to any of the following.
   1. Any activity which, as of the date of designation as a matter of state interest, meets one of the following criteria.
      a. The activity is part of a final discretionary county land use approval and protected by a site specific development plan or agreement whose vesting period has not expired.
      b. The activity has a complete application filed and in process for a discretionary county land use approval, provided the applicant (if a public entity) commits to being bound by any conditions of a final county approval or by denial of the application.
      c. The specific activity has been acted upon by the planning commission as a location and extent application.
   2. An interstate natural gas utility regulated by the Federal Energy Regulatory Commission or its successor, provided the following requirements and procedures are complied with by the utility whenever site selection and construction of major facilities within Larimer County are proposed:
      a. Copies of all materials (i.e., environmental impact statement, application for certification of public convenience and necessity) filed with a federal and/or state regulatory agency shall also be filed with the county commissioners within five days;

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b. Written notice of all scheduled public proceedings before the federal and/or state regulatory agency shall b commissioners not less than 30 days prior to the proceedings, provided further, however, that if the public than 30 days' notice it shall give written notice to the county commissioners within five working days after it

3. A reservoir used exclusively for irrigation is not considered to be a water storage reservoir.
4. An entity that has an approved intergovernmental agreement with the county specific to the project in question, as provided for in Section 14.8 below.

(Res. No. 11182008R012, Exh. A, 11-18-2008; Res. No. 08182009R001, Exh. A, 8-18-2009; Res. No. 01192010R004, 12-21-2009; Res. No. 08042015R001, § 2, 8-4-2015)

14.6. - RELATIONSHIP TO OTHER COUNTY, STATE AND FEDERAL REQUIREMENTS

A. If a 1041 permit is required under this section 14, other sections of the Code shall not apply unless specifically stated in this section 14, or unless applied by the county commissioners as conditions of approval. If an appeal to the requirement for obtaining a 1041 permit is granted pursuant to section 14.7 below, other requirements of the Land Use Code shall apply.

B. Review or approval of a project by a federal or state agency does not obviate, and will not substitute for, the need to obtain a 1041 permit for that project under this section.

C. These regulations shall not be applied to create an operational conflict with any state or federal laws or regulations.
   1. The applicant may request that the county application and review process be coordinated with the applicable state or federal agency review process
   2. To the extent practicable and appropriate, the county may coordinate its review and approval of the application, including the terms and conditions of such approval, with that of other agencies.

(Res. No. 11182008R012, Exh. A, 11-18-2008)

14.7. - APPEAL OF 1041 PERMIT REQUIREMENT

An applicant may appeal the requirement for obtaining a 1041 permit.

A. Appeal process.
   1. Initiation of appeal. A written application for appeal must be submitted to the planning director on a form provided by the planning department. An application fee established by the county commissioners must be paid when the appeal is submitted.
   2. Contents of appeal. The appeal application must include a description of the scope of the proposed activity and evidence that supports the appeal including evidence that demonstrates how section 14.7.B. review criteria are met.
   3. Scheduling. Upon receipt of the appeal, the planning director will schedule the appeal on the next available agenda of the county commissioners, no later than 60 days after the date on which a properly completed application is filed.
   4. Notice. Notice shall be consistent with the requirements of section 12.3, notice of public hearing. Notice of the time and place of the appeal hearing must be published in a newspaper of general circulation at least 14 days before the hearing date.
   5. Action by the county commissioners.
      a. At the appeal hearing the county commissioners will take relevant evidence and testimony from the person who filed the appeal, county staff and any interested party.
      b. The applicant shall have the burden of proving that granting the appeal is consistent with the intent and purpose of this section 14.

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c. The county commissioners may refer an appeal to the planning commission for a recommendation. The decision to refer an appeal to the planning commission will be made by the county commissioners within 14 days of the date the appeal was submitted.

d. The decision of the county commissioners shall be final.

B. The county commissioners shall consider each of the following review criteria and make findings pertaining to each one which, in their discretion, applies to the appeal.

1. Approval of the appeal will not subvert the purpose or intent of this section 14.

2. The development or activity has received approval through a state or federal permitting process which has utilized review criteria substantially the same as those contained in this regulation, and which has afforded a similar or greater amount of input by affected citizens and property owners of Larimer County.

3. In the case of siting and development of a new domestic water or sewer transmission pipeline, evidence has been provided that:

a. The proposed pipeline is located entirely on property owned by the entity proposing the activity and/or within easements or rights-of-way that have been acquired from willing sellers, or

b. The proposed pipeline is located entirely within a special district organized under C.R.S. Title 32, or a public or local improvement district organized under C.R.S. 30-20-Parts 5 and 6, and

(1) The pipeline is intended to provide water or sewer service to properties located within that district in Larimer County; and

(2) Written notice of all scheduled public meetings of the district concerning the siting and development of the new pipeline has been given to all property owners who may be directly affected by the activity, and to the county commissioners, not less than 14 days prior to the meeting.

(Res. No. 11182008R012, Exh. A, 11-18-2008; Res. No. 01192010R004, 12-21-2009)

14.8. - INTERGOVERNMENTAL AGREEMENTS

A. Upon request of the State of Colorado or a political subdivision of the state proposing to engage in an area or activity of state interest, the requirements of this section 14 may be met by the approval of an intergovernmental agreement between the county and such applicant. The county commissioners may, but shall be under no obligation to do so, approve such an intergovernmental agreement in lieu of a permit application and review as provided by this section. In the event such an agreement is approved by the county commissioners, no 1041 permit application to conduct the activity or area of state interest shall be required, provided that all of the following conditions are met.

1. The state or political subdivision applicant and the county must both be authorized to enter into such an agreement.

2. The purpose and intent of this section 14 must be satisfied by the terms of the agreement.

3. A public hearing must be conducted by the county commissioners. Notice of the hearing must be published once in a newspaper of general circulation in Larimer County not less than 30 nor more than 60 days before the date set for the hearing. Prior to the hearing, the county commissioners shall approve the form of any proposed intergovernmental agreement, subject, however, to final approval of the agreement at the conclusion of or subsequent to the public hearing and based upon the evidence presented there. The public hearing shall be for the purpose of taking comment upon the proposed intergovernmental agreement, the provisions of which have been determined to be acceptable to the applicant and to the county.

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4. Both the county commissioners and the state or the governing body of the political subdivision applicant must ap agreement in the manner required of each of them by the state constitution, statutes and any applicable charter, resolution.
5. Memorandum of understanding (MOU). The county and the applicant shall execute a memorandum of understanding, prior to engaging in the process of forming an intergovernmental agreement, the purpose of which is:
   a. To acknowledge the intent of the parties to begin joint discussions which may result in the approval of an intergovernmental agreement.
   b. Establish the timeframe for those discussions and any significant milestones agreed upon.
   c. Establish the timeframe for review, public input and public hearing before the county commissioners.

B. Exercise of the provisions of this section by the state or an applicant that is a political subdivision of the state shall not prevent that entity from electing at any time to proceed under the permit provisions of this regulation. Additionally, any entity which has previously proceeded under the permit provisions of this regulation may at any time elect to proceed instead to seek the establishment of an agreement.

(Res. No. 11182008R012, Exh. A, 11-18-2008; Res. No. 08042015R001, § 3, 8-4-2015)

14.9. - 1041 PERMIT APPLICATION AND REVIEW PROCESS

A. No person may engage in development in a designated area of state interest or conduct a designated activity of state interest without first obtaining a 1041 permit, unless the county commissioners have granted an appeal to the requirement for a 1041 permit or have adopted an intergovernmental agreement per section 14.8 such that a permit is not required.
   1. If a development or activity subject to these regulations is proposed as an integral part of a land division process, the applicant shall comply with this section prior to obtaining final plat approval.
   2. No building permit shall be issued by the county for an activity or development subject to this section without the applicant having first obtained a 1041 permit, unless the county commissioners have granted an appeal to the requirement for a 1041 permit or have adopted an intergovernmental agreement per section 14.8 such that a permit is not required.
   3. 1041 permits issued under this section shall not be considered to be a site specific development plan and no statutory vested rights shall inure to such permit. A 1041 permit may specify a period of time for which the permit is valid or state additional criteria related to future validity of the permit.

B. *General process outline.* The following is a general outline of the steps required for any permit decision under this section. More specific information regarding these referenced steps is contained in section 12 common procedures for development review and in the technical supplement to the Land Use Code.
   1. Pre-application conference.
   2. Complete and sufficient application received.
   3. Referral to affected agencies.
   4. Public hearing before the planning commission and county commissioners.
   5. Post-approval requirements.

C. *Notice of 1041 permit hearing.* Notice shall be consistent with the requirements of section 12.3, notice of public hearing.
   1. Not later than 30 days after receipt of a completed application for a 1041 permit, the planning director shall set and publish notice of the date, time and place for a hearing before the county commissioners. The notice shall be published once in a newspaper of general circulation in Larimer County, not less than 30 nor more

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than 60 days before the date set for the hearing.

a. The planning director shall be responsible for the determination that a complete and sufficient application has been received.

b. Not later than 60 days after receipt of the application, the planning director shall provide a written description of any application materials that are determined to be not complete and the additional materials that are necessary before application processing may begin.

2. Within the time constraints above, the planning director shall schedule the application for a hearing before the planning commission. Notice of the planning commission hearing shall be published in a newspaper of general circulation for the county at least 14 days before the hearing date.

3. A notice will be mailed to property owners in the vicinity of the proposal at least 14 days prior to the hearing(s) according to the procedures and requirements of section 12.3.3 mailed notice.

4. C.R.S. §§ 30-28-133(10) and 24-65.5-103(1) require an applicant for development to notify all owners and lessees of a mineral interest on the subject property of the pending application. The applicant must submit, to the planning department, a certification of compliance with this notice requirement, prior to the initial public hearing for a 1041 permit, except for those types of development applications specifically excluded below. Failure to submit the required certification of notice will result in the public hearing being rescheduled to a later date. According to C.R.S. §§ 24-65.5-102(2) an application for development does not include applications with respect to electric lines, crude oil or natural gas pipelines, steam pipelines, chilled and other water pipelines, or appurtenances to said lines or pipelines; therefore notification of mineral interest owners and lessees is not required for those activities.

D. Any application for a 1041 permit which relates to the location, construction or improvements of a major electrical or natural gas facility as contemplated by 29-20-108 C.R.S. as amended shall be subject to the terms of that statute. In the event of an inconsistency between the statute and these regulations, the statute shall control.

E. The planning director may, when necessary, decide that additional expertise is needed to review a project, according to the procedure detailed in Section 8.01.A of this Code.

(Res. No. 11182008R012, Exh. A, 11-18-2008; Res. No. 01192010R004, 12-21-2009)

14.10. - GENERAL REQUIREMENTS FOR APPROVAL OF A 1041 PERMIT APPLICATION

A. The applicant must submit a complete and sufficient application that is consistent with the submittal requirements that are stated at the pre-application conference.

B. A 1041 permit application may be approved only when the applicant has satisfactorily demonstrated that the proposal, including all mitigation measures proposed by the applicant, complies with all of the applicable criteria set forth in this section 14. If the proposal does not comply with all the applicable criteria, the permit shall be denied, unless the county commissioners determine that reasonable conditions can be imposed on the permit which will enable the permit to comply with the criteria.

C. If the county commissioners determine at the public hearing that sufficient information has not been provided to allow it to determine if the applicable criteria have been met, the board may continue the hearing until the specified additional information has been received. The commissioners shall adopt a written decision on a 1041 permit application within 90 days after the completion of the permit hearing. The 1041 permit will be in the form of a findings and resolution signed by the board of county commissioners. The effective date shall be the date on which the findings and resolution is signed.

D. Review criteria for approval of all 1041 permits.

1. The proposal is consistent with the master plan and applicable intergovernmental agreements affecting land use and development.

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2. The applicant has presented reasonable siting and design alternatives or explained why no reasonable alternativ
3. The proposal conforms with adopted county standards, review criteria and mitigation requirements concerning environmental impacts, including but not limited to those contained in this Code.
4. The proposal will not have a significant adverse affect on or will adequately mitigate significant adverse affects on the land or its natural resources, on which the proposal is situated and on lands adjacent to the proposal.
5. The proposal will not adversely affect any sites and structures listed on the State or National Registers of Historic Places.
6. The proposal will not negatively impact public health and safety.
7. The proposal will not be subject to significant risk from natural hazards including floods, wildfire or geologic hazards.
8. Adequate public facilities and services are available for the proposal or will be provided by the applicant, and the proposal will not have a significant adverse effect on the capability of local government to provide services or exceed the capacity of service delivery systems.
9. The applicant will mitigate any construction impacts to county roads, bridges and related facilities. Construction access will be re-graded and re-vegetated to minimize environmental impacts.
10. The benefits of the proposed development outweigh the losses of any natural resources or reduction of productivity of agricultural lands as a result of the proposed development.
11. The proposal demonstrates a reasonable balance between the costs to the applicant to mitigate significant adverse affects and the benefits achieved by such mitigation.
12. The recommendations of staff and referral agencies have been addressed to the satisfaction of the county commissioners.

(Res. No. 11182008R012, Exh. A, 11-18-2008; Res. No. 08042015R001, § 4, 8-4-2015)

14.11. - ADDITIONAL SPECIFIC REVIEW CRITERIA AND STANDARDS

A. *Additional review criteria for power plants.*
   1. Proposed transmission facilities have been identified and included as part of the power plant project.
   2. Wind power plants must meet the following standards:
      a. All towers must be set back at least 750 feet from property lines and public rights-of-way.
      b. The wind generator turbines and towers must be painted or coated a non-reflective white, grey or other neutral color.
      c. Facilities must not be artificially illuminated unless required by the FAA.
      d. Facilities must not be used to display advertising.
      e. Electrical controls must be wireless or underground and power lines must be underground except where the electrical collector wiring is brought together for connection to the transmission or distribution network, adjacent to that network.
      f. Noise generated from the wind power plant must be in compliance with the Chapter 30, Article V. Noise of the Larimer County Code.
      g. The operator of the plant must minimize or mitigate any interference with electromagnetic communications, such as radio, telephone or television signals caused by the plant.
      h. Towers for wind generators must be constructed of a tubular design and include anti-climb features.
      i. The facility design must use best practices available to protect wildlife.

B. *Additional review criteria for electrical transmission lines.*

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1. The siting and design of the proposal addresses potential levels of electrical and magnetic fields (EMFs) by exerci avoidance" to limit exposure.

(Res. No. 11182008R012, Exh. A, 11-18-2008)

14.12. - POST APPROVAL REQUIREMENTS

Prior to the issuance of a 1041 permit approved under this section the follow conditions must be met, if applicable.

A. The applicant may be required to obtain a construction permit from the county engineer.
B. A development agreement may be required as a condition of approval of the 1041 permit and may include requirements for performance guarantees.
C. An agreement concerning decommissioning, abandonment or reuse of the permitted facility may be required as a condition of approval of the 1041 permit.

(Res. No. 11182008R012, Exh. A, 11-18-2008)

14.13. - TECHNICAL REVISIONS AND 1041 PERMIT AMENDMENTS

A. Any change in the construction or operation of the project from that approved by the county commissioners shall require staff review and a determination made by the planning director in writing as to whether the change is a technical revision or 1041 permit amendment.
B. A proposed change shall be considered a technical revision if the planning director determines that there will be no increase in the size of the area affected or the intensity of impacts as a result of the proposed change(s); or any increase in the area or intensity of impacts is insignificant.
C. Changes other than technical revisions shall be considered 1041 permit amendments. A permit amendment shall be subject to review as a new permit application.

(Res. No. 11182008R012, Exh. A, 11-18-2008)

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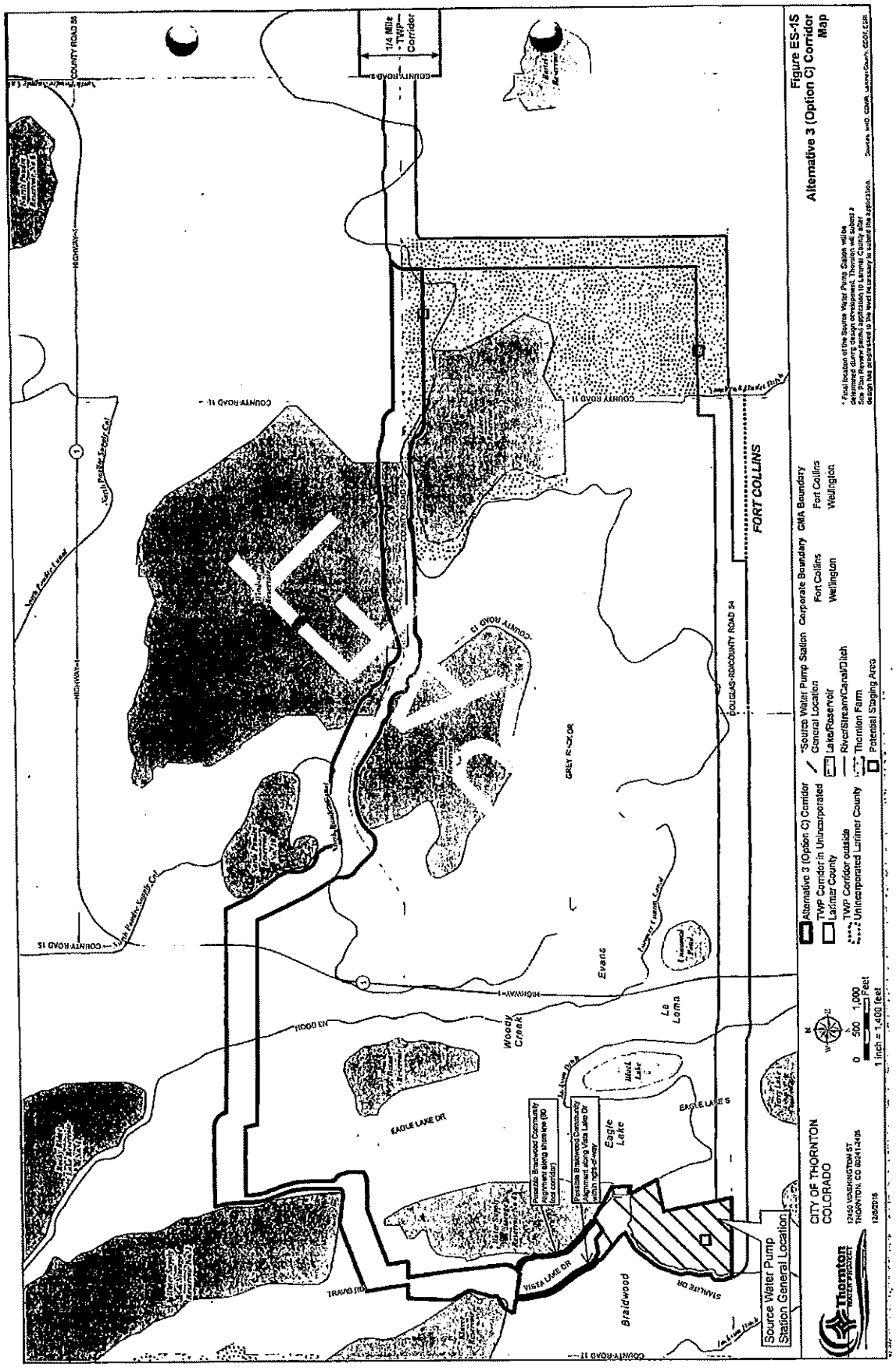

EXHIBIT "C"

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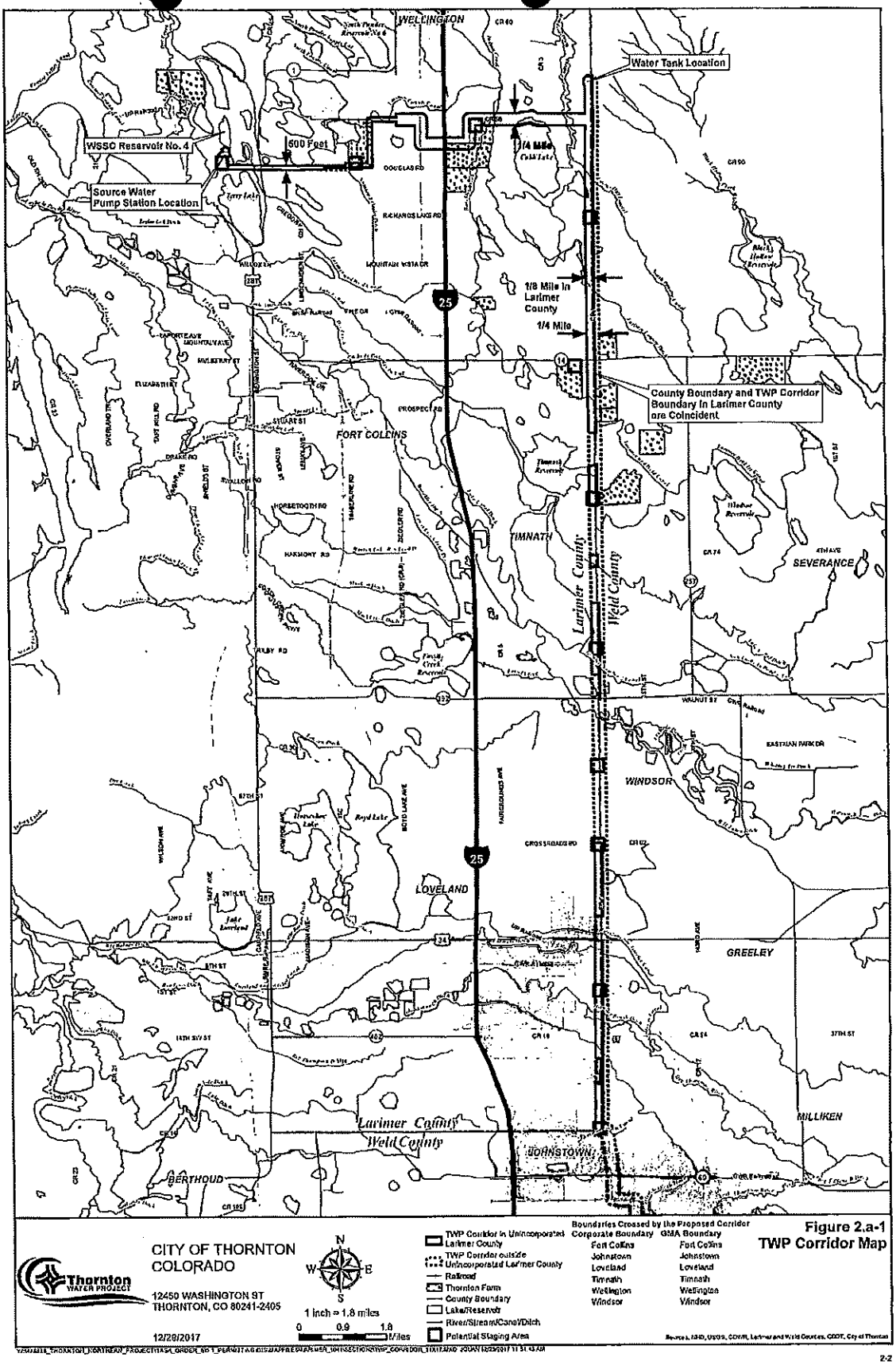
Thornton Water Project



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Larimer County, Colorado, District Court Larimer County Justice Center 201 La Porte Avenue, Suite 100 Fort Collins, Colorado 80521-2761 (970) 494-3500	
CITY OF THORNTON, a home rule municipality of the State of Colorado, Plaintiff, v. BOARD OF COUNTY COMMISSIONERS OF THE COUNTY OF LARIMER, State of Colorado; JOHN KEFALAS, in his official capacity; STEVE JOHNSON, in his official capacity, and TOM DONNELLY, in his official capacity, Defendants, and NO PIPE DREAM CORPORATION and SAVE THE POUDRE, Intervenors.	Court Use Only
Jeannine S. Haag, Reg. No. 11995 William G. Ressue, Reg. No. 34110 Larimer County Attorney's Office 224 Canyon Ave., Suite 200 Post Office Box 1606 Fort Collins, Colorado 80522 Telephone: (970) 498-7450 Fax: (970) 498-7430 jeanninehaag@larimer.org wressue@larimer.org	Case No. 19 CV 30339 Courtroom 3B
DEFENDANTS' COMBINED ANSWER BRIEF AND RESPONSE TO MOTION FOR DECLARATORY JUDGMENT	

Defendants by their undersigned attorneys respectfully submit this Combined Answer Brief and Response to Motion for Declaratory Judgment:

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INTRODUCTION

This case is about whether there is any competent evidence to support the Board of Larimer County Commissioners' (Board) decision that a water pipeline proposed by the City of Thornton (Thornton) does not satisfy all of Larimer County's 1041 permit review criteria. Thornton's Opening Brief argues a multitude of other issues such as whether its water decree, and its innate authority to construct water projects and to condemn property eclipses Larimer County's 1041 permitting authority. The Court need not reach these collateral arguments because they are based on incorrect premises. The Board's only decision was that Thornton's 1041 permit application failed to satisfy Larimer County's 1041 review criteria. The Board has not mandated or forbid any diversion point for Thornton's water. The Board has not prohibited Thornton from exercising eminent domain power. The Board has not prohibited Thornton from constructing a water project in Larimer County.

While this Answer Brief touches on all arguments presented by Thornton, the true scope of this action is much narrower than the Opening Brief portrays. This Answer Brief first addresses Thornton's claim for judicial review pursuant to C.R.C.P. 106(a)(4). The Board next addresses Thornton's purported declaratory judgment claim, however, as argued herein, such claim is essentially a re-packaged Rule 106 claim.

ANSWER BRIEF

I. ISSUES ON REVIEW

a. Whether the Board's decision infringes on Thornton's water rights and authority to construct water projects and to condemn property.

b. Whether there is any competent evidence to support the Board's decision that Thornton did not satisfy all 1041 permit criteria.

c. Whether the Board exceeded its jurisdiction by misapplying criterion 11 of the 1041 permit criteria.

d. Whether the Court's review includes the Board's written Findings and Resolution or is limited to the Board's verbal deliberation.

e. Whether Thornton can proceed under Location and Extent Review and disregard the Board's decision made pursuant to Larimer County's 1041 regulations.

II. STANDARD OF REVIEW AND 1041 AUTHORITY

a. C.R.C.P. 106 Review Standard. A court's review of a quasi-judicial action under C.R.C.P. 106(a)(4) "shall be limited to a determination of whether the body or officer has exceeded its jurisdiction or abused its discretion, based on the evidence in the record before the defendant body or officer." As with any quasi-judicial action, the Board has broad discretion in evaluating the information presented at the public hearing and determining what weight to afford that information. The object of a C.R.C.P. 106 proceeding is not to settle or determine disputed facts, but to investigate and correct errors of law of a jurisdictional nature and abuses of discretion. *Doran v. State Bd. of Medical Exmrs.,* 78 Colo.153, 240 P. 335, 337 (1925). The merits of the case are not involved. *State Bd. Of Medical Exmrs. v. Noble*, 65 Colo. 410, 177 P. 141 (1918). Actions under C.R.C.P. 106(a)(4) provide for a deferential review that gives credence to an agency's own interpretations and application of its policies and regulations. *Langer v. Board of County Commissioners of Larimer County,* 2020 CO 31, ___ P.3d ___*;* citing *Stor-N-Lock Partners #15, LLC v. City of Thornton,* 2018 COA 65, Para. 22, ___ P.3d ___ ("In conducting our review under C.R.C.P. 106(a)(4), we apply a deferential standard, and we may not disturb the governmental body's decision absent a clear abuse of discretion.").

An abuse of discretion occurs only when there is **no** competent evidence to support the decision. *Ross v. Fire & Police Pension Ass'n.,* 713 P.2d 1304, 1305 (Colo. 1986). "No competent evidence" means that the ultimate decision of the lower tribunal is so devoid of evidentiary support that it can only be explained as an arbitrary and capricious exercise of authority. *Bentley v. Valco, Inc.,* 741 P.2d 1266, 1267 (Colo. App. 1987). A Board's "findings may not be set aside merely because the evidence was conflicting or susceptible of more than one inference." *Arndt v. City of Boulder*, 895 P.2d 1092, 1095 (Colo. App. 1994), *cert. denied* (1995); *see also Bristol v. County Court*, 352 P.2d 785, 786 (Colo. 1960) (finding that mere disagreement with a ruling is not a sufficient showing of abuse of discretion). The proper function of a district court under Rule 106 is to affirm a lower tribunal where there is **any** competent evidence to support the tribunal's decision. *Bauer v. City of Wheat Ridge*, 182 Colo. 324, 513 P.2d 203, 204 (1973). The reviewing court cannot consider whether the lower agency's findings are right or wrong, substitute its judgment for that of the agency, or interfere in any manner with the agency's judgment if there is any competent evidence to support those findings. *State Civil Serv. Comm'n v. Hazlett*, 119 Colo. 173, 201 P.2d 616 (1948). A court cannot weigh anew the credibility of witnesses. A mere disagreement with a ruling is not a sufficient showing of abuse of discretion. *Bristol v. County Court,* 143 Colo. 306, 352 P.2d 785, 786 (1960).

"In determining whether the administrative agency abused its discretion, the reviewing court may consider whether the agency misconstrued or misapplied the law. If there is a reasonable basis for the agency's application of the law, the decision may not be set aside on review." *Platte River Envtl. Conservation Organiz. v. Nat'l Hog Farms*, 804 P.2d 290, 292 (Colo. App. 1990) (citations omitted). Furthermore, the construction of ordinances by administrative officials charged with their enforcement "should be given deference by the courts." *Abbott v. Bd. of County Comm'rs,* 895 P.2d at 1167. When a regulation is clear and unambiguous, it should be construed as written so as to carry

out the intent of the legislative body; however, "[i]f the language of an administrative rule is ambiguous or unclear, [the court] give[s] great deference to an agency's interpretation of a rule it is charged with enforcing, and its interpretation will be accepted if it has a reasonable basis in law and is warranted by the record." *Sierra Club v. Billingsley,* 166 P.3d 309, 312 (Colo. App. 2007). "Administrative interpretations are most helpful when the subject involved calls for the exercise of technical expertise or when the statutory language is susceptible of more than one reasonable interpretation." *Id.* "Generally, a reviewing court should defer to the construction of a statute by the administrative officials charged with its enforcement. If there is a reasonable basis for an administrative board's interpretation of the law, [the reviewing court] may not set aside the board's decision." *Lieb v. Trimble,* 183 P.3d 702, 704 (Colo. App. 2008); *see also Langer v. Board of County Commissioners of Larimer County,* 2020 CO 31, ___ P.3d ___ (…[I]ndeed we might have reached a different conclusion than the BOCC were we deciding this case in the first instance, under our applicable standard of review, we do not do so.").

b. Remedy. Thornton requests the court, in lieu of remanding to the Board, reweigh the evidence, substitute its judgment for that of the Board, and order the Board to issue a 1041 permit. Such relief is not available. As explained above, the purpose of a C.R.C.P. 106 action is to review the record and determine if the lower body abused its discretion or exceeded its jurisdiction. The sole remedy for an abuse of discretion or act in excess of jurisdiction is a remand for further proceedings: "Once a court finds that an administrative body has abused its discretion, how to address the deficiency on remand is within the discretion of the administrative body." *Wolf Creek Ski Corp. v. Bd. Of County Com'rs of Mineral County*, 170 P.3d 821, 831 (Colo. App. 2007).

c. 1041 Overview. The intent of Colorado's Land Use Act is the protection, utility, value and future of all private and public lands. §24-65.1-101(1), Colo. Rev. Stat. The Act identifies

land use, planning, and the quality of development as matters of state responsibility for the health, welfare, safety and protection of Colorado's environment. *Id.* To accomplish these objectives the Act designates specific development activities as matters of state responsibility and authorizes local governments to supervise such activities through local regulations. *Denver v. Grand County*; at 755; §24-65.1-101(2), Colo. Rev. Stat. This dual regulation by the state and local government is deemed necessary because the designated development activities may impact the people of Colorado beyond the immediate scope of the project. *Denver v. Grand County*; at 755.

The siting and construction of a Domestic Water System, which includes water pipelines[1], is identified as an activity of state interest for which local governments may designate for local regulation. §24-65.1-203(1)(a), Colo. Rev. Stat. The criteria for administering the siting and construction of a Domestic Water System is provided in §24-65.1-204(1), C.R.S., which requires such systems properly utilize existing treatment plants and orderly develop with water systems of adjacent communities. The Board has designated site selection and construction of new domestic water pipelines that are within new permanent easements greater than 30 feet[2] as an activity of state interest and adopted regulations therefore (1041 Regulations). Larimer County Land Use Code, §§ 14.0; 14.4(J). The 1041 Regulations require those who want to construct new domestic water pipelines in Larimer County to apply for and obtain a 1041 permit (1041 Permit). Larimer County Land Use Code, § 14.9(A). To be issued a 1041 Permit the applicant must complete certain procedural steps and demonstrate at a public hearing before the Board that the project satisfies the permit review criteria. Larimer County Land Use Code, §§ 14.9(B), 14.10. The review criteria for

[1] Per § 24-65.1-104(5), Colo. Rev. Stat., Domestic Water System includes a Water Distribution System as defined in § 25-9-102(6), Colo. Rev. Stat., which includes any combination of pipes, tanks, pumps or other facilities that deliver water from a source or treatment to the consumer.
[2] It is undisputed that Thornton's water pipeline proposes new permanent easements greater than 30 feet. Opening Brief, pp 4, 18.

approval of a 1041 permit are as follows:

1. The proposal is consistent with the master plan and applicable intergovernmental agreements affecting land use and development.

2. The applicant has presented reasonable siting and design alternatives or explained why no reasonable alternatives are available.

3. The proposal conforms with adopted county standards, review criteria and mitigation requirements concerning environmental impacts, including but not limited to those contained in this Code.

4. The proposal will not have a significant adverse affect [sic] on or will adequately mitigate significant adverse affects [sic] on the land or its natural resources, on which the proposal is situated and on lands adjacent to the proposal.

5. The proposal will not adversely affect any sites and structures listed on the State or National Registers of Historic Places.

6. The proposal will not negatively impact public health and safety.

7. The proposal will not be subject to significant risk from natural hazards including floods, wildfire or geologic hazards.

8. Adequate public facilities and services are available for the proposal or will be provided by the applicant, and the proposal will not have a significant adverse effect on the capability of local government to provide services or exceed the capacity of service delivery systems.

9. The applicant will mitigate any construction impacts to county roads, bridges and related facilities. Construction access will be re-graded and re-vegetated to minimize environmental impacts.

10. The benefits of the proposed development outweigh the losses of any natural resources or reduction of productivity of agricultural lands as a result of the proposed development.

11. The proposal demonstrates a reasonable balance between the costs to the applicant to mitigate significant adverse affects [sic] and the benefits achieved by such mitigation.

12. The recommendations of staff and referral agencies have been addressed to the satisfaction of the county commissioners.

Larimer County Land Use Code, §§ 14.10(D).

Following a hearing on a 1041 permit application, "[t]he local government may approve an application for a permit to conduct an activity of state interest if the proposed activity complies with the local government's regulations and guidelines for conduct of such activity. If the proposed activity does not comply with the guidelines and regulations, the permit shall be denied." §24-65.1-501(4), Colo. Rev. Stat. The denial of a 1041 permit by a local government is subject to judicial review in the district court for the judicial district in which the activity is to occur. §24-65.1-502, Colo. Rev. Stat.

III. STATEMENT OF FACTS

Thornton's description of the course of proceedings is largely undisputed and follows the Procedural History laid out by the Board in its Findings and Resolution. In places Thornton sets out some facts and characterizes others in ways with which the Board disagrees. For example, in describing the alternative pipeline routes it considered, Thornton frequently references four "reasonable" routes. Use of the word "reasonable" is a qualitative description, not a statement of fact. The Board appreciates the clear distinction between fact and argument, and therefore generally disputes all argumentative/qualitative descriptors within Thornton's recitation of facts. Otherwise, the Board provides the following limited factual disputes and supplemental facts:

a. The Board disputes Thornton's statements that the Board considered and rejected four pipeline routes. Thornton's initial application presented to the Board for decision a single "preferred route" for which it sought a 1041 permit (the Douglas Road Route). R0007-0008, 7234:4-6.[3] During the course of proceedings Thornton submitted a third supplement to its application identifying a different—but singular—preferred pipeline

[3] References to the quasi-judicial record are to the Third Amended Certified Record filed on January 10, 2020. Citations to the record are "R" followed by the page number (i.e. R8067). When citing to a transcript, the specific line will be referenced after the page number (i.e. R8015:20).

route that uses County Road 56 (the CR 56 Route). R2032-2035, 4967, 7537:23-7539:3. The other routes referenced in Thornton's application materials were alternatives it considered but did not advance to the Board. R2032-2035. The Board's Findings and Resolution addresses the two preferred routes presented by Thornton—the Douglas Road and CR 56 Routes—and measured them against the applicable 1041 permit criteria. R6827-6869.

b. The Board disputes Thornton's assertion that the proceedings were continued on August 1, 2018 "without any specific guidance." Opening Brief, p 5. The transcript shows a lengthy discussion by the Board about the need and purpose for continuing the hearing. Specifically, Commissioner Donnelly commented that additional information was needed about mitigating traffic impacts on the roads under construction and alternative routes that will see increased traffic. R7499:5-7500:21. Commissioner Gaiter stated he was not convinced Thornton had presented reasonable siting and design alternatives as required by the 1041 review criteria, and more information about alternative routes needed to be discussed with people living along those routes. R7503:22-7504:3, 7508:8-7509:12-21. Commissioner Johnson echoed the comments of the other Commissioners and highlighted the need for more information about the alternative routes that were considered by Thornton. R7518:5-24. Commissioner Johnson also reviewed the Land Use Code's reference to continuation of 1041 permit proceedings if additional information is needed to determine if the approval criteria are met. R7519:14, 7521:13-20. When the hearing resumed on December 17, 2018, Thornton confirmed its understanding of the purpose for the continuance with the following statement:

> You provided direction that Thornton needed to provide the specific additional information as discussed by the Board of County Commissioners, and then you directed Larimer County staff to

> involve the public in the information gathering process through public meetings or public open houses. We heard loud and clear that communication was a concern for you, and that further opportunities for your residents to communicate their interests was needed. We understand that communication is about listening as much or more than it is about talking or providing information. Thornton took your direction to heart and we dedicated additional resources to the public outreach effort you asked for. We had a team of Communication Professionals at all of the working group meetings and at all of the public meetings. And we listened and gathered information from those speaking at the events and those that chose to speak with us directly at those events. Thornton believes firmly that this process was beneficial and included a great deal of wisdom to undertake. The information we gathered and evaluated from the outreach efforts you directed indeed led us to what we believe is a better preferred route for our project and for Larimer County. R7573:4-7574:3.

c. Within its recitation of facts Thornton frames the Board's decision as consisting of only a few oral statements by individual Commissioners during deliberation and argues the Board's decision is limited to what was said during deliberation rather what is in the Findings and Resolution. Opening Brief, p 16-17. The Board's deliberation should be considered in its entirety rather than only select soundbites. The transcript reflects the entire deliberation and is in the record at Vol. 7(e), pp 8067:7-8082:20. Further, with respect to Thornton's argument that the written Findings and Resolution does not count, the Board's responsive argument is in Section V(d) below.

IV. ARGUMENT

a. Whether the Board's decision infringes on Thornton's water rights and authority to construct water projects and to condemn property.

Thornton asserts Larimer County's 1041 authority impermissibly infringes on the terms of its water decree and authority to construct water projects and condemn property. Specifically, Thornton argues its water decree "requires and entitles Thornton, as a matter of law, to install a

water pipeline to deliver its water to Thornton" and the Board "must choose one of the four reasonable routes Thornton presented and saying 'no' to all four amounted to unlawful interference with Thornton's powers to construct a water pipeline across Larimer County." Opening Brief, pp. 13, 25.

Similar arguments were rejected by the Colorado Supreme Court in *City and County of Denver By and Through Board of Water Com'rs v. Board of County Com'rs of Grand County*, 782 P.2 753, 761-765 (Colo. 1989). In that case, Denver argued 1041 regulations infringe on its governmental powers to, *inter alia*, construct, operate and condemn for water projects. *Id.* at 762. The Court rejected this argument after finding 1041 statutes confer the power to regulate not prohibit, and Denver's condemnation and utility powers "do not prevent other local governments from regulating the activities…" *Id.*

In *Denver v. Grand County*, Denver also argued it should not be subject to 1041 regulations because its water project was necessary to implement its established water rights. *Id.* at 756, 764. In rejecting this argument, the Court noted that Denver's established water rights did not give it a blanket exemption from 1041 regulation, and such a reading would ignore the plain language in the 1041 statutes that subject water projects to regulation. *Id.* at 764-765. The Court recognized that local government regulation is valid even when it impacts established water rights, so long as such rights are not undermined. *Id.* at 765.

The Board has not required Thornton forgo any water rights or its authority to construct water projects and to condemn property. Further, the Board has not mandated or excluded any specific diversion point for Thornton's water and has not required any particular route of conveyance. Nothing prohibits Thornton from returning to the Board with a revised proposal for the pipeline that better addresses the unmet criteria.

Thornton speculates that the Board's decision disapproving the Douglas Road and CR 56 Route proposals was an attempt to force Thornton to convey its water via the Poudre River. The record shows that the Board was fully aware that the project was a proposed pipeline. "The Board is cognizant that it may not deny Thornton the use and benefit of its water right and that the Board's authority is limited to approving the siting and development of pipelines." R6839. Further, the Planning Staff informed all that the Board's authority was to decide the siting and development of a water pipeline, not tamper with water rights. R4971, 7169:18-19 ("Its about a pipeline. It's not about where the water comes from or where the water is going to."). The Board's decision did not require or otherwise condition the conveyance of water using the Poudre River. True, Commissioner Johnson inquired about the so-called Shields Street alternative by referencing how Thornton staff had initially presented it to Thornton City Council as an option to consider and questioned if it was a reasonable alternative. R7514:5-20, 7784:18-25. That inquiry was the result, however, of Thornton initially proposing this alternative to its council. R7611:11-7612:11.

After reciting the basis for its eminent domain authority, Thornton asserts the Board was required to approve one of the proposed pipeline routes, and its failure to do so, impermissibly interfered with Thornton's condemnation power. Opening Brief, pp 12-13. Thornton argues its condemnation of private property is immaterial, should not have been a topic of discussion, and any findings by the Board that mention eminent domain are invalid. Opening Brief, pp. 59, 75. Public testimony included opposition to Thornton's possible taking of certain landowner's private property. R7022:4-6, 7420:6-9, 7856:20-7857:6, 7906:10-14, 7973:10-12, 7997:17-21. The Board appreciates that its citizens have private property rights and seeks to balance governmental power against those rights. The Board did not state, however, that it would approve no route that required Thornton to condemn private property. Thornton cannot be and was not precluded from using eminent domain.

It was not arbitrary or improper for the Board to express a preference for Thornton to use a route that prefers (not requires) pipes be installed in public right of way or other public property when feasible, rather than taking private property.

b. Whether there is any competent evidence to support the Board's decision that Thornton did not satisfy all 1041 permit criteria.

Thornton invites the Court to reweigh the evidence in the record and reach a different decision than the Board. In doing so, Thornton ignores the role of a reviewing court in a C.R.C.P. 106 proceeding, which is to search the record for any competent evidence in support of the Board's decision. *Ross v. Denver Dep't of Health and Hosp.*, 883 P.2d 775, 778 (Colo. App. 1994) (citing *Sundance Hills Homeowners Assoc. v. Bd. of County Comm'rs*, 534 P.2d 1212, 1216 (Colo. 1975)). The number of revisions to Thornton's plan, the number of public hearings, and the evidence in favor of granting Thornton's permit are not relevant.

The Board found Thornton's application failed to satisfy seven of the twelve review criteria. R6831-6839. Pursuant to §14.10(B) of the Larimer County Land Use Code, a 1041 permit application must satisfy all review criteria to be approved. R6892. If the Court finds record support for any single criterion not being satisfied, it need not review any remaining criteria because denial is required even if only one criterion is unmet.

The record in this proceeding is vast, consisting of over 8,000 pages. With respect to the Board's decision that seven criteria were not satisfied, the record includes the following examples of competent supportive evidence:

i. Criterion 14.10(D)(1)[4] *The proposal is consistent with the master plan and applicable*

[4] The 1041 review criteria are in Section 14.10(D) of the Larimer County Land Use Code which can be found in the Record at R6892.

intergovernmental agreements affecting land use and development.

In finding this criterion was not met the Board summarized relevant principles from Larimer County's Master Plan such as settlement patterns that protect existing neighborhoods; a fair, open and predictable land planning and development process that does not infringe on the rights of individuals; and preservation of agricultural as a viable and valued economic, cultural and social resource. R6831-6832; 8103-8105. Thornton's pipeline is proposed to be constructed in a yet-to-be-determined spot within a corridor of 500' to ¼ mile wide in places. R0006, 6934:11-14; 7070:23-7071:13; 1223-1224. This vast corridor, the Board found, unreasonably limited the ability to assess specific impacts to existing neighborhoods and on the property rights of those living along the corridor. R6829-6836. This uncertainty interferes with the Master Plan's goal of a fair and predictable development process because property owners must speculate about the impacts on their property. The record has the following competent evidence in support of the Board's finding that the proposed 500' + corridor fails to meet the Master Plan principles of protecting existing neighborhoods, and fair and predictable development that does not infringe on individual rights:

1. Testimony from a farmer who explained the 500' corridor covers essentially his entire 40-acre farm and Thornton's proposal "is not a specific plan, and this map [of the pipeline] doesn't show the route." R7908:3-11.

2. Testimony from a representative of 12 property owners along the corridor who explained their confusion about where the pipe would actually go; changes in the preferred route with the most current depiction running the pipe potentially between a home and barn; an undetermined route through a 100-acre area

with three separate owners; and a 35-acre parcel within the corridor that the pipeline will cut across, which may limit buildable area beyond current limitations due to existing wetlands. R7853:12-7856:8.

3. Testimony about uncertainties for the redundant power source for the pumphouse, such as whether it will require additional power lines or new substations. R7960:21-7961:1.

4. Testimony questioning the reasonableness of Thornton's proposal because it is "replete with qualifiers like 'may,' 'could,' and 'up to,'…" rather than concrete terms. R7973:18-20.

5. Testimony that "[t]he description of the pipeline route is currently very vague. If [the Board] approves it as it is currently written, Thornton will assume that they can place the pipeline wherever they want in that corridor, irrespective of how it harms the landowner, and [the Board would] have stripped the landowner of any negotiating ability." R7981:18-24.

6. Testimony from a citizen who explained: "[m]y concerns for the Thornton water pipeline lie in the fact that so much of Thornton's water project is undefined, unknown, unavailable. According to Thornton's water project website, detailed designs for the water pipeline have not been completed. The details of the construction of the pipeline are not yet known. The design of the source water pump station is not finalized…everything involved in this project should be much more clearly and specifically defined before approval of the 1041 application is granted…." R7345:8-7346:1.

7. A representative of a home owners association for a neighborhood

on the east side of I-25 along Thornton's proposed CR 56 Route testified that approval of the ¼ mile wide corridor leads to speculation about whether trees, structures or other improvements on their private property would be injured by the chosen location of the pipeline. R7864:13-16.

8. Findings of different Planning Commission members concerned about the lack of a specific pipeline location: "I don't understand how people that are along this pipeline corridor are going to understand their [sic] impact to them without having much more specificity…" (R7105:8-20); "we're trying to talk about affecting private properties and property rights and citizens and to not have that information doesn't —I mean, that makes it really hard for me to see how they're going to be affected" (R7072:11-15); and "The lack of specificity in some of this, which I think could have been addressed to allay some of the concerns of the neighbors and of Larimer County as a whole were not done and so I really don't think that this is complete as it should have been and I would not support passing this at this time." (R7103:19-24).

9. Testimony about the Master Plan purposes of maintaining quality of life and fundamental fairness, and compatibility of new development with existing uses. R7262:5-8; 7272:13-20.

The above competent evidence supports the Board's decision that Thornton's proposal does not satisfy the Master Plan principles of protecting existing neighborhoods and fair and predictable land development that respects individual rights.

With respect to the Master Plan principle to preserve viable agricultural in Larimer County, the Board found "it [is] important to have information about and consider the

cumulative impacts of irrigated farmland turning to dryland. A significant reduction in the amount of irrigated farmland is concerning to the Board and conflicts with the goals of the Master Plan. The long-term viability of Larimer County's agricultural communities, and the economic, cultural and environmental impacts of drying up irrigated farmland are valid considerations under the Master Plan. As these impacts are not adequately described or analyzed by Thornton, the Board cannot conclude that Thornton's proposal is consistent with the Master Plan." R6833. In support of these findings, the record show that over time Thornton has purchased about 20,000 acres of irrigated farmland in northern Colorado, of which eight farms totaling 1,509 irrigated acres are in Larimer County. R7640:23-7641:8; 7759:11-14. Thornton has already dried up three of these eight farms, turning the irrigated acreage into native grasses. R7759:19-21. Thornton does not provide any supplemental irrigation on farms that it has dried up. R7764:1-2. Thornton's other five farms continue to be used for irrigated agriculture and are described by Thornton as "very good producing farms, and they're important parts of—that farmers that farm these properties of their overall business." R7759:24-25, 7768:1-4.

The water for Thornton's irrigated agricultural acreage flows through the Water Supply and Storage Company (WSSC) canal system in which Thornton owns 289 of the 401 municipal use water shares. R7924:4-12. The 401 municipal water shares represent 2/3 of all water shares in WSSC, and all but 21 of the 401 municipal shares remain currently used for agricultural irrigation. R7924:4-8. But, as WSSC testified, the agricultural use of municipal shares is changing, presumably as they are pulled from agricultural use for municipal use. R7924:7-8. Thornton's plan is to begin drying up its irrigated acreage in 2030, starting with two farms it refers to as the "I-25 farms.". R7767:24-7768:6. WSSC

testified that as Thornton and other municipalities divert their water shares for municipal use "it's going to be a struggle for us to be able to take care of all of rest of those farms for…as long as they want to keep farming, because the total amount of water in the [WSSC] system, obviously is going to be dropping." R7934:13-24.

This sample of competent evidence in the record supports the Board's finding that Thornton's proposal, in its current form, is inconsistent with the Master Plan principle of preserving agriculture as a viable long-term segment of Larimer County's economic, cultural and social fabric. The irrigated farms described by Thornton as "very good producing farms" that are important to the overall business of the farmers who farm them, are going to be dried up in the coming years. R7759:24-25, 7768:1-4. That impact has not been evaluated by Thornton. And, as WSSC testified, Thornton is one of many municipalities who have converted water shares in Larimer County from agricultural to municipal use. Currently, the vast majority of those converted shares—380 of 401 shares—are still used for agriculture, but that is changing. R7924:5-8. The Board is justified in questioning the significance of this change within the scope of Thornton's pipeline project—the pipeline is the conduit that will enable Thornton to implement this change. The Board understands that it cannot prohibit Thornton from using its water for municipal purposes, but without an analysis of impact on the agricultural fabric of Larimer County, the Board found Thornton's project was not consistent with the applicable Master Plan principles.

After arguing the weight of the evidence, Thornton turns to the validity of the Board's reliance on provisions in the Master Plan. In *Board of County Commissioners of Larimer County v. Condor,* the Colorado Supreme Court confirmed that master plan provisions are regulatory (rather than advisory only) when the master plan is adopted within land use

regulations and its provisions are sufficiently clear. *Bd. of Cty. Comm'rs v. Conder*, 927 P.2d 1339, 1350-1351 (Colo. 1996). While not expressly stated, it appears Thornton concedes that the Master Plan is regulatory rather than merely advisory. To be clear on this point, in *Condor* the Court concluded that Larimer County's Master Plan was regulatory rather than advisory because subdivision regulations incorporated the Master Plan through statements such as "[t]he Board of County Commissioners shall use the Master Plan as a guideline in the evaluation of each development proposal." *Id.* at 1346. Here, Larimer County's 1041 regulations similarly mandate compliance with the Master Plan in Section 14.10(D)(1) by requiring the applicant show "[t]he proposal is consistent with the master plan…" R6892.

As mentioned above, the Court in *Condor* explained that regulatory master plan provisions must be sufficiently clear to ensure application will be rational and consistent and allow for judicial review. *Id.* at 1348. In evaluating for such clarity, the *Condor* Court explained that flexibility should not be undercut, and broad master plan provisions requiring "[c]ompatibility with the surrounding area" and "[h]armony with the character of the neighborhood" are sufficient when applied in conjunction with more specific criteria. *Id.* Using this measure, the record shows the Board relied on specific Master Plan principals as outlined in its Findings and Resolution such as development patterns that protect existing neighborhoods, a fair, open and predictable land planning and development process that does not infringe on the rights of individuals, and preservation of agriculture as a viable and valued economic, cultural, and social resource in Larimer County. R6831-6832. The provisions are clearly spelled out in the Master Plan as follows:

1. Master Plan §1.5, TH-3 "**Agriculture will remain a viable long-term segment of Larimer County's economic, cultural and social fabric.**"

R8103.

2. Master Plan §2,7, GM-8 "**Agriculture shall be recognized as an important economic, cultural and environmental resource value-provider for the County."**

3. Master Plan §1.5, TH-4 "**The Master Plan shall support logical settlement patterns that reflect the character of the Open West, i.e. the existing character of Larimer County, and protect existing neighborhoods.** Proposed uses shall be compatible with adjacent uses and help create sustainable communities. Performance standards shall be used to protect existing uses from adverse impacts to ensure that new uses are 'good neighbors.'…" R8103.

4. Master Plan §1.5, TH-13 "**The planning and development review process shall be fair, open and predictable, and meet the needs and interest of the community without infringing on the rights of individuals.**" R8105.

5. Master Plan §4.3, PF-8 "**The location and design of new public facilities shall be consistent with the Master Plan.**" R8145.

6. Master Plan §6.1.3 "**Cumulative Impacts**" explains the need to consider cumulative impacts from development, including temporal and spatial. R8155.

The Master Plan principals relied on by the Board are sufficiently clear to allow for rational and consistent application, as was done by the Board here. As explained above, these Master Plan principals were evaluated against specific attributes of Thornton's proposal such as its 500' to ¼ mile wide corridor, and the conversion of irrigated agricultural acreage into dryland that will result from the project.

ii. Criterion 14.10(D)(2) *The applicant has presented reasonable siting and design alternatives or explained why no reasonable alternatives are available.*

The Board found this criterion was not met because the two routes proposed by Thornton identified large corridors of 500' or more which made evaluation of the pipeline siting unreasonably imprecise. R6833-6834. The Board also found the impacts of the pipeline could vary significantly depending on where within the corridor the pipeline is physically located. R6833-6834. The lack of a specific location for the pipeline and the inability to assess specific impacts led the Board to conclude that reasonable alternative routes were not presented. R6834. Further, the Board found that Thornton had internally considered and rejected many siting alternatives, but only presented two options to the Board. R6834.

The record shows the two routes proposed by Thornton had 500' to ¼ mile wide corridors within which the pipeline would be located. R6934:11-14; 7070:23-7071:13; 1223-1224. The physical location of the pipeline was not identified, which elicited substantial testimony from property owners who were frustrated that they could not determine the specific impacts on their properties. Without knowing the physical location of the pipeline, the Board found Thornton's two proposed routes did not present reasonable alternatives. Testimony in support of this finding is referenced in this Answer Brief in Sections V(b)(1)-(9) above, which is incorporated by reference rather than repeated here. In addition, the following testimony supports the Board's decision:

1. Planning Commission member found that Thornton did not present reasonable alternative routes because the project "was really looked [at] purely from Thornton's position." This member also commented about her experience with a

pipeline project where the location of the pipe "was very clear all along the pipeline…" R7104:24-7105:17.

2. Testimony summarizing Thornton's presentation of routes that were not really reasonable alternatives because Thornton had already ruled them out: "Thornton would like to say, well, we've presented reasonable alternatives. But in the next breath they say, but they're unreasonable." R7822:14-16.

3. Testimony from Thornton that it narrowed down 10 possible routes for the pipeline to a single route, and then started public outreach for that singular route. R7233:8-7234:8. Thornton further testified it created its own criteria for evaluating route alternatives and different location options for the pumphouse. R7205:3-14.

4. Testimony that during the community open house/working group meetings to evaluate routing options "Thornton at no time took any interest whatsoever in considering any route by the pipeline off of Douglas or County Road 56. In fact, throughout the working group, Thornton never showed themselves to be open to any viable alternatives." R7891:1-16.

While Thornton internally vetted many potential routes, it unilaterally deemed most were impractical and only presented two routes to the Board. The Board found Thornton's self-evaluation of alternative routes was insufficient to satisfy Thornton's obligation to present reasonable alternatives to the Board. R6834. That finding is supported by competent evidence and should be affirmed.

With respect to reasonable design alternatives, the Board found that Thornton identified tunneling and boring as the methods for constructing the pipeline as it goes north

by WSSC reservoirs No.3 and No.4. R6834. Robin Dornfest, an engineer with over 18 years of experience in geologic and geotechnical engineering with a main focus on pipeline infrastructure, was hired by the County to evaluate the use of a lake tap as a possible alternative to installing the pipe around the perimeter of the reservoirs. R1476-1479, 4757. Mr. Dornfest noted that lake taps are more expensive and have inherent risks but are becoming more common in water storage and conveyance projects. R1479, 4759-4760. Reasons to consider a tunnel/lake tap rather than digging a trench, per Mr. Dornfest, are to minimize impacts to third parties and avoid impacts to infrastructure and environmentally sensitive areas. R4759. Mr. Dornfest found nothing about Thornton's project that would preclude the use of lake taps as Thornton itself had initially contemplated. R4760. Mr. Dornfest also concluded there "is room for optimization for each lake tap option. Further development of the lake tap options could include shortening tunnel lengths, conducting geotechnical investigations, refining tunnel and shaft designs, and refining the intake riser design." R4760.

The Board found the potential use of lake taps may mitigate significant impacts on established neighborhoods around reservoirs, such as the Braidwood and Eagle Lake neighborhoods. R6836. The Board does not dispute that lake taps cost more and have some inherent risks, but Thornton dismisses them as even an option to evaluate because they do not believe they are warranted. Thornton's Opening Brief criticizes Mr. Dornfest's comments as a "superficial opinion of an engineer…who admitted that more information was needed…" Opening Brief, p. 53. The Board agrees that more information about the reasonableness and viability of lake taps is needed. Commissioner Gaiter asked County staff during the August 1, 2018 hearing whether a lake tap is feasible without resorting to the

"draconian measure" mentioned by Thornton. R7495:6-9. County staff responded that technical experts would need to get involved to evaluate the options because "we don't have that information available to us at this time." R7495:10-13. It could be that a lake tap is not a reasonable alternative design, but the Board is not required to take Thornton's word on that point.

iii. Criterion 14.10(D)(3) *The proposal conforms with adopted county standards, review criteria and mitigation requirements concerning environmental impacts, including but not limited to those contained in Section 8 of this Code.*

This criterion requires the proposal conform with development criteria in Section 8 of the Larimer County Land Use Code. The Board found Thornton's proposal did not meet two of the applicable Section 8 criteria: Section 8.4 Wildlife and Section 8.8 Irrigation Facilities.[5] R6834-6835.

With respect to Section 8.4 Wildlife, County staff noted the environmental analysis identified possible conflicts with wildlife. R7180. The Board heard testimony with general concern about the potential removal of established trees in the area that are used for nesting and perching by raptors (R7444:13-17); disruption of rattlesnake dens and osprey nesting sites that could occur given the ¼ mile wide corridor identified as Thornton's proposed route (R7865:15-25); disruption of hawks, ospreys and other federally protected raptors that live along the reservoirs in Thornton's pipeline corridor (R7958:4-7); and displacement of wildlife that use the property proposed for Thornton's pumphouse (R7887:15-25).

With respect to Section 8.8 Irrigation Facilities, County staff testified many irrigation ditches will need to be crossed, some more than once. R7180. With respect to the Douglas

[5] The Board's argument addresses only the Section 8 criterion that it found were not met.

Road Route, the already lengthy construction period could be extended for yet unknown delays related to, among other things, permits to cut across ditches. R4758. The Board found it prudent to consider alternatives that reduce these impacts involving ditch crossings. R6835.

iv. Criterion 14.10(D)(4) *The proposal will not have a significant adverse affect (sic) on or will adequately mitigate significant adverse affects (sic) on the land on which the proposal is situated and on lands adjacent to the proposal.*

As a preliminary matter, Thornton's argument with respect to this criterion is founded on its belief that only "permanent" effects from its project count. Opening Brief, p 47-48. In evaluating this criterion, the Board applied it as written. A significant amount of testimony addressed long and short-term adverse impacts from Thornton's project, and Thornton's application and presentation similarly addressed temporary and permanent impacts. There is simply no basis on which to now, on judicial review, stray from the express language in the criterion by looking only at "permanent" impacts. When a regulation is clear and unambiguous, it should be construed as written so as to carry out the intent of the legislative body; however, "[i]f the language of an administrative rule is ambiguous or unclear, [the court] give[s] great deference to an agency's interpretation of a rule it is charged with enforcing, and its interpretation will be accepted if it has a reasonable basis in law and is warranted by the record." *Sierra Club v. Billingsley,* 166 P.3d 309, 312 (Colo. App. 2007).

The Board found Thornton's proposal will have a significant adverse effect on the land on which the pipeline will be constructed and on adjacent lands. R6835-6836. The Board specifically highlighted an unreasonably long construction cycle that will cause significant impacts on those along the route; traffic intersections that will perform at

unacceptable levels with the addition of traffic from those avoiding construction areas; impacts on private property where the pipeline will go through neighborhoods and areas with limited public right of way; and impacts caused by the uncertainty of the physical location of the pipeline and future pipelines contemplated by Thornton's long-range water plans. R6835-6836. In support of these findings the record has the following:

1. Testimony about the negative visual, noise and quality of life impacts of the pumphouse being located within a residential area where sound travels, and replacing what is currently open fields, trees, wildlife, peace and quiet. R7887:15-25, 7883:20-15, 7301:18-25, 7953:13-7954:4, 8013:1-8014:14.

2. Testimony about a narrow and dead-end residential dirt road only 10-15 feet wide that is a possible location for the pipeline; and concerns about existing foundation and structural problems being exacerbated by installation of the pipeline. R7885:18-15. This person also testified that the use of his residential street as a possible location for the pipeline had not been discussed with him and was mentioned for the first time during the hearings on the application. R7885:18-21.

3. Testimony about how the pipeline will introduce commercial features like large breather tubes, inspection ports, manhole covers, and a 48" pipe into his residential neighborhood and injure quality of life and property values. R7956:1-17.

4. Testimony from a resident who currently has two pipelines on his property that have ongoing impacts. R7972:8-10.

5. Testimony about the proposed pipeline bifurcating a home and barn. R7854:24-7855:5.

6. Testimony about a vacant investment parcel within Thornton's

corridor that has wetlands and limited building area that will be negatively impacted by installation of a pipe. R7859:1-12.

7. Testimony about disruption of rattlesnake dens within Thornton's corridor that may drive the snakes into the neighboring residential area. R7865:21-25.

8. Testimony that pipeline projects in addition to Thornton's are in the works and there is no evaluation on the cumulative impacts of multiple pipelines traversing Larimer County from west to east, which could subject the area to repeat impacts over many years. R7948:9-16, 7832:8-13, 7314:11-7315:18, 7337:7-11, 7441:14-7442:15.

9. Testimony that the pipeline, even in concept, has negatively affected the marketability and value of property in the area. R7852:7-13; 7909:14-19; 803:11-17.

10. Testimony that road construction for the project may last two years, and the traffic impacts will be significant and unacceptable. R7195:5-24, 7344:11-16, 7405:8-25, 7420:24-7421:11, 7439:17-7440:2.

11. Testimony from the owner of an assisted living facility located along the Douglas Road Route with residents an average age of 90 years old who will be significantly impacted by a lengthy construction period. R7354:24-7356:8.

12. Testimony from Thornton that less than 50% of the pipe to be installed for the CR 56 Route will be within road rights of way. R7807:8-22.

13. Testimony, as cited in Section IV(b)(i)(1)-(9) above, about the impacts of uncertainty about the actual physical location of the pipeline given the

imprecise corridors proposed by Thornton.

14. Testimony about the uncertainty of Thornton's proposed pipeline route, specifically that the initial part of the CR 56 Route would travel north from a pumphouse located "somewhere" below Reservoir No. 4, and "either" go through residential lots in the Braidwood neighborhood or along the residential subdivision road Lake Vista Drive. R7724:21-7725:3.

The above evidence in the record supports the Board's finding that the Douglas Road and CR 56 Routes, as proposed, would have significant adverse impacts to the property in the area.

Thornton next argues the Board "never stated that the corridor approach was unacceptable, and thereby waived this objection." Opening Brief, p 54. In support, Thornton cites *Crawford v. Mcaughlin*, 473 P.2d 725 (Colo. 1970), however that case addresses facts that are not present here. In *Crawford*, the Court outlined the doctrine of equitable estoppel and explained where a building permit is issued and relied on by a property owner, a property right vests and the local government may be estopped from contesting the validity of the permit after the fact. *Id.* at 731. Here, no aspect of Thornton's project has been approved and it has no vested right to construct its pipeline project. Further, the Board's concern with the uncertainty of Thornton's 500' to ¼ mile wide corridor arose during the hearing on the application based on testimony from concerned property owners. Shortly thereafter the Board's concern with the breadth of the corridor was communicated to Thornton and the public in the Findings and Resolution.

v. Criterion 14.10(D)(6) *The proposal will not negatively impact public health and safety.*

The Board found this criterion was not met because Thornton's proposal includes a lengthy construction cycle that may delay (not prevent) emergency services. R6837. In support of these findings the record shows testimony that there are a significant number of single-entrance residences where delayed emergency services could be problematic. R7006:23-7007:4, R7023:11-14.

vi. Criterion 14.10(D)(10) *The benefits of the proposed development outweigh the losses of any natural resources or reduction of productivity of agricultural lands as a result of the proposed development.*

The Board found Thornton's proposal will cause a significant reduction in the productivity of agricultural lands in Larimer County that outweighs the benefits of the development. R6838. More specifically, without further mitigation, the Board found the project will divert water from irrigated agricultural land and injure the agricultural segment in Larimer County. R6838. The record has the following competent support for these findings:

1. Since the 1980s, Thornton has purchased about 20,000 acres of irrigated farmland in northern Colorado, of which eight farms totaling 1,509 irrigated acres are in Larimer County. R7640:23-7641:8; 7759:11-14.

2. Thornton has already dried up three of these eight farms, turning the irrigated acreage into native grasses. R7759:19-21. Thornton does not provide any supplemental irrigation on farms that it has dried up. R7764:1-2.

3. Thornton's other five Larimer County farms continue to be used for irrigated agriculture and are described by Thornton as "very good producing farms, and they're important parts of – that farmers that farm these properties of their overall business." R7759:24-25, 7768:1-4.

4. The water for Thornton's irrigated agricultural acreage flows through the Water Supply and Storage Company (WSSC) canal system in which Thornton owns 289 of the 401 municipal use water shares. R7924:4-12.

5. The 401 municipal water shares represent 2/3 of all water shares in WSSC. R7924:4-8. Despite having been converted for municipal use, these water shares have continued to be used mostly for agricultural irrigation (all but 21 of the 401 municipal shares remain currently used for agricultural irrigation). R7924:4-8.

6. The historical agricultural use of the majority of WSSC water shares is changing as municipalities need the water for municipal purposes. R7924:7-8.

7. Thornton's plan is to begin drying up its irrigated agricultural acreage in 2030, starting with two farms it refers to as the "I-25 farms." R7767:24-7768:6.

8. WSSC testified that as Thornton and other municipalities divert their water shares for municipal use "it's going to be a struggle for us to be able to take care of all of rest of those farms for…as long as they want to keep farming, because the total amount of water in the [WSSC] system, obviously is going to be dropping." R7934:13-24.

Thornton's pipeline project will enable it to commence further removal of water from irrigated farmland in Larimer County. While Thornton's focus has been that its water decree authorizes such use, that was not the focus of the Board. It is the *impacts* of Thornton's removal of significant water from agricultural use in Larimer County that is relevant to the Board, not whether Thornton has secured the right to use its water for municipal purposes. The Board, relying on the above competent evidence, decided the conversion of significant irrigated farmland to non-irrigated dryland grass will reduce the

productivity of such agricultural lands that, without further mitigation, outweighs the benefits of Thornton's proposal.

In addition to re-weighing the evidence, Thornton argues the Board could only consider the physical impacts of installing the pipeline and therefore impacts on irrigated agriculture was outside the Board's authority. Opening Brief, p 63. First, Thornton's argument is based on an unreasonably narrow reading of the criterion. The criterion looks at the balance of benefits of the proposed development with its impacts on natural resources and the productivity of agricultural lands. There is no express or implied limitation that only physical impacts from digging a hole in the dirt can be considered. Further, Thornton's narrow interpretation conflicts with the purposes of 1041 regulations which are to manage land development impacts on the health, welfare, safety and protection of Colorado's environment and "to supervise land use which may have an impact on the people of Colorado beyond the immediate scope of the land use project." §24-65.1-101(1), Colo. Rev. Stat.; *City and County of Denver By and Through Board of Water Com'rs v. Board of County Com'rs of Grand County*, 782 P.2d 753, 755 (Colo. 1989).

vii. Criterion 14.10(D)(11) *The proposal demonstrates a reasonable balance between the costs to the applicant to mitigate significant adverse affects (sic) and the benefits achieved by such mitigation.*

The Board inquired about options that Thornton initially considered that involved a combination of pipes and use of the Poudre River to convey water to Thornton. Thornton testified it believes conveyance options that include the Poudre River would degrade the quality of water and cause loss through evaporation, and therefore these options did not advance past initial consideration. R7606:14-7613:7. Thornton also testified its water court decree requires diversion of its water from a specific point, WSSC Reservoir No. 4, and

therefore any conveyance option must abide by the water decree. R7597:21-25.

The record has contrary testimony from a water lawyer, Ryan Donovan, who opined Thornton's water decree allows for a change in the diversion point with certain agreements and notice to the Division Engineer, and providing such notice is relatively routine. R7379:1-7380:15. Thornton acknowledged a change to the water decree would be an option, albeit an unattractive one in its estimation. R7079:6-8. And further, Mr. Donovan testified there is no legal barrier to Thornton seeking changes to its water decree that would allow it to store its water in "new buckets" closer to Thornton that would significantly reduce the length of pipeline. R7017:14-7018:23.

The Board also heard testimony from attorney John Barth who referred to an expert report from Lisa Buchanan, LRB Hydrology & Analytics, which refutes Thornton's claim that water quality would be degraded if taken out downstream on the Poudre River. R7269:23-7270:4. The report from Ms. Buchanan is in the record at R8396-8432, and concludes that water taken from the Poudre River downstream and above the Mulberry Water Reclamation Plant would be at least as clean as the water taken from WSSC Reservoir No. 4. R8422. Further, Ms. Buchanan opined that even water taken below the reclamation plant would satisfy safe drinking water standards and recommendations more than 50% of the time without treatment, and otherwise would satisfy the standards with some treatment. R8422.

Thornton acknowledged that it currently treats its water at a treatment plan, and such water is similar in quality to what would be found in water that has traveled via the Poudre River through the City of Fort Collins. R7589:13-17. Thornton did not evaluate the cost of treating water withdrawn from downstream on the Poudre River, and could only venture a

guess of $10 million per year when asked by the Board to "spitball it" and "just guess." R75911-17.

To be clear, the Board did not find Thornton must withdraw its water from a location other than WSSC Reservoir No.4 or use the Poudre River as a means of conveyance. However, Thornton's project will have significant impacts as outlined in other sections of this Answer Brief, and the Board must evaluate the balance of costs to mitigate those impacts with the benefits of the mitigation. A cost/benefit analysis of mitigation steps proposed by citizens—namely involvement of the Poudre River—could not be performed because Thornton rejected such mitigation steps are even possible. There was conflicting evidence about the feasibility of Thornton's use of the Poudre River in any respect, and regardless of whether its diversion point remains at WSSC No. 4 as provided in Thornton's water decree. After considering the conflicting evidence, the Board concluded Thornton failed to satisfy the criteria requiring a balance of the costs to mitigate impacts with the benefits of achieved by such mitigation. R6839.

c. Whether the Board exceeded its jurisdiction by misapplying criterion 11 of the 1041 permit criteria.

Thornton argues that its pipeline project will have no adverse effects, only short-term temporary impacts. Opening Brief, p 66-67. This argument is premised on a faulty assumption that Thornton's proposal will not have any long term or permanent adverse impacts. As outlined elsewhere in this Answer Brief[6], there is competent evidence that Thornton's proposal will have substantial and permanent impacts in Larimer County. The Board's evaluation of the costs to mitigate those impacts with the benefit of the mitigation is not an exceedance of jurisdiction but

[6] Sections IV(b)(i); IV(b)(iv).

required by the 1041 permit review criteria.

d. Whether the Court's review includes the Board's written Findings and Resolution or is limited to the Board's verbal deliberation.

Thornton states (i) the Board's decision is limited to the verbal statements each Commissioner made at the close of the hearing on February 11, 2019; (ii) only those statements or reasons shared by two or more of the Commissioners (i.e. a majority) constitute the "decision" to be considered by the Court; and (iii) any facts, analyses, rationales, etc. verbally articulated by the Board must be set out in the written decision (Findings and Resolution), meaning the Court cannot consider anything in the Findings and Resolution that was not verbally stated when the Board announced its decision on February 11, 2019.

This position hoists Thornton on its own petard. To adopt Thornton's argument means the Board's decision was full and final at the conclusion of the hearing on February 11, 2019. Under this premise, the jurisdictional deadline for Thornton's Rule 106(a)(4) complaint was March 11, 2019 (28 days from the final decision pursuant to C.R.C.P. 106(b)). Thornton filed its complaint on April 16, 2019, far past this deadline, meaning the Court would have no jurisdiction over Thornton's Rule 106 claim. *3 Bar J. Homeowners Ass'n v. McMurry,* 967 P.2d 633, 634 (Colo. App. 1998) (the mandatory time period under C.R.C.P. 106(b) begin to run at the point of "administrative finality," which occurs when the "action complained of is complete, leaving nothing further for the agency to decide. The date of the public vote by the Board of County Commissioners, and not the date final plats were approved and recorded, was the point of administrative finality that triggered the 30-day time limitation."); *Park County v. Board of County Commissioners,* 969 P.2d 711 (Colo. App. 1998)(when a tribunal announces its decision in a quasi-judicial proceeding, a party seeking judicial review under Rule 106 must file the complaint within 30 days after the ruling is announced).

Contrary to its own arguments, Thornton recognized the Findings and Resolution as the final decision of the Board when it filed its Rule 106 complaint exactly 28 days from the date the Board signed its Findings and Resolution (March 19, 2019). R6840. Thornton takes no exception to the parts of the Findings and Resolution describing the course of events or that it met five of the twelve criteria, even though a majority of the board did not comment on any of those criteria at the conclusion of the hearing. Thornton cites to and otherwise relies on many parts of the Findings and Resolution that were not verbally discussed by the Board. Thornton cannot have it both ways.

Further, Section 12.4.3 of the Land Use Code sets out the order of proceedings for a public hearing. Step "G" states: "*Decision of board of or commissioners.* The board or commission makes its decision or recommendation to approve, approve with conditions or deny the application. The decision must be in writing." This makes clear that the commissioners will issue a written decision. The Board announces a decision verbally at the conclusion of the hearing in the interests of transparency and out of respect to the public who often have attended and listened to hours of testimony. The public deserves to know the outcome sooner than later. Moreover, this custom and practice is observed by other county commissioners in Colorado.

In *Wilson v. Bard of County Commissioners of Weld County,* 992 P.2d 668 (1999), the Board adopted a verbal resolution denying plaintiffs' requested permit at the conclusion of a public hearing. The decision was subsequently reflected in a written resolution that detailed its findings and conclusions. The Board's actions in entering the written resolution and later revising it demonstrates that the Board's verbal decision was not the final decision.[7]

[7] This Court addressed the issue of verbal pronouncements at the conclusion followed by a written decision in *Estes Valley Recreation and Park District v. Joshua Tobey, et.al,* Larimer county District Court Case No. 1955CV11918, Order Denying Motion to Dismiss (December 12, 2019) appended to this Brief as Exhibit "A".

Colorado courts have also variously addressed this practice within the judicial context. In *Koontz v. Rosener,* 787 P.2d 192 (1989), the court, at the conclusion of the trial, made remarks and opinions. The court then directed defendant's counsel to prepare written findings, conclusions, and judgment. Plaintiffs argued that because the court's written findings varied from those it announced earlier on the record in open court, the inconsistent written findings must be set aside. The Court rejected this argument: "A court's remarks or expressions of opinion made during or at the end of a trial are not necessarily formal findings of fact prepared as the basis for a judgment . . . . [T] findings that serve as the basis for the court's judgment are those it formally approved and adopted contemporaneously with the entry of judgment." Id. at 195

In *Jones v. Boyer,* 193 P. 568, 569 (Colo. 1920) the Court noted, "the judge, as judges often do, after the argument had been made, discussed the case at length but his remarks, as is usual in such cases, were informal and desultory, consisting mostly of comments on the evidence and the witnesses, and we cannot regard them as of the force of formal findings, prepared as a basis for a judgment; there is nothing to indicate that they were so regarded by the judge." *See also, In re Marriage of West,* 94 P.3d 1248, 1250 (Colo.App. 2004); *Rock Mountain Health Maintenance Organization, Inc. v. Colo. Dept. of Health Care Policy and Financing,* 54 P.3d 913, 918.

In addition, Thornton's assertion that the Board acted covertly in violation of the Colorado Open Meetings Act when it voted on and approved the written Findings and Resolution is wrong. The Findings and Resolution approval occurred at a duly advertised meeting open to the public on March 19, 2019. R008681. This meeting fully complied with the Open Meetings Act. Thornton confuses a public **hearing** where the Board takes testimony with an open **meeting** where the Board typically does not take testimony. Thornton had constructive, if not actual, notice of this open meeting and could have attended. Because the taking of testimony had closed just prior to the

Board's vote on February 11, 2019, it was not error for the Board to sign the written decision as part of the consent agenda at the open meeting on March 19, 2019. This action did not deny Thornton due process any more than a judge who issues his or her written decision after a trial has concluded.

Moreover, quasi-judicial decision makers are not required to express every fact and reason for their decision, and even the findings themselves can be implied. *Hudspeth v. Bd. of County Comm'rs*, 667 P.2d 775, 778 (Colo. App. 1983) ("The absence of express findings by a lay board does not affect the validity of the decision where the necessary findings are implicit in the action taken.") (citing *Sundance Hills Homeowners Assoc. v. Bd. of County Comm'rs*, 534 P.2d 1212, 1216 (Colo. 1975)). Since an administrative board's findings may be express or implied, its decision should be upheld if there is support in the record for the decision. *Ross v. Denver Dep't of Health and Hosp.*, 883 P.2d 516, 518 (Colo. Ct. App. 1994), *cert. denied* (1994). Where necessary, the reviewing court should search the record to uphold the board's decision, and should "hold, in the absence of an express finding . . ., that there is an implicit finding in the decision of these prerequisite facts when the state of the evidence is such as would warrant the making of such finding by the board." *Sundance*, 534 P.2d at 1216 (quotation marks omitted); *Colo. Office of Consumer Counsel v. Public Util. Comm.*, 786 P.2d 1086, 1091 (Colo. 1990). Thornton's argument that the Board's written Findings and Resolution should be ignored or discounted is inconsistent with the court's function of reviewing the entire record in search of credible evidence to support the Board's decision.

e. Whether Thornton can proceed under Location and Extent Review and disregard the Board's decision made pursuant to Larimer County's 1041 regulations.

At page 71 of the Opening Brief, Thornton states:

> Given the unique facts of this case, the Court should also revisit the ability of municipalities to rely on C.R.S. § 30-28-110(1)(c) and find that Thornton can overrule the BOCC's denial of its 1041 permit in

> this case. Under this provision, a municipality constructing a utility in another jurisdiction can override the planning commission's decision in the extraterritorial jurisdiction by a majority vote of the municipality's council.

The statute to which Thornton refers provides for what is commonly known as a "location and extent" review. It is a mechanism by which one governmental entity project is reviewed by another governmental entity in whose jurisdiction the project is to be constructed. The advisory review is performed by the local planning commission to determine if the project is in sync with the master plan of the hosting jurisdiction. The planning commission's decision may be overruled by the project entity's governing body. This perfunctory review does not apply, however, where a county has elected to adopt 1041 regulations which allow for a detailed review of the project and possibly denial. The allowance of a 1041 process by the General Assembly was a means to allow local governments more authority over large projects that could significantly impact them.

Thornton's attempt to distinguish *City of Colorado Springs v. Board of County Commissioners of Eagle*, 895 P.2d 1105 (Colo. App. 1994) is unavailing. The Court's decision did not turn on the voluntariness or involuntariness of the cities' agreement to follow Eagle County's 1041 regulation. That was dicta. The decision turned on the conclusion that the 1041 statute, though adopted before the location and extent statute (later statute controls principle), was more specific (specific controls over general principle). The Court's decision also recognized that the Colorado Supreme Court had decided years earlier that the location and extent statute did not exempt a municipality from complying with a county's 1041 regulations. *City & County of Denver v. Bd. of County Com'rs of Grand County,* 782 P.2d 753, 763-764 (Colo. 1989).

By its own admission, Thornton spent years, hundreds of man-hours and significant expense pursuing a 1041 permit. Those actions belie its new argument that the truly applicable process is a location and extent review. As such the argument rings hollow.

RESPONSE TO MOTION FOR DECLARATORY JUDGMENT

Thornton's Complaint includes twelve claims for relief, the first eleven of which seek judicial review under C.R.C.P. 106(a)(4) and are addressed by the Board in the Answer Brief above. The twelfth claim is brought for a declaratory judgment pursuant to §13-51-101 C.R.S. *et seq*., C.R.C.P. 57, and Colo. Const. Art. III. ("Rule 57 Claim"). This claim sets out four allegations:

> 182. Thornton incorporates into this claim for relief all of the allegations in the preceding paragraphs.
>
> 183. The Board misconstrued its criteria and the scope of its powers under the 1041 Act in denying Thornton's 1041 application.
>
> 184. Thornton is entitled to the Court's determinations and declarations that Thornton complied with the 1041 criteria. A ruling from the court will resolve a current dispute.
>
> 185. Thornton has no other plain, speedy and adequate remedy otherwise provided by law; therefore, Thornton is entitled to declaratory relief.
>
> Complaint, p 30.

As presented in its Complaint, Thornton's Rule 57 Claim is a reiteration of its Rule 106 Claim and seeks the same relief: declare the County's decision was wrong, set it aside, and order the County to issue the 1041 permit. Without more, this duplicative claim should be dismissed as a matter of law. *Fairall v. Frisbee,* 104 Colo. 553, 92 P.2d 748 (1939) (Where in the pleadings in an action for a declaratory judgment, no question is presented which is properly cognizable under the uniform declaratory judgment act, the suit should be dismissed).

But now there is more. On February 24, 2020, Thornton filed a Motion for Declaratory Relief and Determination of Questions of Law pursuant to C.R.C.P. 57 (declaratory judgment) and 56(h) (summary judgment on a question of law). This Motion requests the Court:

> 1. Rule that the County cannot consider, condition or deny Thornton's 1041 permit application for a pipeline based on any alternative that would change, impair, infringe, take or condition:
>
> (a) Thornton's constitutional right to build a pipeline and its property rights;
>
> (b) Water matters already determined under the exclusive jurisdiction of the Water Court, such as Thornton's water diversion point, delivery point, water quality, water quantity, and use, or alter Thornton's requirement to cease irrigation on Thornton-owned farms; and
>
> (c) Thornton's delivery point in violation of the WSSC Contract.
>
> 2. Rule that the County cannot diminish the quantity and degrade the quality of Thornton's water rights in violation of the 1041 Statute.
>
> 3. Rule that the County cannot fall outside of its authority under the LUC.
>
> *Motion*, p 36.

Thornton's Motion then goes on to provide a detailed history of the acquisition of its water rights, the nature of its water rights, the holdings of the Water Court, and a synopsis of applicable water law.

Section 13-51-106, C.R.S., states:

> Any person interested under a deed, will, written contract, or other writing constituting a contract or whose rights, status, or other legal relations are affected by a statute, municipal ordinance, contract, or franchise may have determined any question or construction or validity arising under the instrument, statute, ordinance, contract, or franchise and obtain a declaration or rights, status, or other legal relations thereunder.
>
> *See also,* Rule 57 (b) C.R.C.P. (same language).

By its explicit terms, the declaratory judgment statute and rule require the Court to determine parties' rights, status and legal relationship with respect to a document. In this case, the document is the decree entered by the Water Court. Thornton's Motion is premised entirely on its speculative supposition that the County denied Thornton's pipeline in an effort to alter Thornton's water decree and cause Thornton to use the Poudre River as a means of conveyance of its water.[8] Thornton's supposition is wrong.

In Section II(c) of its Rule 106 Answer Brief above, the County sets out its authority to regulate matters of state interest under 1041, including installation of pipelines, notwithstanding there is a collateral effect on Thornton's water. This collateral effect does not translate to surreptitious motive to deny Thornton's use of its water. The County expressly acknowledged Thornton's right in its Findings and Resolution. The County's decision does not interpret, apply, or change Thornton's water rights or its point of diversion. Most importantly, the County has not taken any position with respect to Thornton's water decree.

A "court may refuse to render or enter a declaratory judgment or decree where such judgment or decree if rendered or entered, would not terminate the uncertainty or controversy giving rise to the proceeding. §13-51-110 Colo. Rev. Stat.; C.R.C.P. 57(b). The hallmark of a declaratory judgment action is an actual case or controversy. In *Beacom v. Board of County Com'rs of Adams County,* 657 P.2d 440 (Colo. 1983), the board of county commissioners denied certain of the district attorney's budget requests. The district attorney filed a petition for writ of mandamus to require the board fund the full amount of his budget and for a declaratory judgment that the employees of his office were employees of the

[8] Thornton's Rule 57 Motion includes many of the same facts and arguments set out in its Rule 106 Opening Brief. The County has addressed these in the Rule 106 part of its Answer Brief and incorporates those arguments rather than repeat them here.

judicial district and not county employees subject to county administrative requirements.

The court passed on the budget question and then turned to the question of the status of the district attorney's employees. As to that question, the court held:

> The only actual controversy before the district court was the board's denial of certain budgetary items. We view the remaining requests for declaratory judgment—that of the district attorney for a declaration that the employees of his office are employees of the 17th Judicial District, and that of the county for a declaration that the employees of the district attorney's office are county employees for purposes of a variety of insurance and retirement programs and the county pay, classification and benefit plan—as requests for advisory opinions.
>
> The Uniform Declaratory Judgments Law, section 13–51–101 *et seq.,* C.R.S.1973 and C.R.C.P. 57 give the district court the power to declare rights, status, and other legal relations affected by a statute when the court is presented with a question of construction or validity arising under the statute, but the court may refuse to render or enter a declaratory judgment or decree where such judgment or decree would not terminate the uncertainty or controversy. **A proceeding for declaratory judgment must be based upon an actual controversy and not be merely a request for an advisory opinion.** *Farmers Elevator Company v. First National Bank,* 176 Colo. 168, 489 P.2d 318 (1971); *Heron v. City and County of Denver,* 159 Colo. 314, 411 P.2d 314 (1966); *Ahern v. Baker,* 148 Colo. 408, 366 P.2d 366 (1961); *Taylor v. Tinsley,* 138 Colo. 182, 330 P.2d 954 (1958). In addition, for a declaratory judgment to be binding, the necessary parties must be before the court. *City and County of Denver v. Denver Land Co.,* 85 Colo. 198, 274 P. 743 (1929). Here, neither party adduced evidence as to a number of the purposes for which the county requested a declaration of employee status nor were the individual employees joined in order that they might be bound by the court's determination. Consequently, it was inappropriate for the district court to rule that the employees of the district attorney's office were employees of the 17th judicial district or to imply that they were employees of the county for a variety of purposes.

Id. 446-447. (Emphasis added).

Beacom is only one of a plethora of cases where the court has asserted the need for a case or controversy in order to act. *See e.g., Associated Master Barbers, Local 115 v. Journeyman Barbers, Local 205*,

132 Colo. 52, 285 P.2d 599 (1955) (The supreme court will not render an advisory opinion in declaratory judgment actions.); *Gabriel v. Board of Regents*, 83 Colo. 582, 267 P. 407, 408 (The real question is, "have such questions 'arisen' "? This act was not intended to repeal the statute prohibiting judges from giving legal advice, nor to impose the duties of the profession upon the courts, nor to provide advance judgments nor to settle mere academical questions. . . . Court is not required to reply to mere speculative inquiries.); and *Mulcahy v. Johnson,* 80 Colo. 499, 512, 252 P. 816 (1927) (We decline to determine those questions which have not yet arisen, and which may never arise. Courts are not required to give general advice and instructions upon matters which have not arisen at the time their jurisdiction is invoked. The court should refuse to answer speculative inquiries.).

Here there is no controversy. Thornton says: ". . . [T]he [County] by its own admission has only the limited authority granted to it by the 1041 Statute 'to approv[e] the siting and development of pipelines.' R6839. This limited authority does not allow the [County] to deny Thornton's chosen means of its water delivery – a pipeline – as that right is granted by the Constitution. Nor does the [County's] limited authority allow it to determine where the pipeline starts or what water Thornton can take through the pipeline." *Motion*, p 4. The Board agrees! The Board's decision was that Thornton's proposal does not satisfy certain of Larimer County's 1041 permit review criteria— it did not deny Thornton the use of a pipeline nor dictate a starting point for it.[9] Thornton, with speculation and argument cannot turn the Board's decision into a water controversy requiring intervention by this Court.

[9]Thornton admits in its Rule 57 Motion, Footnote 7, Page 5 that the ideas of conveying the water by the river or canal were "proposed by the **public.**" Thornton notes that the County Staff advised the County that the 1041 regulations only covered the siting and design of pipelines and did not allow Larimer County to regulate Thornton's water rights, source water, or amend Thornton's Water Decree and that the County acknowledged this. Rule 57 Motion, p 7-8. Thornton's assertion that the County acted contrarily is fiction.

Thornton also strenuously argues the Water Court is the only entity with jurisdiction as to its water rights. Thornton then contrarily asks this Court to intervene and interpret and apply the water decree. This Court cannot do so. The Water Court entered the decree after a decade of litigation that involved numerous parties in interest. The Water Court retains exclusive jurisdiction over the case and its decree. This Court cannot alter, amend, interpret, or supplement that decree without notice and involvement of all parties to the Water Court litigation. §13-51-115, Colo. Rev. Stat. (When declaratory relief is sought, all persons shall be made parties who have or claim any interest which would be affected by the declaration); *City & County of Denver v. Denver Land Co.,* 85 Colo. 198, 274 P. 743, (1929) (As desirable as it might be to have an announcement of the court upon a question, it would be improper for it to decide in the absence of the necessary parties).

Thornton seeks an advisory ruling to direct the County to act in a particular manner should this case be remanded. Equally, Thornton seeks to limit the nature of the evidence that may be presented to the County should a further hearing on remand occur. "The Court's declarations or rulings protecting Thornton's constitutional and property rights are also critical to providing the appropriate guidance and side-boards to the [County] in the event that the Rule 106 appeal is remanded, or if Thornton has to re-apply. Otherwise, the [County] will again improperly consider, condition or deny Thornton's 1041 permit application based on matters that are outside its authority." Motion, p 6. Thornton directs this Court to control the County's future actions should they arise. On this point, precedent is clear: declaratory judgment proceedings may not be invoked to resolve a question which is nonexistent, even though it can be assumed that at some future time such question may arise. *Heron v. City & County of Denver,* 159 Colo. 314, 411 P.2d 314 (1966); *Taylor v. Tinsley,* 138 Colo. 182, 330 P.2d 954 (1958).

There simply is no judicial Rule 57 claim here. Thornton does not seek this Court's interpretation of the Water Decree. Thornton asks this Court to read the decree, obey it according to Thornton's terms, and enforce it.

CONCLUSION

For the reasons herein the Board respectfully requests the Court affirm its decision denying Thornton's 1041 permit application.

DATED: June 1, 2020.

LARIMER COUNTY ATTORNEY'S OFFICE

By: s/William G. Ressue
Jeannine S. Haag, Reg. No. 11995
William G. Ressue, Reg. No. 34110
Attorneys for Defendants

CERTIFICATE OF SERVICE

The undersigned certifies that true and correct copies of the foregoing DEFENDANTS' COMBINED ANSWER BRIEF AND RESPONSE TO MOTION FOR DECLARATORY JUDGMENT was served using the Colorado Courts E-Filing system this 1st day of June, 2020, which will send notification to the following:

Luis A. Corchado
Joanne Herlihy
City of Thornton
9500 Civic Center Drive
Thornton, CO 80229
luis.corchado@cityofthornton.net
joanne.herlihy@cityofthornton.net

Mike Chiropolos
Chiropolos Law
3325 Martin Drive
Boulder, CO 80305
mike@chiropoloslaw.com

John M. Barth
P.O. Box 409
Hygiene, CO 80533
barthlawoffice@gmail.com

s/Jennifer D. Infeld

LAW OFFICE OF
JOHN M. BARTH

P.O. BOX 409 HYGIENE, COLORADO 80533 (303) 774-8868 BARTHLAWOFFICE@GMAIL.COM

By email (ellislk@co.larimer.co.us)
Leslie Ellis
Larimer County Community Development
P.O. Box 1190
Fort Collins, CO 80522-1190

April 17, 2020

Re: Request for reconsideration of March 18, 2020 completeness determination for Northern Colorado Water Conservancy District, Northern Integrated Supply Project 1041 Application

Ms. Ellis:

On behalf of No Pipe Dream Corporation, Save Rural NoCo, and Save the Poudre, we are writing to ask you to reconsider, and reverse, your March 18, 2020 determination that that the NISP 1041 application is complete. Exhibit 1 hereto. As highlighted below, there are numerous significant deficiencies with Northern Colorado Water Conservancy's District's ("Northern") 1041 application for the Northern Integrated Supply Project ("NISP") as posted by the County at the following website: (https://www.larimer.org/planning/NISP-1041). In light of these numerous deficiencies with the application identified herein, we believe your interpretation and/or administration of the Land Use Code ("LUC") and your completeness determination is in err and should be reversed. Thus, we are asking to reconsider and reverse your March 18, 2020 interpretation and determination. LUC §3.5.A. As per LUC §22.2.2.A.1, we also request a 30-day extension of the deadline for appealing your March 18, 2020 completeness determination to the Board of County Commissioners. Also, please provide us with a copy of the appeal form, as referenced in LUC §22.2.2.A.2, and inform us of any applicable appeal application fee in the event you do not reverse your March 18, 2020 interpretation/determination and we are forced to file such an appeal with the Board.

Below, this letter identifies both substantive deficiencies with the application and deficiencies with the documents posted to the County's website.

Substantive Deficiencies with application

1) The application is incomplete as to the relocation of Highway 287. The relocation of 7 miles of a major federal highway would not occur "but for" the NISP project, so attempting to bifurcate major components of NISP and treat the highway relocation as a separate "CDOT" project would unacceptably leave out major impacts to Larimer County

resources and residents. The relocation of U.S. Highway 287 is part and parcel of NISP, it must be included in the 1041 application.

- The NISP application states "Larimer County in its designation of areas and activities of state interest and associated 1041 permitting process declined to regulate state highways." A memo included in the application states:

  The County land use code regulates the construction of Glade Reservoir and all appurtenant uses, including appurtenant roads, however U.S. Highway 287 is not an appurtenant use of Glade Reservoir. The County's land use code does not define "appurtenant" or "appurtenant road," but "appurtenant" means "annexed to a more important thing" and an "appurtenance" is "something that belongs or is attached to something else." See Black's Law Dictionary. A use is the privilege or benefit of using something. See Use, Webster's Online Dictionary. Together, appurtenant and use refer to the secondary or tertiary benefits derived from the construction of Glade Reservoir. Appurtenant roads at Glade Reservoir will be the roads subordinated to and used for the benefit of Glade Reservoir and recreation at the reservoir. The relocation of U.S. Highway 287 is a one-time consequence of the reservoir's construction, not an ongoing benefit provided by it. Glade Reservoir will not be "used" to relocate U.S. Highway 287 - rather the highway is an impediment to Glade's development and must be realigned.
- The current 1041 regulations do not list "state" or "federal" highways as exemptions from Designated Matters of the State.
- The relocation would have significant impacts on land uses in Larimer County, disturbing up to 145 acres of open land.
- Elevating the highway out of it's current valley-bottom alignment and turning it up and over a hogback would create significant visual impacts and noise because the topographic screens would be lost and these impacts will significantly degrade quality of life and impact property values. The impacts of increased noise and aesthetics on rural residents must be evaluated.
- U.S. Highway 287 has a high number of motor vehicle accidents each year. The NISP project has forced CDOT to identify a new alignment (and CDOT has selected a preferred alignment) that involved taking a straight alignment along a valley bottom and turning it up and over a high hogback. How will that curvy realignment affect the accident rate on the highway, and how will local emergency services be affected? How will the noise of traffic, especially the heavy truck traffic, be mitigated? The new alignment will increase emergency response times by at least 5 minutes, critical minutes in a life-threatening emergency. These are key public health and safety concerns that are not addressed in the application.
- NISP and Larimer County publicly stated that the realignment of US Highway 287 would be included in the County's analysis, first when the proponent was proposing an Intergovernmental Agreement, and then for several months after it opted to complete a full 1041 permitting process. So, up until a few months ago,

the public was led to believe that the Highway 287 relocation would be part of the permit.

2) The application is incomplete because it doesn't provide sufficient and necessary information on the feasibility of the project, specifically with regards to water rights. The project is relying on a farm-buying scheme that 1) the Corps of Engineers has deemed doesn't meet the purpose and need for the project and 2) will have significant environmental and socio-economic impacts which aren't analyzed in any environmental document.
3) The application states, "Plans and designs presented in this 1041 Permit application have been developed at a conceptual level." The project has had 2 major changes in the past year, since the final EIS was published. The application does not, therefore, provide a complete project description. Because significant impacts from the project as currently proposed to the County have not been fully disclosed and mitigation has not been appropriately developed, determinations regarding evaluation criteria cannot be made.

Criterion 1. The proposal is consistent with the master plan and applicable intergovernmental agreements affecting land use and development.

4) The application is incomplete because it relies on an outdated County Master Plan. The application refers to the 1997 Master Plan and provides rationale for project compliance with that plan. However, the County adopted The Larimer County Comprehensive Plan in 2019. , Based on our correspondence with the County, this is the appropriate governing document for this 1041 permit application (and the existing land use code is still in effect, although it is being revised). If the County is choosing to use the 1997 Master Plan for the evaluation of this project, it must clearly provide this information to the public so the public can provide input regarding the conformance of the project with land use plans. However, it would appear that the 2019 Comprehensive Plan is in effect and applies, rather than the 1997 Master Plan.

   The application <u>does not address</u> the questions posed by The Larimer County Comprehensive Plan for the Mountains and Foothills and Natural Resource Areas that Glade Reservoir would occupy:
   - *How does the project adequately protect air and water quality, cultural and natural resources, and minimize fragmentation of the landscape?* The application defers each of these issues to some later permitting/planning effort.
   - *How does the project avoid impacts to the open character of rural areas, unique or highly visible viewsheds, landforms and ridgelines?* The project does not avoid such impacts.
   - *How does the project consider the natural terrain in its design and siting to minimize environmental impacts and avoid or reduce hazard risk to an acceptable level?* The project severely alters the natural terrain and appears to exacerbate hazard risks.

- *How does the project mitigate risks and reduce economic costs of natural hazard events to increase resiliency?* The projected influx of up to 500 people during construction and almost 400,000 people during operations to this high fire risk area only increases the potential for fires. More human activity increases the likelihood and frequency of human-caused fires, putting local homeowner's lives and property at risk.
- *How does the project comply with County policy, Code, Master Plans, and initiatives in relation to hazard risk reduction?* It doesn't. The application presents only conceptual plans (see section 12.0 in the application); a massive construction project, with huge infrastructure and the potential for hoards of visitors only increases hazard risk, especially fires and medical emergencies.

Larimer County has had land use and zoning regulations for decades, going back to 1963. These regulations set the rules for developing land in the unincorporated areas of the County and are intended to protect landowner rights while also looking out for overall community interests. The application does not provide sufficient information to evaluate impacts to landowner rights and in fact provides much misinformation and deferred promises about mitigation. Furthermore, the application does not demonstrate how the project promote "overall community interests" because most of the benefits of the project would accrue to communities outside Larimer County, and the proposed recreational benefits are unlikely to materialize because water to fill the reservoir is not available and the reservoir would often be mostly empty. Finally, current events require a wholesale re-evaluation of the purpose and need for the project and the financial ability to proceed.

Criterion 2. The applicant has presented reasonable siting and design alternatives or explained why no reasonable alternatives are available.

5) The application is incomplete because it presents no alternatives. The application refers to the alternatives analysis conducted for the federal EIS process, which is unnecessarily limited to a water storage project and is out of date. There are many less costly and less environmentally destructive alternatives for water development now available. Finally, the application is for an alternative that involves both the Glade Reservoir and a farm-buying scheme that has not been evaluated in any of the federal EIS or Clean Water Act Section 4040 documents. Failing to present alternatives is a "my way or the highway" approach that would preclude informed decision-making contrary to the letter and spirit of the LUC.

Criterion 4. The proposal will not have a significant adverse affect on or will adequately mitigate significant adverse affects on the land or its natural resources, on which the proposal is situated and on lands adjacent to the proposal.

6) The application is incomplete because it does not adequately identify environmental impacts, analysis of key impacts to the land and natural resources is incorrect or inadequate, is not specific enough for local land use decision-making, or is deferred to some later permitting/approval process.

- The noise analysis did not identify sensitive receptors in the residential areas around the proposed dam or reservoir and did not monitor or model expected noise increases due to construction or recreation at these sensitive receptors.
- The air quality impact analysis is incorrect because it is based on a faulty calculation that it would take an 80-mph wind to raise any dust off the lakeshore. Misguidedly, the proponent used a stockpile in an industrial yard, with partially compacted surfaces and large particle sizes, as a surrogate for the sediments along the lakeshore, and concluded that fugitive dust during operations would not be an issue. In reality, many of the native soils are prone to wind erosion. Furthermore, the waves and ice and fluctuating water levels in the reservoir would work together to deposit fine materials on the lakeshore that would readily blow up and down the valley. This part of Larimer County is designated a very high wind area. Larimer County must conduct an independent analysis of impacts to air quality.
- Visual/aesthetic impacts would be significant. The construction of Glade Reservoir would change the character of the area. The EIS states that the scenic quality of residential areas near the reservoir would increase because the water would provide "texture". The application, however, fails to evaluate the extreme negative visual impacts of a partially filled reservoir and a barren shoreline. The existing scenic quality of Hook and Moore Glade is overlooked. The avoidance and mitigation measures (re-vegetation and planting) don't even begin to address this issue – once it's gone, it's gone.
- Visual impacts from the relocation of Highway 287 would also be significant. The elevated highway would be visible for miles, and the light pollution from nighttime headlights, also elevated to be seen for miles, would also severely impact visual resources in and around the reservoir.
- Noise associated with the elevation of highway 287 is not addressed. Once the highway rises above the topographic screens, the noise from over 14,000 vehicle trips per day, much of it large trucks, would have a unobstructed path into the surrounding hills.
- The effects on property values of dam and a partially full reservoir with exposed, un-vegetated lakeshores have not been disclosed.
- Section 7.1 of the application fails to mention the Bonner Peak residential area, whose landowners will be negatively affected by this project.
- The potential for trespassing and its associated impacts are not addressed. Rural residential landowners experience trespass already; an influx of non-owners to this area will only exacerbate the problem.
- The application fails to address how the rural character of the Hook and Moore Glade and its surrounds would be affected. Larimer County recognizes that its residents may choose to live in non-urban settings for any number of reasons that do not include an industrial project of this magnitude. These settings are becoming more and more rare and difficult to find.

- Most of the mitigation planning is deferred to a later date, to another agency, to another process, etc. The application provides concrete mitigation only for wildlife (which must also be reassessed since the water for a fishery is likely unavailable), which the applicant developed with the Colorado Division of Wildlife, but for air quality, for cultural and historic resources, for fire, and other impacted resources, the mitigation plans are "conceptual" or "will be developed", are grossly inadequate (e.g., planting trees to screen a 300-foot tall dam), or are simply not proposed (e.g., noise or aesthetics). Unbelievably, the air quality mitigation plan states that a mitigation plan is not needed. The fire mitigation plan ignores two of the affected fire protection districts. The fugitive dust mitigation plan is incomplete by simply calling for application of wastewater for dust suppression. The project relies on the permitting authorities of many other agencies (e.g., Colorado Department of Health and Environment), and the result is a piecemealed project.

Criterion 5. The proposal will not adversely affect any sites and structures listed on the State or National Registers of Historic Places.

7) The Final EIS states there are 82 eligible or potentially eligible cultural sites present in the Glade Reservoir APE. Eight of the sites are officially eligible and 74 require additional data and formal evaluation. There are numerous additional sites in the APEs of the 287 reroute and other proposed project facilities. The FEIS then states that all unavoidable adverse effects on historical properties would be mitigated following the process described in an as yet to be developed Final Programmatic Agreement. The Corps anticipates the Final Programmatic Agreement will contain a number of provisions for cultural resources mitigation. The Corps then anticipates that Northern Water would implement all feasible and prudent measures to avoid and minimize effects on historic properties and to mitigate all adverse effects. With all these yet to be conducted evaluations, Programmatic Agreement, and anticipations, the Corps (FEIS p.4-527: *Section 4.19.14 Effect Determination)* reaches the conclusion: "*Consequently, effects on directly affected historic properties would be either minor or moderate. Effects on indirectly affected historic properties would be either minor or moderate."* According to the definition of moderate provided by the Corps in that same section: "*In accordance with criteria in 33CFR325, Appendix C, the following terms are used to describe potential effects on cultural resources:……..Moderate: The effect on a designated historic property would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Measures identified in the Programmatic Agreement to minimize or mitigate adverse effects reduce the intensity of impacts under NEPA from major to moderate. The determination of effect for Section 106 would be an adverse effect"* Thus, the determination of effect for Section 106 of Northern Water's proposed action on those affected historic properties that consequently end up post-mitigation as moderate as concluded by the Corps will by definition be adverse effects. The application is incomplete because it does not contain an adequate analysis of Criterion #5.

Criterion 6. The proposal will not negatively impact public health and safety.

8) The application is incomplete because it does not adequately analyze wildfire impacts. Public safety may be adversely affected by wildfire.
    - While the fire mitigation plan states that wildfire mitigation will follow Larimer County's Recreation Regulations, none of the documentation addresses the real danger of the people who don't follow the regulations and the consequences thereof. With a reservoir of this size, and a trail along the edge, visitors may build fires, smoke and inappropriately discard still burning cigarettes/cigars and/or discharge fireworks outside of the campground, disregarding regulations, and inadvertently start fires. The application fails to analyze these reasonably anticipated actions.
    - Many wildfires are started by people. The County cannot encourage almost 400,000 people to one of the most fire-prone areas in the state and simply hope for the best. It is also one of the windiest areas in the County. The fires that have recently occurred in this area have cost tens of millions of dollars to suppress and have resulted in hundreds of millions of dollars of private property damage, and one fatality.
    - Increased fire risk will impose costs and risks for nearby affected residents and communities that have not been addressed.
    - The application focuses on the Poudre Fire Authority as the primary fire response agency (see fire mitigation plan), but both Livermore and Wellington Fire Protection Districts overlap with the proposed reservoir (e.g., the north end of the reservoir and the proposed trail). Both fire protection districts are rated as having high potential for wildfires. The application doesn't address this.
    - The suppression costs are paid for by taxpayers. The application fails to fire risk and the costs associated with suppression, loss of life and property.
    - Section 7.0 of the application states that the Natural Hazard Mitigation Plan for Glade Reservoir (Technical Memo No. 8) addresses wildfire hazard and mitigation, but this memo does not address wildfire at all.

9) The application is incomplete because it fails to evaluate the possible public health issues the project's many air emissions may exacerbate.
    - The public health and aesthetic issues surrounding fugitive dust, which, as noted above, the application erroneously concludes would not be an issue during project operations. The application must address these potential impacts, especially in light of the lack of water, and a regular (if not permanent) low-water situation, which will result in frequently exposed, barren shores.
    - The public health issues associated with the emissions of ozone precursors (VOCs and NOx) from recreational uses are not disclosed. Larimer County is frequently a severe non-attainment area for ozone. Most recreation would occur during the hot summer months, when ozone is readily formed. It might move up the valley, to the rural properties, or down, into Bellevue, Laporte, and Fort Collins. The application doesn't address this issue.

- The pumping stations would emit over 30,000 tons per year of CO2 and ozone forming compounds. Colorado's climate change policies are calling for large reductions in greenhouse gas emissions. The application must clearly state how the emissions of CO2, water vapor, and other greenhouse gases will comply with Colorado's policies.
- Black carbon emissions (from motorized boating), and their potential to affect public health, are not addressed.

Criterion 8. Adequate public facilities and services are available for the proposal or will be provided by the applicant, and the proposal will not have a significant adverse effect on the capability of local government to provide services or exceed the capacity of service delivery systems.

10) Larimer County would pay 25% of the $21.8 million cost to develop the recreational facilities, or $5.5 million. The application predicts that total economic benefits would be between $13 and $30 million, but these estimates are incorrect because they are based on the 1) a full compliment of water rights, which Northern Water does not possess, 2) the proponent's modeling (which does not account for future hydrologic conditions and therefore likely overstates reservoir fill levels, and 3) the proponents faulty calculations regarding revenue. The application, therefore, lacks a realistic forecast of recreational income. Operation of Horsetooth Reservoir costs over $1.7 million per year, and most of the costs are paid for by entrance fees. If Glade would rarely be "full enough" to provide recreational (especially in the form of motorized watercraft with its high entrance fees), then who will pay the operational fees? The risks and costs to taxpayers must be thoroughly explained in the application.

11) The FEIS does not assess potential impacts form the range of risks to water supplies to Glade. Climate change, including rising temperatures and the very real threat of increasing frequency of prolonged droughts, and uncertainties in future water policy and water rights acquisitions, represent plausible risks to water supplies to Glade. A robust water supply vulnerability study that considers the range of plausible risks to water supplies at Glade should be part of the County's review process. As it stands, the FEIS does not provide decision-makers and the public the information necessary to evaluate the feasibility, levels of service, and potential value of proposed recreation at Glade.

12) The application fails to disclose how the siting, construction, and operation of an industrial facility in a rural setting will impact sheriff, fire, and other emergency services. For example, the fire mitigation plan states that fires won't be an issue because the campgrounds will be operated in accordance with Larimer County regulations. But this ignores the fact that wildfires are often started by accident, or even by arson, and in this area, one wrong fire in the right conditions could be devastating. In addition, how will the LCSO deal with a 14% increase (for example, 2,000 vehicles traveling to the reservoir on a summer day) in the number of vehicles (currently about 14,000 per day) on

highway 287? How will the emergency services teams (some of which are all volunteers) that protect these rural areas compensate for the increased number of calls? What is the expected increase in number of calls? How will service to existing communities be impacted by the need to serve visitors?

Criterion 10. The benefits of the proposed development outweigh the losses of any natural resources or reduction of productivity of agricultural lands as a result of the proposed development.

13) The application is incomplete because it does not identify the farms that will be purchased to acquire the water needed to implement the project. Without information on the location of the farms and water rights to be purchased in Larimer County, it is impossible to determine whether the benefits of the proposed development outweigh the losses of any natural resources or reduction of productivity of agricultural lands as a result of the proposed development.
14) The application incorrectly assumes that rural landowners view huge reservoir-based recreation as a benefit, and it fails to address how the natural aspects of the quality of life adjacent to Hook and Moore Glade would be irrevocably destroyed by the project.
15) The application is incomplete because it fails to analyze the negative impact to the Cache la Poudre River from removing vast quantities of water from the watershed. There is no analysis of the "benefit" of draining the River and storing water in Glade Reservoir versus keeping the water in the River.

Criterion 11. The proposal demonstrates a reasonable balance between the costs to the applicant to mitigate significant adverse affects and the benefits achieved by such mitigation.

16) The application is incomplete because there is no discussion of costs and adverse impacts to the River versus the benefit of such mitigation.
17) The application defers much mitigation planning to a later permit or process, so for many resources, insufficient information has been provided to assess whether this criterion is met. The applicant must provide concrete, not conceptual, mitigation plans and the costs thereof and the benefits to be achieved. The application should also disclose which adverse affects cannot be mitigated.

Deficiencies with application materials posted to the County's webpage

The NISP application materials the County posted to its website (https://www.larimer.org/planning/NISP-1041) on or about March 18, 2020 contain numerous errors, do not allow the public to access the actual 1041 application, and underscore the fact that your completeness determination of March 18, 2020 is incorrect. We have identified the following errors of completeness with the application posted to the County's website.

1. "1st Sub. No. 1 Attachment D Mapbook Poudre Map 4 Topography" is not the correct document.
2. "1st Sub. No. 1 Attachment D Mapbook Poudre Map 5A Wildlife WT Deer" is not the correct

document.
3. "1st Sub. No. 1 Attachment D Mapbook County Line Map 5A Wildlife WTDeer" is not the correct document.
4. "1st Sub. No. 1B Attachment B U.S. Highway 287 Memo" is not the correct document.
5. "1st Sub. No. 10 Glade Unit Stormwater Memo" is not the correct document.
6. "1st Sub. No. 10 Pipeline Stormwater Memo" is not the correct document.
7. "1st Sub. No. 11 Glade Unit Floodplain Study Pipeline" is not the correct document.
8. "1st Sub. No. 12 Pipeline Groundwater Report" is not the correct document.
9. "1st Sub. No. 13 Glade Dam Visual Simulation" is not the correct document.
10. "1st Sub. No. 14 Conveyance Pipeline Noise Analysis" is not the correct document.

Please review and respond to all of the deficiencies identified in this letter. If you disagree with any deficiency, please state why. Further, we ask that you reconsider and reverse your March 18, 2020 completeness determination. Please respond in writing to this request. Thank you,

Sincerely,

s/ John Barth

Counsel for Save the Poudre

s/ Michael Foote
Counsel for No Pipe Dream Corporation

s/ Mike Chiropolos
Counsel for Save Rural NoCo

Exhibit 1

Cc: Jeanine Haag, Larimer County Attorney

SavethePoudre.org
Poudre Waterkeeper

P.O. Box 20, Fort Collins CO 80522
info@savethepoudre.org
www.savethepoudre.org

April 22, 2019

By email
(aimee.konowal@state.co.us)
Aimee M. Konowal, Watershed Section Manager
Watershed Section/Clean Water Program
Water Quality Control Division
Colorado Department of Health and Environment
4300 Cherry Creek Drive South
Denver, CO 80246-1530

(scott.garncarz@state.co.us)
Scott Garncarz
Water Quality Scientist
Environmental Data Unit
Water Quality Control Division
Colorado Department of Health and Environment
4300 Cherry Creek Drive South
Denver, CO 80246-1530

Re: Submission of Public Comments and Request for Public Hearing on the Northern Integrated Supply Project Draft Section 401 Water Quality Certification.

Dear Ms. Konowal and Mr. Garncarz:

On behalf of the Save the Poudre, a non-profit organization dedicated to the protection of the waters and environment of the Cache La Poudre River, and its individual members including its members who work, reside, and recreate in the vicinity of the above-referenced proposed project, we are respectfully submitting written comments set forth below on the above-captioned application of the Northern Colorado Water Conservation District ("Northern") for a Clean Water Act ("CWA") Section 401, 33 U.S.C. § 1341, water quality certification ("401 Certification") for the proposed Northern Integrated Supply Project ("NISP"). Save the Poudre also hereby requests a public hearing in response to the Public Notice issued by the Colorado Department of Public Health and Environment ("CDPHE"), Water Quality Control Division (the "Division") in the Water Quality Information Bulletin dated March 1, 2019 and documented in the Division's letter to the Army Corps of Engineers ("Corps") the same day. The Division granted Save the Poudre until April 22, 2019 to submit written comments.[1]

[1] Exhibit 1 hereto (Email correspondence between the Division and Save the Poudre dated March 14, 2019 granting extension until April 22, 2019 to submit comments).

Save the Poudre respectfully requests that the Division deny Northern's 401 Certification Application for the proposed NISP pursuant to 5 COLO. CODE REGS. § 1002-82.5(A)(5) ("Regulation 82") because the proposed project, as currently configured, will not comply with applicable state water quality standards and requirements as discussed in detail below.

Save the Poudre also formally requests to be placed on the Division's mailing list to receive notice of actions taken by the Division in response to the 401 Certification Application pursuant to C.R.S. § 25-8-302(1)(e) and receive a written analysis of the Division's basis for certification, if granted, including all actions to prevent, reduce, or mitigate water quality impacts pursuant to 5 COLO. CODE REGS. § 1002-82.5(C)(1). Save the Poudre also requests that the Division extend the public comment period and leave the administrative record open, pending the determination by the U.S. Army Corp of Engineers ("Corps ") to further supplement its Final Environmental Impact Statement ("FEIS"), extend its public comment period, and hold a public hearing. Finally, in the event the Division grants a conditional certification containing conditions to prevent, reduce or mitigate water quality impacts identified, Save the Poudre requests that the Division hold a public hearing to allow the Division to develop the mitigation conditions "in concert with commenters to the certification proceeding" pursuant to 5 COLO. CODE REGS. § 1002-82.5(A)(6).

Save the Poudre has previously submitted extensive comments on the Draft, Supplemental Draft, and Final Environmental Impact Statement ("DEIS," "SDEIS," and "FEIS" respectively) for the NISP proposal. These comment letters address existing and potential violations of water quality standards resulting from NISP. Save the Poudre attaches these documents to this comment letter and incorporates all arguments contained therein by reference.[2] The expert reports of Lisa Buchanan (Attachment A) and John Woodling (Attachment E) to Save The Poudre's October 4, 2018 FEIS comment letter address water quality issues and are particularly relevant to Northern's 401 Certification Application.

I. LEGAL BACKGROUND

Section 401 of the Clean Water Act states:

> "[a]ny applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates…that any such discharge ***will comply*** with the applicable provisions of the sections 1311, 1312, 1313, 1316, and 1317 of this title…No license or permit shall be granted until the certification required by this section has been obtained or has been waived…No license or permit shall be granted if certification has been denied by the State…"

[2] Exhibit 2 (October 4, 2018 FEIS comment letter); Exhibit 3 (March 12, 2019 Request for Supplemental NEPA Review); and Exhibit 4 (September 3, 3015 Supplemental DEIS comment letter).

33 U.S.C. §1341(a)(1)(emphasis added).

Similarly, the term "certification" is defined in the State regulations as, "… that determination by the Division that the Project ***will comply*** with the Basic Standards and Methodologies for Surface Water, Regulation No. 31 (5 CCR 1002-31), the Basic Standards for Ground Water, Regulation No. 41 (5 CCR 1002-41), surface and ground water classifications and water quality standards, and all other applicable water quality requirements for the affected waters. Such certification is subject to section 25-8-104, C.R.S." Regulation 82.2(5)(emphasis added).

The purpose of Section 401 is to ensure that "applicable water quality requirements will not be violated." 33 U.S.C. §1341(4). Under federal law, the Division has up to one year to issue a decision after receipt of a 401 certification application. *Id.* In this case, the NISP 401 certification application was submitted on January 31, 2019 and the Division has until January 30, 2020 to render its decision on the application.

II. THE PUBLIC COMMENT PERIOD SHOULD BE EXTENDED AND HELD IN ABEYANCE PENDING THE DETERMINATION OF THE CORPS TO FURTHER SUPPLEMENT THE FEIS AND EXTEND THE PUBLIC COMMENT PERIOD AND HOLD A PUBLIC HEARING ON THE CWA § 404 PERMIT APPLICATION FOR THE PROPOSED NISP.

The Corps provided the public with the opportunity to submit written comments on the FEIS for the CWA § 404 permit application for the proposed NISP. Save the Poudre submitted its comments to the Corps on the Draft Environmental Impact Statement, Supplemental Draft Environmental Impact Statement, and Final Environmental Impact Statement.[3]

Since the issuance of the FEIS, Northern announced a significant change in the way NISP would acquire and utilize the water rights upon which the Project is dependent. The FEIS is based on the premise that Northern's acquisition and implementation of water rights would be accomplished via water "trading" in which Northern would trade South Platte River water for cleaner Cache La Poudre River water. However, since the issuance of the FEIS, Northern announced a significant change in its acquisition and implementation of water rights called the "Water Secure" program. Under this new program, Northern, rather than pursuing exchanges with agricultural land owners, would have to purchase outright agricultural land to secure rights to 25,000 acre feet of water from willing sellers in the New Cache La Poudre Irrigating Company and the Larimer and Weld Irrigation Company ditch and reservoir systems in Weld County.[4] It is anticipated that Northern would have to approximately 100 farms and that this would take 10 years to accomplish.[5] This new program could fundamentally change how water from the South Platte and Cache La Poudre Rivers are utilized, thereby rendering useless the entire water quality analysis in the FEIS. In addition, the Water Secure program will significantly increase the cost of the NISP project, thereby requiring a new analysis of other less expensive alternatives through the NEPA process. Because of these fundamental changes

[3] See footnote 2 above.
[4] Article from the Fort Collins Coloradoan, April 1, 2019 attached hereto as Exhibit 5 and Press Release from Northern attached hereto as Exhibit 6.
[5] *Id.*

in the acquisition and implementation of water rights upon which the NISP FEIS is based, Save the Poudre has requested that the FEIS be re-opened for an analysis of Northern's new water rights scheme.[6] In summary, it would be arbitrary and capricious for the Division to proceed with a 401 certification decision relying on an FEIS water quality analysis that no longer represents how water will be acquired and utilized from the South Platte and Cache La Poudre Rivers. Instead, the Division should either deny the 401 Certification Application or hold the public comment period in abeyance and direct Northern and the Corps to conduct a new NEPA analysis based on the new Water Secure program for acquiring and implementing water rights for NISP.

Save the Poudre will also be asking the Corps to conduct a public hearing on its CWA Section 404 permit. Corps regulations at 33 C.F.R. § 327.4(c) articulate a strong presumption in favor of holding a public hearing and specifically provide that "[i]n case of doubt, a public hearing shall be held." 5 COLO. CODE REGS. § 1002-82.5(C)(4) provides that if the federal permitting agency (in this instance the Corps) determines that a public hearing or other action is needed to supplement the body of information for the application, the Division may delay the issuance of a certification decision until a time not later than sixty (60) days following the close of the administrative record. Save the Poudre respectfully requests that the Division stay issuance of the requested CWA § 401 certification and leave the Division's administrative record open under this provision until the Corps holds a public hearing on the CWA Section 404 permit. A public hearing would most likely "produce information relevant to the certification decision" as provided by Regulation 82.5(C)(4). Moreover, if the Corps grants an extension for additional comments, supplemental information will be received by the Corps which may assist the Division's CWA § 401 certification determination. The Division, therefore, should hold the issuance of the CWA § 401 certification process in abeyance and leave the administrative record open for additional comments until the Corps decides how to proceed on the FEIS supplementation request and public hearing issue.

In addition, Regulation 82 requires that the Division apply its Best Management Practices ("BMP") Policy to 401 certification applications.[7] The Division is process of developing a new BMP policy that will be finalized in the next several weeks.[8] The new policy will include updates to BMPs that could be applied to NISP. The Division should hold the draft 401 certification public comment period in abeyance until the BMP Policy is finalized and the public has the opportunity to comment on the policy and its application to NISP.

III. IF A CONDITIONAL CERTIFICATION IS GRANTED, THE DIVISION SHOULD HOLD A PUBLIC HEARING TO ALLOW THE PUBLIC TO PARTICIPATE IN THE DEVELOPMENT OF MITIGATION PLANS

Assuming *arguendo* the Division grants a conditional certification containing conditions as

[6] Exhibit 3 hereto, Save the Poudre's letter dated March 12, 2019 requesting a new NEPA analysis of Water Secure Program.
[7] Regulation 82.6(B).
[8] Email correspondence between John Barth, attorney for Save the Poudre and Annette Quill, Colorado Attorney General's Office dated March 18, 2019 attached hereto as Exhibit 7.

to various means to prevent, reduce or mitigate water quality impacts identified, Save the Poudre respectfully requests that the Division hold a public hearing to allow the Division to develop the mitigation conditions "in concert with commenters to the certification proceeding" per 5 COLO. CODE REGS. § 1002-82.5(A)(6). Save the Poudre asserts that the 401 certification should be denied because the proposed Project will not comply with applicable water quality standards and requirements even with the development of mitigation plans. However, the Division has indicated in the draft certification that the Division intends to issue a conditional certification with the development of best management practices. There are numerous complex issues and pitfalls associated with developing mitigation plans for the proposed Project particularly in light of the Division's initial determination as set forth in the March 1, 2019 Draft 401 Water Quality Certification, which states that the proposed Project has "[p]otential long-term water quality impacts" and the "potential for significant degradation for one or more segments listed in this notice."

Colorado's 401 Certification Regulation contemplates that mitigation plans be developed with input from the public along with the applicable federal agencies pursuant to 5 COLO. CODE REGS. § 1002-82.5(A)(6). The best method of ensuring public engagement in the development of mitigation plans is to hold a public hearing in Fort Collins to receive comments from the affected and potentially aggrieved persons about the proposed Project and hold work group sessions in which interested members of the public may participate in the development of mitigation plans including clear and enforceable BMPs.

IV. THE STATE 401 CERTIFICATION REGULATIONS ARE UNCONSTITUTIONALLY VAGUE ON THEIR FACE AND CANNOT BE APPLIED CONSISTENT WITH COMMON NOTIONS OF DUE PROCESS

As discussed below, the applicable State 401 certification regulations are unconstitutionally vague on their face and cannot be applied to this application in a manner consistent with common notions of due process.

Regulation 82.5(A)(1)(a) states,

> "[f]or USACE 404 permits and FERC licenses, 'significance determinations' for reviewable waters under section 31.8(3)(c) shall be made with respect to the ***net effect*** of the new or ***increased water quality impacts*** of the proposed Project, taking into account ***any environmental benefits*** within the Project area, including any ***water quality improvements***, or ***mitigation measures*** proposed to be implemented within the Project area." (emphasis added).

The terms "net effect", "increased water quality impacts", "any environmental benefits" "water quality improvements", and "mitigation measures" are not defined in Regulation 82 or the Colorado Water Quality Control Act.

Regulation 82.5(A)(3) also states,

> "The Division may condition water quality certification on ***adaptive management*** to address changes in the Project's predicted impacts and/or future changes in applicable water quality classifications and standards.

Again, the term "adaptive management" is not defined in Regulation 82 or the Colorado Water Quality Control Act.

Because the above-referenced terms are undefined, neither the Colorado Water Quality Control Act ("CWQCA") nor Regulation 82 provide a predictable, repeatable, and objective administrative and/or quasi-judicial test or framework by which the Division, or the Colorado Water Quality Control Commission ("WQCC"), can determine whether a 401 Certification application should be approved without conditions, denied, or approved with conditions. Colorado's 401 Certification process under the CWQCA and Regulation 82 is facially unconstitutionally vague and provides the Division (and WQCC on appeal) with unfettered discretion to approve, deny, or approve with conditions a 401 Certification application. The controlling principle in a constitutional void for vagueness challenge is whether the questioned law:

> "either forbids or requires the doing of an act in terms so vague that men of ordinary intelligence must necessarily guess as to its meaning and differ as to its application. Two basic interests underlie this principle. First, the interest in fair notice requires the law to be sufficiently definite to alert the populace to the nature of the proscribed conduct so that they may control their actions accordingly. Second, the interest in even-handed treatment requires that the law provide specific standards for those charged with its enforcement so that arbitrary and discriminatory application will be avoided.
>
> *People ex rel. City of Arvada v. Nissen*, 650 P.2d 547, 550 (Colo. 1982) (citations omitted).

Both the CWQCA and Regulation 82 fails to provide specific standards so that arbitrary and discriminatory application will be avoided in processing 401 Certification applications. Instead, the CWQCA and Regulation 82 give unfettered discretion to the Division and WQCC.

In light of these facial deficiencies with the CWQCA and Regulation 82, the Division and WQCC may not "apply" these regulations to the NISP 401 Certification Application in a manner that complies with common notions of due process under the law. Thus, Save the Poudre also objects to the application of the CWQCA and Regulation 82, as written, to the NISP 401 Certification Application.

The NISP 401 Certification Application should be denied or held in abeyance until such time that the Commission revises Regulation 82 to provide definitions of the above-referenced terms including specific standards that ensure a predictable, repeatable, and objective administrative and/or quasi-judicial framework for processing 401 Certification applications.

V. THE DIVISION SHOULD DENY THE CWA § 401 CERTIFICATION REQUEST FOR THE PROPOSED PROJECT.

Northern seeks a Corps permit under section 404 of the CWA, 33 U.S.C. § 1344, for discharges into waters of the United States relating to construction and operation of a water collection, storage, and conveyance system. As presently proposed, NISP would consist of miles of raw water pipelines that will cross jurisdictional waters of the United States, require new and/or modified irrigation intake diversion structures, and require the construction of two new reservoirs.

A CWA 401 certification from the Division is a condition precedent to the issuance of a CWA § 404 permit from the Corps to allow for the discharge into waters of the United States. Applicable state regulations at 5 COLO. CODE REGS. § 1002-82.5(A)(1) require the Division to consider the following criteria in determining whether to issue a CWA § 401 certification for the proposed Project:

- An antidegradation review under Regulation No. 21, COLO. CODE REGS. § 1002- 21, section 21.16;
- Compliance with the Basic Standards and Methodologies for Surface Water Regulation No. 31, 5 COLO. CODE REGS. § 1002-31 and the Basic Standards for Ground Water Regulation No. 41, 5 COLO. CODE REGS. § 1002-41;
- Classifications and water quality standards assigned to the affected waters; Applicable effluent limitations or control regulations;
- Best management practices or "BMPs" as set forth in subsection 82.6(B), 5 COLO. CODE REGS. §1002-82.6(B);
- Stormwater discharge provisions;
- Public comments; and,
- Any project-specific conditions.

The Division may grant a CWA § 401 certification if the proposed project complies with all applicable requirements as set forth above. 5 COLO. CODE REGS. § 1002-82.5(A)(2). Alternatively, the Division must deny the application for CWA § 401 certification if the proposed project will not comply with all applicable requirements even with the application of conditions. 5 COLO. CODE REGS. § 1002- 82.5(A)(5). Save the Poudre asserts that in light of the Regulation 82.5(A)(1) criteria, the Division should deny the CWA §401 certification of the permit for the proposed Project because NISP as presently configured will not comply with all applicable state water quality requirements even with the addition of conditions. Alternatively, Save the Poudre asserts that Northern's 401 Certification Application and anti-degradation analyses are fatally flawed and cannot be relied upon to serve as the basis for approval of the Application.

Save the Poudre asserts the following reasons as basis for the denial of the CWA § 401 certification request for NISP:

A. The Division Must Deny The CWA § 401 Certification Application Because The Proposed Project Will Not Comply With Colorado's Water Quality Standards for Surface Water Regulation No. 31, 5 COLO. CODE REGS. § 1002- 31

State regulations at 5 COLO. CODE REGS. § 1002-31 require the Division to deny CWA § 401

certification application for the proposed Project because it will not comply with Colorado's numeric water quality standards. The Division may not allow discharges that cause non-attainment of a narrative water quality standard as contained in 5 COLO. CODE REGS. § 1002-31 including discharges that "are harmful to the beneficial uses or toxic to humans, animals, plants or aquatic life." 5 COLO. CODE REGS. § 1002-82.6(A)(17)(d).

Northern's Application admits that "[w]ater diversions and releases…on the scale of the Proposed Action are likely to have environmental consequences…" including altered stream flow, pollutant concentrations, and heat balance.[9] Northern's Technical Report supporting the 401 Certification Application also admits that there are existing impairments and water quality issues for arsenic, temperature, E. coli., and selenium.[10] The Technical Report also acknowledges "additional concerns about the internal release of phosphorus, iron, manganese, and arsenic brought on by low concentrations of DO in the hypolimnion" of the existing and proposed reservoirs.[11]

Save the Poudre retained Lisa Buchanan of LRB Hydrology and Analytics to conduct a critique of Northern's 401 Certification Application and Technical Report. The attached report of Lisa Buchanan identifies significant deficiencies with Northern's 401 Certification Application and anti-degradation review with respect to the project. These deficiencies include, but are not limited to Buchanan's finding that:

- Water quality data from reservoirs located near the proposed Upper Galeton Reservoir and from South Platte water near Kersey show low to no assimilative capacity of arsenic, nutrients, selenium, and iron. Information from these reservoirs also indicates that Upper Galeton Reservoir is likely to stratify for the summer months prompting release of contaminants in the deoxygenated hypolimnion. The 401 Application states that water quality standards for many contaminants will likely be exceeded over the long term in Galeton Reservoir. However, the 401 Application fails to address the impact of these exceedances on surface water runoff or deep percolation to groundwater from farms included in the exchange program.[12]

The WQCD should deny the 401 Certification Application and direct Northern to analyze these potential exceedances on surface water and groundwater standards.

B. The 401 Application's Anti-Degradation Analysis is Deficient

Ms. Buchanan's critique of the 401 Certification Application also found significant deficiencies with Northern's anti-degradation analysis. These deficiencies include, but are not limited to:

[9] Northern's Technical Report, p. 15.
[10] *Id.*
[11] *Id.*
[12] Exhibit 8 hereto (Buchanan Report) p. 2.

- The 401 Application fails to include focus locations-locations where modeled water quality results are summarized in the 401 Application- in the stretch of river between the PRI and Boxelder Creek. Water quality model results focus on seven locations between the proposed Glade Reservoir outlet and the Greeley Gage. A focus location is not included in Segment 11 between the Lincoln Street Gage and Boxelder Gage to fully evaluate water quality impacts downstream of the MWRP and at the Timnath Inlet diversion structure. Hardness values of Poudre River water quality data, obtained from CDPHE for the time period 2008 to 2013, show that Segment 11 is comprised of three distinct subsections due to influence of Boxelder Creek at its downstream end and rapidly changing water quality in this Segment. This is important in the calculation of Table Value Standards (TVS) for hardness dependent metal standards, evaluation of the Baseline Available Increment (BAI), and assessment of potential significant water quality degradation. *The Water Quality Control Division ("WQCD") should deny the 401 Certification Application and direct Northern to use representative hardness data, particularly in Segment 11, for hardness dependent water quality standards, and include additional water quality focus locations in the upper and middle sections of Segment 11 in its anti-degradation analysis.*[13]

- Water quality data from reservoirs located near the proposed Upper Galeton Reservoir and from South Platte water near Kersey show low to no assimilative capacity of arsenic, nutrients, selenium, and iron. Information from these reservoirs also indicates that Upper Galeton Reservoir is likely to stratify for the summer months prompting release of contaminants in the deoxygenated hypolimnion. The 401 Application states that water quality standards for many contaminants will likely be exceeded over the long term in Galeton Reservoir. However, the 401 Application fails to address the impact of these exceedances on surface water runoff or deep percolation to groundwater from farms included in the exchange program.[14]

- The 401 Certification Permit Application does not address the risk of significant degradation of Poudre River water quality, particularly for metals and phosphorus which currently have low or no assimilative capacity in the Poudre River. If Glade Reservoir waters are re-introduced to the river from the hypolimnion of the reservoir, it could cause greater water quality degradation than was modeled and could cause significant degradation of the Poudre River for these pollutants. Based on data from Horsetooth Reservoir, it is likely that Glade Reservoir will stratify in late summer through October and cause release, particularly of arsenic, iron, manganese, and phosphorus caused by anoxic conditions in the lower levels of the reservoir. *Prior to approval by WQCD, the 401 Application needs to identify potential contaminant concentrations and anticipated frequency of discharges from the hypolimnion of Glade Reservoir and the impact to Poudre River water quality.*[15]

For the above-stated reasons, Northern's anti-degradation analysis is technically deficient. The WQCD should deny the 401 Certification Application and direct Northern to address the anti-

[13] Exhibit 8 at p. 2.
[14] *Id.*
[15] *Id.*

degradation deficiencies identified in Ms. Buchanan's report.

C. The 401 Application Contains Other Significant Technical Omissions and Deficiencies and Cannot Be Relied On To Issue a 401 Certification.

Ms. Buchanan's 401 Certification Application review also identified other significant technical omissions and deficiencies. A summary of these additional technical omissions and deficiencies is provided below:

- The 401 Application fails to evaluate the MWRP effluent data to identify which, and at what concentrations, emerging contaminants are present in the MWRP discharge. These parameters combined with summertime reduction in river flows caused by NISP would also affect water quality and potentially be deleterious to fish and macro-invertebrate populations downstream of the MWRP. *Emerging contaminant compounds and concentrations in wastewater discharges from the MWRP and other wastewater plants on the Poudre River need to be evaluated along with potential instream impacts to fish and micro-invertebrate populations.*[16]

- The CDPHE 10-year Roadmap includes voluntary reduction in nutrient and selenium loads from agricultural lands. Monitoring of agricultural runoff will evaluate the effectiveness of Best Management Practices (BMPs) and determine if further nonpoint regulation is necessary from agricultural lands. The combination of the poor water quality anticipated in Upper Galeton Reservoir, the presence of emerging contaminants in South Platte water, and efforts required for the 10-year roadmap will likely prevent farmers from agreeing to exchange Upper Galeton water for their ditch water supply. Approximately 50 percent of the Glade Reservoir water supply is to come from exchanges to farms on the Larimer Weld and New Cache Canals. Water quality of storage in Upper Galeton Reservoir will likely hinder acquisition of the full 20,000 AF in exchanges needed to operate and fill Glade Reservoir. The 401 Permit Application fails to address this possibility and does not provide an alternate source of water for Glade Reservoir if exchanges with agricultural entities on the Larimer Weld and New Cache Canals are insufficient. *Prior to WQCD approval of the 401 Application, Northern needs to identify farms and water volumes that would be exchanged for Galeton irrigation water – since this source of water is an important component of the project – and if sufficient farms are not amenable to exchange, what other source of water will be utilized instead. Northern needs to evaluate how high levels of nutrients and metals in Galeton Reservoir water would impact stream water quality - through both surface water runoff and groundwater discharges from farms - and specify what, if anything, it plans to do to assure farmers on properties amenable to the exchange that Upper Galeton Reservoir water will not impede their ability to reduce non-point nutrient and selenium loading to streams per state requirements in the 10-year Roadmap (2017 to 2027).*[17]

- The CTP model and therefore water quality modeling in the 401 Application also fails to:

[16] *Id.*
[17] *Id.* at p. 3.

- Evaluate impacts of different distributions of SPWCP exchanges into the Larimer Weld and New Cache Canals: exchange volumes depend on the land acreage of farms associated with each ditch that are willing to enter into an exchange contract with Northern Water – as yet to be determined.

- Account for climate change impacts that likely will reduce annual flow and alter the monthly distribution of streamflow – altering historical daily flow patterns on which daily disaggregation of monthly flows and water quality models depend.

- Omit outlier 1983 model output in calculation and comparison of monthly averages.[18]

- Additional CTP and water quality modeling needs to be conducted to evaluate potential scenarios of:

  - Diversions to Glade Reservoir, for instance during fill, without additional demand.

  - Refined conveyance system flows between Glade Reservoir and the PRI are reduced; for instance prior to the need for the full 40,000 AF additional water supply.[19]

All of these technical omissions and deficiencies need to be addressed before the WQCD can rely on Northern's 401 Certification Application to issue a certification. Accordingly, Save the Poudre requests that the WQCD deny Northern's 401 Certification Application and direct Northern to address these deficiencies.

D. Northern Has Not Proven That The Adverse Impacts Will Be Mitigated To Provide Reasonable Assurance Of Compliance With Water Quality Standards And Requirements.

Northern's 401 Certification Application fails to provide reasonable assurance that the numerous documented violations of water quality standards in the affected watershed segments will be fully mitigated. For example, Ms. Buchanan's review of the 401 Certification Application found:

- The modeling of the water quality impacts of NISP, Alternative 2M, depend entirely on assumptions made in the hydrologic model, the Common Technical Platform (CTP), and the projected water demands of the 15 NISP participants. The modeling of the refined conveyance system represents a best-case scenario as it reflects the full and consistent delivery of 40,000 AF to NISP participants. This presents a significantly more optimistic outcome than is expected in reality as the mitigation will not operate at the same level when participants utilize less water than the maximum, which is the expected case. Specifically, the CTP modeling of the refined conveyance system fails to:

[18] *Id.* at p. 4.
[19] Exhibit 8, pp. 12 and 3 respectively.

- Account for the 20- to 30-year or greater period before the full additional demand of 40,000 AF is required by NISP Participants in even some years.

- Account for approximately one-fourth of the total demand that would not be delivered via the North Tier Pipeline or through the Poudre River Intake.

- Adequately evaluate the daily, seasonal, and annual variation in water demand and therefore the expected variability in water deliveries to NISP Participants.

- An independent demand study also indicates that NISP participant additional demands may not reach 40,000 AF by 2060.[20]

- The CTP model, and therefore water quality modeling in the 401 Application, also fails to:

  - Evaluate impacts of different distributions of SPWCP exchanges into the Larimer Weld and New Cache Canals: exchange volumes depend on the land acreage of farms associated with each ditch that are willing to enter into an exchange contract with NISP – as yet to be determined.

  - Evaluate water quality impacts between the Poudre River Intake and Boxelder Creek – several miles of the Poudre River that will not benefit from the refined conveyance system flows and reduce streamflow upstream of the MWRP.

  - Account for climate change impacts that likely will reduce annual flow and/or alter the monthly distribution of streamflow – altering historical daily flow patterns on which daily disaggregation of monthly flows and water quality models depend.

  - Omit outlier 1983 model output in calculation and comparison of monthly averages. [21]

Further, the 401 Certification Application relies on an outdated Fish and Wildlife Mitigation and Enhancement Plan (FWMEP). More specifically, the 401 Water Quality Certification Technical Report (Technical Report) is reliant on the FWMEP, approved by the Colorado Wildlife Commission on September 7, 2017 and adopted by the Colorado Water Conservation Board on September 20, 2017. See Technical Report at 21, 33, and Appendix B. The FWMEP was prepared and adopted prior to the publication of the Final EIS and is based on project proposal that incorporated a Colorado-Big Thompson Project (C-BT) exchange to provide 10,000 acre-feet of water to some NISP participants. For example, the FWMEP states:

> Conveyance to the Participants will be made from Glade Reservoir via a Colorado-Big Thompson Project (C-BT) exchange, Poudre River intake, and pipelines.

FWMEP at 5 (emphasis added).

[20] *Id.* at p. 3.
[21] *Id.* at p. 4.

The FWMEP also states:

> Due to locations of their existing and projected future demands and water supply infrastructure, some Participants require delivery of NISP yield from C-BT facilities to effectuate deliveries to their water supply systems. A C-BT exchange volume of 10,000 acre-feet per year would allow delivery for these participants, and would also fall within a volume that could be reliably delivered from C-BT facilities. The C-BT exchange would work by delivering up to 10,000 acre-feet per year of C-BT deliveries that are currently made to the Poudre River from Glade Reservoir instead. In exchange, the NISP exchange participants would be delivered 10,000 acre-feet of water from C-BT facilities. This exchange would require a conveyance contract and special use permit from the Bureau of Reclamation for this operation.

FWMEP at 8 (emphasis added).

The C-BT exchange was eliminated from the preferred alternative in the FEIS and is not considered in the proposal being considered in this certification process. The FEIS states:

> Water quality analyses completed for the FEIS (Hydros 2018h; 2018i) indicated that Alternative 2M without C-BT exchanges had less effect on water quality and aquatic habitat in the Poudre River and in Horsetooth Reservoir than the Reclamation Action Option. Based on the FEIS water quality analyses, the Corps eliminated the Reclamation Action Option, including the use of the Glade-to-Horsetooth Pipeline, in Alternative 2. In Alternative 2, water would be conveyed to the Participants through the Carter Pipeline discussed in Section 2.7.5.2. Any further pursuit of a Reclamation contract for storage or conveyance of NISP water would require separate environmental compliance and federal agency approval.

FEIS 2-32 (emphasis added). Further, the FEIS also states:

> The Reclamation Option and Glade Reservoir to Horsetooth Reservoir pipeline option were eliminated from Alternative 2M. Horsetooth Reservoir and any exchanges with CBT water are no longer in the Applicant's Preferred Alternative.

FEIS A-174 (emphasis added). The Technical Report admits that:

> Operations of both Horsetooth Reservoir and Carter Lake would be not be modified under NISP operations, as the proposal for a C-BT exchange for delivery of NISP water to some NISP participants is not being carried forward at this time as part of the Proposed Action.

Technical Report at 62 (emphasis added).

The 401 Certification Application must not base its consideration of mitigation of the numerous and significant impact of NISP on the already outdated FWMEP that is based on the 10,000 acre-foot exchange that is no longer an element of the project proposal. Before considering certification for this project, the Division must critically evaluate the mitigation and enhancement measures proposed in the FWMEP, determine their efficacy, relevance, and appropriateness in light of this significant change to the project, and must independently determine to what extent, if any, the FWMEP mitigates the impacts of NISP. The WQCD should deny the 401 Certification Application

and direct Northern to address the above referenced deficiencies.

E. Northern Water Has Not Proven That Water Quality Degradation Is Necessary To Accommodate Important Economic Or Social Development In The Area In Which The Waters Are Located.

In the draft application, Northern asserts that even if the Division finds that the Proposed Action will cause a net harm to the environment, the Division should grant a 401 certification:

> Operation of the Proposed Action is likely to result in some water quality degradation not all of which is directly amenable to mitigation. The significant determination by the WQCD will reach a conclusion about the net effect of mitigation and enhancement measures on the environment. Should the WQCD conclude that these measures are not sufficient to yield net environmental benefit, it is Northern Water's view that "the degradation is necessary to accommodate important economic or social development in the area in which the waters are located."

Technical Report at 165 (emphasis added).

Although Northern does not specifically reference the regulation, this assertion appears to be based on the WQCC regulations which state:

> An intermediate level of water quality protection applies to waters that have not been designated outstanding waters or use-protected waters. These waters shall be maintained and protected at their existing quality unless it is determined that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located.

5 CCR 1002-31.8(1)(b) (emphasis added).

Appropriately, the Division has requested public comment on both the economic or social development importance of the Proposed Action and the availability of alternatives that would result in the same or less degradation of state waters. Draft Conditional Certification at 2.
STP and others have, throughout the Federal review of NISP, provided a preponderance of evidence that:

- NISP is not important for economic or social development because the water that it would drain from the Poudre River is not needed by the Northern Colorado communities that it is purportedly designed to serve; and,

- A variety of economically, environmentally, and technologically reasonable alternatives are available to provide these communities with the water that they may need in the future.

In short, the justification for NISP is fatally flawed and much of the water it proposes to supply is simply not needed. Further, even if the Division were to find that water that NISP proposes to supply were important for economic or social development, there are alternatives to the Proposed

Action that would result in less degradation of state waters. As the Proposed Action clearly fails to meet the simple standards of 5 CCR 1002-31.8, the Division must not provide a certification that allows for degradation of state waters.

STP herein attaches the NISP SDEIS and FEIS comment letters and attachments that address these points for the Division's review.[24] The documents highlighted below speak most directly to the Division's questions but are supported by the whole of our submission here.

LRB Demand Analysis

An expert analysis conducted by LRB Hydrology & Analytics ("LRB Demand Analysis," attached here as Attachment A of the Conservation Organizations' NISP FEIS comments, October 4, 2018), demonstrates that the water use intensity—i.e., the rate that water is used by each person within the service area—has steadily declined since 2000. *See* LRB Demand Analysis at Fig. 3. Despite this clear downward trend in water use intensity, the NISP FEIS projects future water use demands based on an average of past intensity, incorporating only currently planned conservation activities as a downward pressure on water use. *See id.* 11-13. Indeed, the NISP SDEIS's projections based on average historic water use intensity have proven to be substantially higher than the actual use for the periods for which data for comparison is available (2010 and 2015). *See id.* at Fig. 5. Further, the projections presented in the FEIS easily outstrip a simple linear extension of the recent water use record, ignoring the long-running downward trend in water use intensity. *See id.* at Fig. 5. In sum, the FEIS projections of future water demand fail to accurately reflect the changing nature of water use in the service area and Colorado in general, and substantially overstate the amount of water that the participants will need to meet their needs over the planning period.

Healthy Rivers Alternative

A large coalition of citizen and nonprofit groups prepared and submitted to the US Army Corps of Engineers the Healthy Rivers Alternative ("HRA," attached hereto and Exhibit 9, Appendix B07 of the Save the Poudre's NISP SDEIS comments, September 2015). The HRA is an economically, environmentally, and technologically reasonable portfolio of actions relying on conservation and more efficient use of existing water supplies that would provide water supply security to the NISP communities with less degradation of state waters, less expense to the communities, and less impact on ranches and farms in the region. After the Corps failed to adopt HRA as their preferred alternative, STP and others provided further support of its effectiveness in their comments on the NISP FEIS (Exhibit 2, comments on NISP FEIS at 15 – 16).

A Better Future for the Poudre River

Western Resource Advocates prepared a similar document outlining a portfolio of alternative actions to providing for the water supply security of the NISP communities, "A Better Future for the Poudre River" ("Better Future," attached here as Exhibit 10, Appendix E51 of the STP's NISP SDEIS comments, September 2015). Like HRA, Better Future provides a reasonable option to NISP that would result in less expense, less degradation of state waters, and less impact on agricultural communities. The Corps' failure to adequately consider HRA and Better Future is one of the most

[24] See footnote 2 above.

significant flaws of the NISP NEPA analysis process, as outlined in the STP and Conservation Organization comments on the NISP SDEIS and FEIS.

No Action Alternative

The Corps' NEPA analysis has contemplated a No Action Alternative that would lead to less degradation than the Proposed Action. Although STP asserts that the FEIS version of this alternative is not an appropriate "no action alternative" under NEPA, *see* Exhibit 2, at pp. 8 – 11, the consideration of the outlined alternative does demonstrate that there is a viable option that would not require NISP and its associated degradation of state waters. Throughout the review process, Northern and the Corps' have alleged that the No Action Alternative is less preferable than the Proposed Action due to its impacts on the local agricultural community; the recent purchase of agricultural land to supply water for NISP demonstrates that the Proposed Action itself will have similar if not worse impacts on ranchers and farmers.

Northern has urged the Division to ignore the significant degradation of state waters that will result from construction and operation of NISP because, it alleges, the Proposed Action "is necessary to accommodate important economic or social development in the area in which the waters are located." In reality, NISP is not needed, either for the present or future development of the Northern Colorado communities that it proposes to serve. Throughout its long permitting history, inflated claims have been made about the future water demand of the region and, although the more recent analyses have lowered the demand, it still overstates the true need. The water supply security of the NISP communities can be safely met through a combination of conservation, transfer, and other techniques that will result in no degradation of state waters. The Division must not grant a 401 certification for this significantly impactful project under the guise of "necessity" when no such need exists.

IV. CONCLUSION

In conclusion, pursuant to Regulation 82.5(C)(4), Save the Poudre respectfully requests that the Division extend the public comment period, hold the public record open, and delay issuing its certification decision pending the Corps' FEIS supplementation, issuance of the Record of Decision, public hearing, and closure of the administrative record on the CWA § 404 permit. If a conditional certification is granted, then the Save the Poudre requests that the Division provide for a public hearing on the proposed mitigation plan. Finally, Save the Poudre respectfully requests that the Division deny the CWA § 401 certification for the proposed Project because NISP will not comply with Colorado's Antidegradation Rule, will not comply with Colorado's Water Quality Standards, 5 COLO. CODE REGS. § 1002-31, and would cause or contribute to violations of Water Quality Standards at 5 COLO. CODE REGS. § 1002-32.

Pursuant to Regulation 82.5(C)(1), Save the Poudre requests that the Division provide to its written analysis of its basis for certification, including identification of the stream segments affected, the potential water quality impacts identified as a result of the Project, and the results of any actions under subsection 82.5(A)(6) to prevent, reduce or mitigate water quality impacts associated with the exercise of water rights.

Thank you for your consideration of Save the Poudre's comments. Please contact me if you have any questions regarding these comments or if we may be of assistance.

Respectfully submitted,

Gary Wockner, PhD, Director
Save The Poudre: Poudre Waterkeeper
PO Box 20, Fort Collins, CO 80522
970-218-8310

John Barth
Attorney at Law
Representing Save The Poudre
P.O. Box 409
Hygiene, CO 80533
(303) 774-8868

SavethePoudre.org
Poudre Waterkeeper

P.O. Box 20, Fort Collins CO 80522
info@savethepoudre.org
www.savethepoudre.org

To: Catherine Blackwell, U.S. Army Corps of Engineers
From: Save the Poudre: Poudre Waterkeeper
Regarding: Greenhouse Gas Impact Analysis of the Northern Integrated Supply Project

Dear Ms. Blackwell, 16 May 2014

The Climate Crisis presents a critical challenge to Colorado and our planet. Save the Poudre: Poudre Waterkeeper is deeply concerned about the coming effects of climate change, and is committed to finding solutions to environmental problems that do not create new environmental problems or worsen existing problems.

The National Environmental Policy Act requires that the U.S. Army Corps of Engineers analyze all environmental impacts associated with the proposed Northern Integrated Supply Project. Further, because the project has triggered the Clean Water Act, the SDEIS must address the EPA's 404(b)(1) guidelines (see 40 C.F.R. § 230), and the Corp's "public interest" factors (see 33 C.F.R. §§ 320 et seq.) including:

- Rejecting a permit if there is a practical alternative that would cause less adverse impact
- Ensuring that the permitting project not cause significant degradation to waters of the U.S., including "jurisdictional wetlands"
- Mitigating any impacts

We evaluated the potential greenhouse gas emissions that would be produced by NISP to consider whether the NISP project, as proposed, would contribute to climate change. Climate change emissions from NISP would come from four sources: 1) the construction of the project, 2) the pumping of water out of the Poudre River and other ditches, and up into Glade and Galeton Reservoirs, 3) the draining of 1,700 acres of wetlands due to depleted flows in the Poudre, and 4) the methane emissions from the fluctuating water levels and operations of Glade and Galeton Reservoirs.

In terms of (1) above, we have calculated that the total climate change emissions produced during the construction of the project – also called "embodied" emissions – would be at least 218,000 metric tons CO_2-equivalents. These emissions from construction alone would be equivalent to the emissions from almost 46,000 automobiles on the road for one year.

In terms of (2) and (3) above, we have calculated that the total yearly climate change emissions for NISP as proposed in the Draft Environmental Impact Statement would range from at least 43,751 to 84,236 metric tons CO_2-equivalent per year, depending on the action alternative chosen. These emissions would be equivalent to the emissions from almost 13,500 automobiles on the road every year.

In terms of (4) above, the scientific literature has not yet reached consensus on methane and carbon dioxide emissions from reservoirs in Western semi-arid environments, however emissions in this category are likely to be at least several thousand metric tons of CO_2-equivalent each year. As this science progresses over the coming months, we will offer input to the SDEIS as available.

These estimated results are major greenhouse gas emissions at a time when we should be doing absolutely everything we can to reduce greenhouse gas emissions in every aspect of our lives.

Our calculations are based on the following methodology:

1. Embodied emissions from construction of the project – including fuel burned on site, concrete manufacturing and use, rock fill, and excavation in the construction of the project – would total at least 218,000 metric tons CO_2-equivalent[1] [2], which is more than 5 metric tons CO_2-equivalent per acre-foot of water proposed to be yielded from the project. We calculated these emissions by matching the projected materials and excavation amounts in the financial cost estimates for the project with the embodied emissions calculated in the Inventory of Carbon and Energy (ICE) database.

2. Direct emissions from pumping water for the project's proposed actions would range from at least 19,822 to 45,125 metric tons CO_2-equivalent per year, depending on the action selected and the operation of the project [3] [4] [5]. These emissions were calculated be multiplying the projected electrical energy use by the current Xcel Energy portfolio emissions. Indirect emissions from pumping water would range from at least 11,893 to 27,075 metric tons CO_2-equivalent per year.[6] These emissions were calculated based on the measured leakage rates for natural gas, oil and coal production and delivery, and applying those rates to the current Xcel energy portfolio.

3. The project's proposed action and action alternatives would affect 1,700 acres of riparian-associated wetlands in the Cache la Poudre Basin.[7] [8] Carbon in soils and wetland vegetation are a major sink for ecosystem carbon, and the loss of those wetlands would result in a major source of emissions to the atmosphere of at least 7,036 metric tons CO_2-equivalent per year. We evaluated the Natural Resource Conservation Service (NRCS) SSURGO soils database for wetlands soils in the affected region[9], and then modeled the soils under

[1] Technical Memorandum, Northern Integrated Supply Project, Glade Complex, Facilities Update and Cost Estimate
[2] ICE database (http://www.circularecology.com/ice-database.html#.U1Z4B_ldVgg)
[3] Xcel Energy Corporation
[4] U.S. Environmental Protection Agency eGRID Data for Year 2009 (updated 2012), WECC Rockies
[5] NISP Pumping Requirements, provided by the Northern Colorado Water Conservancy District.
[6] Miller, S.M. *et al.* 2013. *Anthropogenic emissions of methane in the United States.* Proceedings of the National Academy of Sciences of the United States of America 110(50): 20018-20022.
[7] Carlson, Erick and Joanna Lemly. 2011. National Wetland Inventory (NWI) Mapping of the Cache la Poudre and South Platte Rivers. Colorado Natural Heritage Program. http://poudreriver.home.comcast.net/~poudreriver/CNHP_FINAL_Poudre_Wetland_Mapping_Report-2011_03_23.pdf
[8] Save The Poudre. 2012. NISP's impacts on riparian areas including wetlands along the Cache la Poudre River. Report provided to the U.S. Army Corps of Engineers. http://savethepoudre.org/stp-correspondence/2012-12-17-combined-wetlands-letter-and-reports.pdf.
[9] Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/. Accessed 2/15/2014.

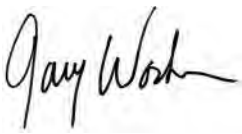
drained and undrained conditions using the CENTURY model[10] [11]. This analysis conservatively predicts emissions of at least 3.7 metric tons per year of CO_2-equivalents per acre of affected wetlands per year over 30 years. Additionally, emissions from decomposing wetland vegetation from dead and dying trees and shrubs are expected to equal at least 1.5 metric tons CO_2-equivalents per acre per year over 30 years.

4. Reservoirs in the American West are significant sources of greenhouse gases, and the combination of reservoirs constructed for the project, if built, are likely to emit thousands of metric tons CO_2-equivalent per year[12] [13]. No current model exists that we are aware of to predict the greenhouse gas emissions from temperate reservoirs, however the research we are aware of indicates that no reservoirs have been found to be a net year-round sink for carbon. Nearly all reservoirs studied to date appear to be net sources of greenhouse gas emissions, and there is no reason to indicate the reservoirs proposed under NISP would be any different. Recent measurements indicate emissions are particularly high from reservoirs that fluctuate significantly over the course of the year, as do most reservoirs in Colorado.

The results predicted above must be used and analyzed as a part of the Supplemental Draft Environmental Impact Statement (SDEIS) for NISP when that SDEIS is released – without this analysis, the SDEIS would not satisfy the requirements of the National Environmental Policy Act. If the Corps has not already done so, we recommend that the Corps do the same analysis for this project, as the analysis has direct bearing on how the Corps would select the Least Environmentally Damaging Practicable Alternative in examining the project alternatives.

Thank you for the opportunity to provide input and make requests of your offices regarding the environmental impacts of NISP. Your organization and ours mandate objective, scientifically valid information to thoroughly comply with the letter and spirit of existing national and state laws. Please acknowledge receipt of this letter.

Respectfully,



Gary Wockner
Executive Director
Save The Poudre: Poudre Waterkeeper

Mark Easter
Board Chair
Save The Poudre: Poudre Waterkeeper

[10] Parton, W.J., D.W. Anderson, C.V. Cole, J.W.B. Stewart. 1983. Simulation of soil organic matter formation and mineralization in semiarid agroecosystems. In: Nutrient cycling in agricultural ecosystems, R.R. Lowrance, R.L. Todd, L.E. Asmussen and R.A. Leonard (eds.). The Univ. of Georgia, College of Agriculture Experiment Stations, Special Publ. No. 23. Athens, Georgia.

[11] Century Model Home Page. http://www.nrel.colostate.edu/projects/century/, viewed on 2/15/2014.

[12] Soumis, N. *et al.* 2004. Greenhouse gas emissions from reservoirs of the Western United States. Global Biogeochemical Cycles 18(3): GB3022.

[13] Deemer, B.R., J.A. Harrison, and M.T. Glavin. 2012. Water level drawdown boosts greenhouse gas production in a small eutrophic reservoir. Poster at the Ecological Society of America Annual Meeting, Portland, OR.

Healthy Rivers, Healthy Communities

A Balanced Proposal for the Cache la Poudre River in Colorado

Save the Poudre Coalition
PO Box 20
Fort Collins, CO 80522
http://www.SaveThePoudre.org
info@SaveThePoudre.org

Lead Authors

Mark Easter
Save The Poudre Coalition

Gary Wockner
Save The Poudre Coalition

Taryn Hutchins-Cabibi
Western Resource Advocates

Dan Luecke
Western Resource Advocates

Bart Miller
Western Resource Advocates

Stacy Tellinghuisen
Western Resource Advocates

Save The Poudre Coalition
PO Box 20
Fort Collins, CO 80522
info@SaveThePoudre.org
www.SaveThePoudre.org

Western Resource Advocates
2260 Baseline Road, Suite 200
Boulder, CO 80302
(303) 444-1188
info@westernresources.org
www.westernresources.org

Table of Contents

Water Supply Security that Preserves Our Rivers

In this document, the Save The Poudre Coalition, a grassroots effort built from a wide range of Local, Regional, State, and National organizations provides a ***Healthy Rivers Alternative*** to the proposed Northern Integrated Supply Project (NISP). NISP includes the proposed Glade and Galeton Reservoirs and would take water from both the Cache la Poudre and South Platte Rivers to support growth in service areas stretching from Larimer County south to the Denver metro area. Our alternative, in comparison to a proposal pursued by the NISP proponents, achieves both water supply security and river conservation for the citizens of northern Colorado, and it does so at a much reduced cost that supports agriculture and protects the environment.

In addition to the ***Healthy Rivers Alternative***, we outline long-term proposals for instream flows and river restoration and policy and legislative solutions that will provide for a sustainable future for the Cache la Poudre River and the residents of northern Colorado. Together, these short- and long-term steps set a course of action that will allow the citizens to control the fate of their rivers and communities. The steps are based on the following principles:

To provide for healthy rivers and communities in the short-term, we need the following right now:

1. **A realistic assessment of future water needs of the NISP participants.** An analysis of population growth and water demand that realistically portrays the future need for water in NISP participant communities is needed before any decisions on future investments can be made. The NISP Draft Environmental Impact Statement (DEIS) is inadequate in analyzing the growth, water need, and conservation potential for NISP participant cities. As a consequence, its justification for the project dramatically overstates the future need for water to be provided by the project. A revised Purpose and Need analysis for the NISP project provides the foundation for a proposal that will meet the participants' needs without unnecessarily draining the river.

2. **A full range of alternative water supply options for NISP participants.** A number of viable options exist (in addition to those discussed in the DEIS) that would allow the NISP participants to meet their needs without draining the Cache la Poudre River of its last flows. Although these options individually provide only a portion of the water needed, when combined they go well beyond the NISP participants needs.

3. **A full range of alternative water storage options for NISP participants.** As with supply, there are a number of storage options that, taken together, would make needed water available. A system of these options would eliminate need for construction of the unnecessary and tremendously expensive Glade and Galeton Reservoirs.

4. **An accurate and current revised cost estimate for all of the options that might be used to meet the needs of NISP participants.** Significant increases in infrastructure costs over the last few years have rendered the cost estimates prepared for the NISP DEIS inaccurate and obsolete. A revised look at both the proposed project and the options described in this document allows residents of northern Colorado and decision makers to thoughtfully approach major investments.

A Healthy Rivers Alternative to NISP/Glade

Responsible Demand Management and Small-Scale Supply Options Eliminate the need for NISP

The Save The Poudre Coalition has devoted more than a thousand hours to the analysis of the NISP DEIS. This work has been performed by research scientists, analysts, attorneys, qualified professionals, and community members with expertise in issues related to this issue. In the course of our work, we have discovered numerous problems with the NISP proposal, starting with the underlying justification for the project and continuing through the analysis and proposed mitigation

Our review made it clear that it was essential for us to carefully analyze the proposed NISP project and prepare a positive alternative that would meet the needs of the NISP participants while reducing water withdrawal-associated impacts on the Cache la Poudre River. This alternative, the ***Healthy River Alternative***, is explained in detail here.

While alternatives are typically composed solely of action steps, the fundamental flaws with the project's justification as presented in the NISP DEIS required us to take a step back and in essence start from square one. It is also necessary to critique a number of elements of the DEIS to fully explain the alternative and its rationale. Consequently, we present our discussion of the alternative in five parts:

- A critique of the Purpose and Need section of the proposed NISP project as presented in the DEIS, explaining why this project justification is fundamentally flawed and incapable of serving as the foundation for further analysis;

- A revised projection of future water demands that honestly and accurately states the needs of the NISP participants while incorporating realistic population growth scenarios, alternative water supply options, alternative storage, and industry standards for best management practices;

- An overview of alternative water supply options that can meet the actual needs of the NISP participants;

- Cost estimates for the NISP project and the Healthy Rivers Alternative scenarios;

- A comparison of the environmental impacts of the proposed NISP with the impacts of the Healthy Rivers Alternative.

The Justification for NISP Presented in the DEIS is Fundamentally Flawed

In reviewing the NISP DEIS we determined that the population growth and water demand estimates provided by the project's participants were poorly done. A large number of major inconsistencies point to a speculative and severely flawed analysis of current water use and projected demand. Key failures of the DEIS include:

- The DEIS does not evaluate the role of water conservation or efficiency either as a way to reduce demand. This is counter to the regional trend toward lowered water consumption rates.

- The DEIS arbitrarily removed major industrial users from the analysis, which artificially lowered estimates of gallons per capita daily (gpcd) water use for the participants. It then compared these estimates, which represent just a portion of the residential use, with the total industrial, residential, and municipal gpcd figures from other communities.

- Water use levels reported for several of the participants were inconsistent with other published reports on water use.

- Parts of the analysis combined water use data from one year with population data from another. Periods of high water use by the participants were arbitrarily removed from the analysis.

- Future projected population growth was inconsistent with current population trends.

These inconsistencies point to a severely flawed analysis. The results are water use estimates that are speculative and faulty, undermining the water demand analysis that the remainder of the document rests on.

An honest and accurate analysis of a community's projected water needs depends on an understanding of how the community uses water. An analysis of the distribution of water use sectors (residential, industrial, commercial and municipal/public safety) in future community growth, rational target water use goals for those water use sectors, and a clear understanding of existing water use are essential to demand projection.[1] To understand baseline needs and project water demand into the future, water providers must analyze water use over a period long enough to include droughts and other factors that influence water use.[2] It is not clear that the DEIS authors had access to such information, or if indeed the participants themselves had collected such information and done an analysis to project past and present water use by sector.

We do not believe that the decision makers tasked with reviewing and approving this project can make an informed decision into the actual purpose and need for the project unless these issues are addressed. The result is a severely flawed water use analysis that does not meet basic NEPA requirements under 40 CFR § Title 1502 et seq. The NISP DEIS does not divulge accurate information from which decision makers can accurately assess the purpose and need for the project, nor can the public adequately asses the efficacy of the analysis. We offer our revised water demand analysis below.

Reassessing Demand by Overhauling NISP Population Forecasts and Incorporating Cost-Effective Demand Management

Population Growth Projections in the NISP DEIS are Incorrectly Calculated

The annual percentage growth rates used in the NISP DEIS do not always correspond to the actual population estimates for the projected periods. Furthermore, the ranges provided for annual growth rates are far too broad. It would be more appropriate to calculate the population growth estimates based on the middle of the range growth rates for each participant. We believe that this is not only more accurate but even conservative (i.e., very unlikely to understate growth) given rising energy costs that are likely to slow growth rates in NISP project area and instead redirect growth to urban centers and transportation hubs.

Population Growth Projections in the NISP DEIS are Unachievably High

There is reason to question whether the growth rates projected in the NISP DEIS will be achieved by the NISP participants. A recent study of American housing trends analyzed the roots of the housing bubble and the mortgage foreclosure crisis, finding that high fuel costs were the largest contributing factor to the foreclosure

[1] One example that analyzes water use by industrial sector is the City of Aurora, Colorado *Water Conservation Plan* dated August 8, 2007. http://www.auroragov.org/stellent/groups/public/documents/article-publication/035857.pdf

[2] The city of Santa Fe has evaluated water demand going back to 1995 and has reduced water use by 4.2% per year through 2007. City of Santa Fe Water Conservation Office. http://www.santafenm.gov/DocumentView.asp?DID=2178

rate in suburban communities.[3] The work describes how the price of fuel is driving the U.S. housing market to restructure around transit and employment centers.

To see how this trend is affecting the NISP participants, we analyzed their foreclosure rates alongside new housing permits, and found the NISP participant regions have some of the highest foreclosure rates in the country (Figure 1 and Figure 2).[4] New housing permits in 2008 so far are half those in 1998,[5] when the population was significantly smaller. Gasoline price inflation is highly correlated with the foreclosure rate and drop in permits,[6, 7] as residents find they can no longer afford to commute by automobile long distances to work or to retail centers.

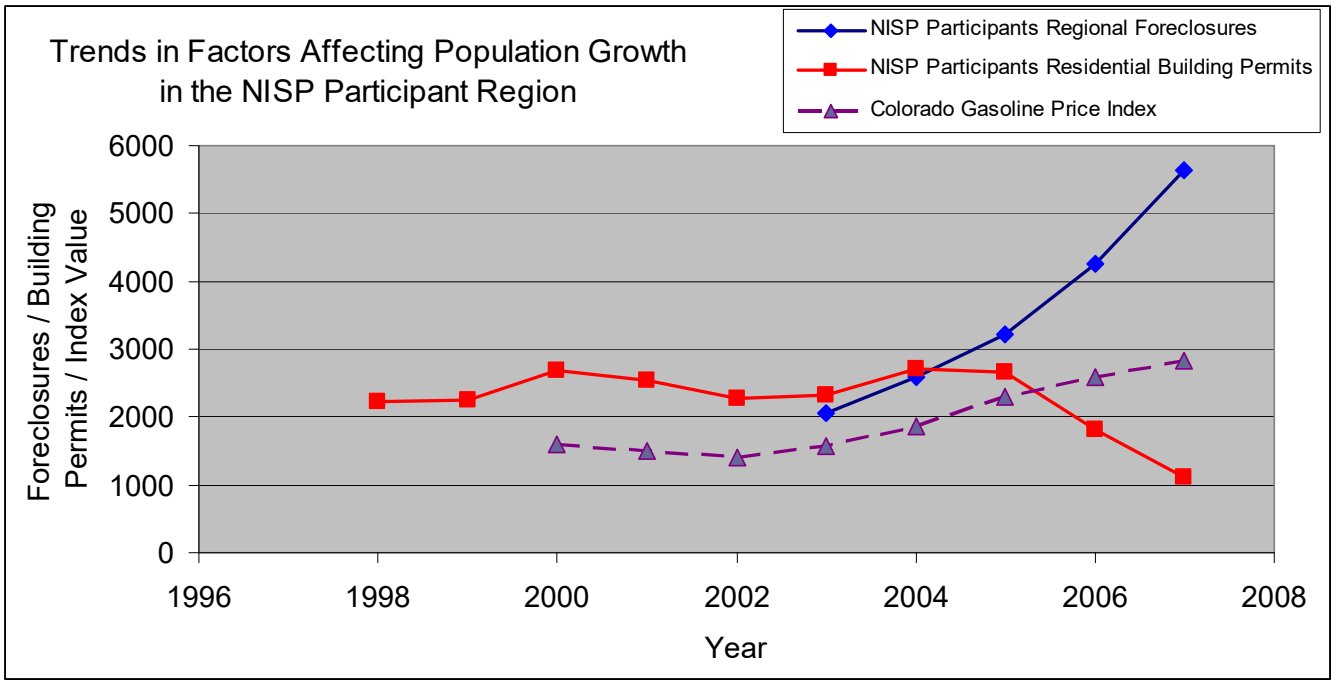


Figure 1. Indicators of significant uncertainty in population and water use growth projections for the NISP participants. As fuel price inflation soars, home mortgage foreclosures in the NISP participant region climbed well above the national average, and building permits sank to half that of recent levels. The foreclosure rate in Weld County is 1 out of very 29 homes.

[3] Joe Cortright. 2008. Driven to the Brink: How the Gas Price Spike Popped the Housing Bubble and Devalued the Suburbs. CEOs for Cities. http://www.ceosforcities.org/newsroom/pr/files/Driven%20to%20the%20Brink%20FINAL.pdf, viewed on 7/7/2008.
[4] Mortgage foreclosure data provided by RealtyTrac. http://www.realtytrac.com/ContentManagement/pressrelease.aspx?ChannelID=9&ItemID=3988&accnt=64847, viewed on 8/31/2008.
[5] Building permit data were provided by Boulder, Larimer, Morgan, and Weld Counties, and the NISP participants.
[6] U.S. Department of Energy. http://tonto.eia.doe.gov/oog/ftparea/wogirs/xls/pswrgvwsco.xls, viewed on 8/31/2008. Data are scaled for comparison purposes.
[7] Average yearly fuel costs in Colorado are 95% correlated with mortgage foreclosures, and 70% correlated with the drop in building permits.

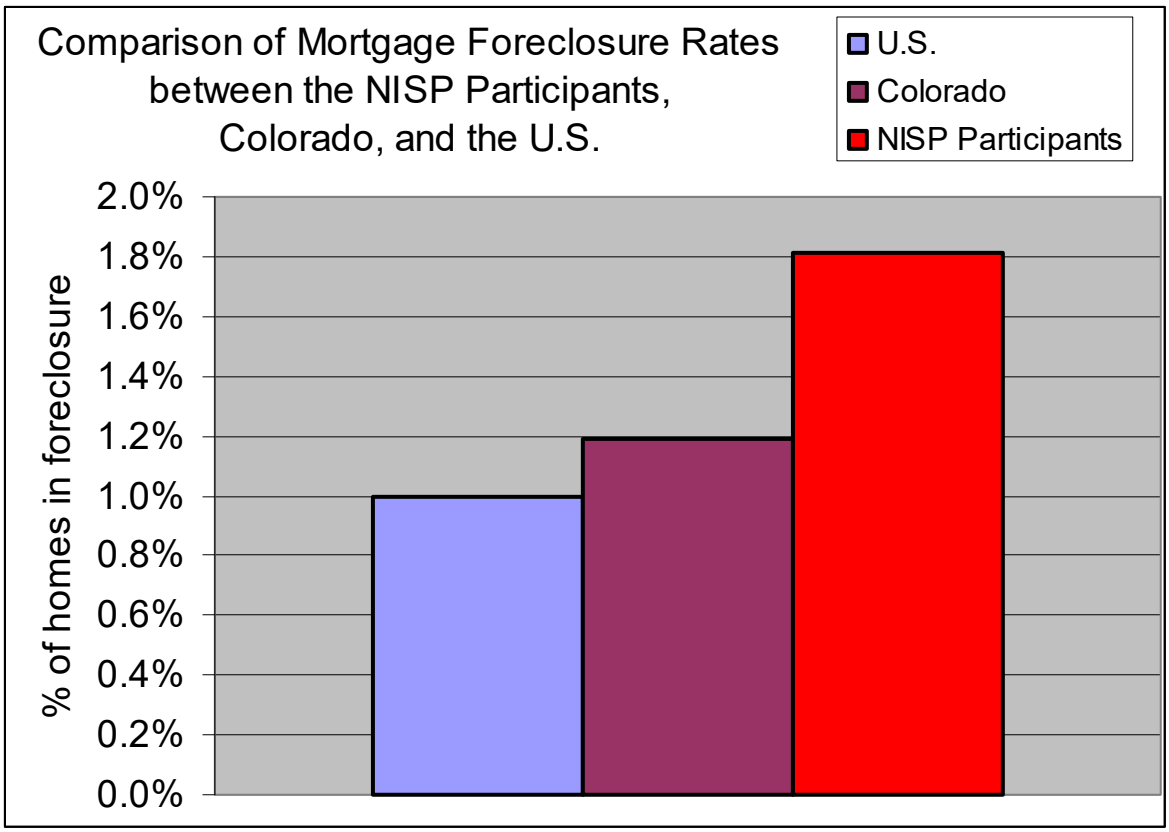


Figure 2. Population weighted mean percent in 2007 of all homes in Mortgage Foreclosure in the NISP participants region (Boulder, Larimer, Morgan, and Weld Counties) compared with the Colorado and U.S. statistics for home foreclosure.

For these reasons, we believe that the NISP participants are very unlikely to achieve the population growth scenario described in the NISP DEIS.

Revised Base Water Use Projections

In order to calculate a more reasonable and accurate water demand required by the NISP participants, we constructed revised scenarios of projected water demand over time. Population estimates were based on information in the NISP DEIS, using the mean average annual growth rate when a range was provided (Figure 3).[8] Build out figures from the DEIS were also observed. After population projections were re-calculated using the midline growth rates and respecting the listed build-out figures, total population in 2035 for the NISP participants is 375,613; 11% less than listed in the DEIS. In 2050 the population is projected to reach 440,920; 27% less than the DEIS projects.

[8] NISP DEIS, Table 1-4.

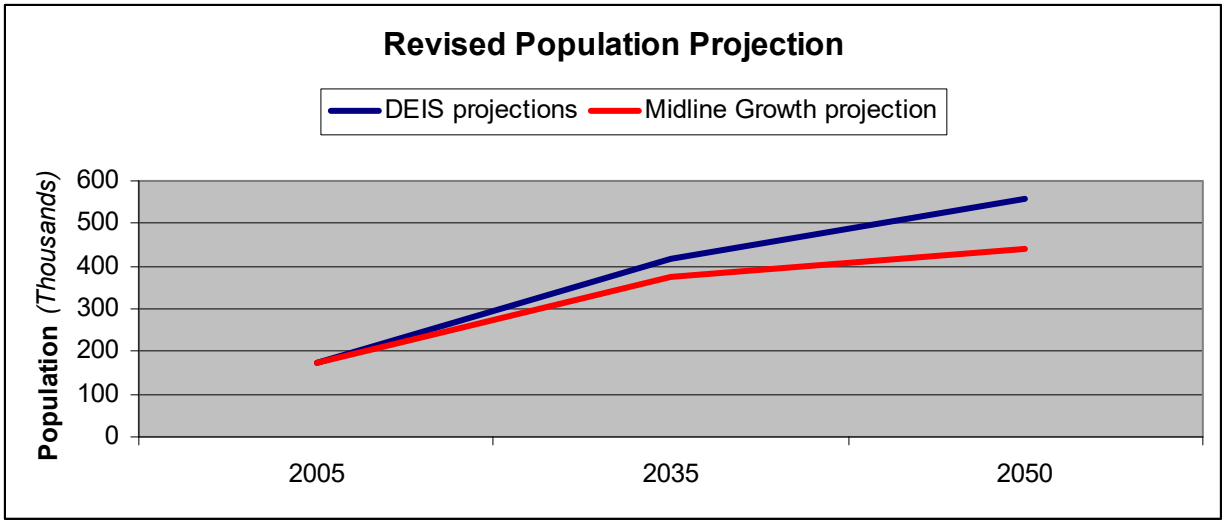


Figure 3. Projected midrange population trends in the NISP participants region.

Using these revised population projections we calculated the total required demand. Even with no decrease in levels of use, the lower population projection leads to decreased demand. We analyzed two modest conservation scenarios based on the following assumptions:

- We used current system-wide per capita figures as a basis for calculating future demand. Current per capita figures were calculated using data provided in the DEIS, Table1-3. These figures include all system-wide potable use and loss and thus is more reflective of where community use levels are than the GPCD figures provided in the DEIS that exclude large water users (Table 1).
- Final demand figures include a 10% system loss on top of the calculated potable demand. Ten percent is the level of system-wide loss that is deemed appropriate by the American Water Works Association.[9] Many NISP participants have loss levels much larger than 10%; reducing these losses will save a great deal of water and reduce overall demand.

Table 1. Recalculated 2003 Gallons Per Capita Per Day (GPCD) Figures for the NISP participants. Total population-weighted mean is 183 gpcd.

	Potable Deliveries	Total Potable Deliveries with Loss	2003 Population	System Wide GPCD
CWCWD	5,102	5,547	18,652	**265**
Eaton	577	698	3,702	**168**
Erie	1,474	1,706	9,039	**168**
Evans	1,572	2,465	11,754	**187**
FCLWD	5,732	6,368	30,189	**188**
Fort Lupton	866	1,158	7,071	**146**
Fort Morgan	2,619	2,867	10,994	**233**
Lafayette	3,478	3,754	24,996	**134**
LHWD	3,389	4,033	18,158	**198**
MCQWD	1,661	1,631	5,711	**255**
Severance	129	178	1,300	**122**
Windsor	1,609	2,040	13,984	**130**

[9] AWWA Leak Detection and Water Accountability Committee, "Committee Report: Water Accountability," Journal AWWA (July 1996): 108-111.

Water conservation, also known as demand management, in Colorado has changed dramatically over the past five years. After responding to the record drought of 2002, some water utilities have implemented widespread conservation programs, not just as a drought-management tool, but also as a means to secure permanent water conservation savings. These savings can increase system reliability, serve new growth, and decrease the need for new water development that can have detrimental impacts on Colorado's river environment, water recreation, and rural communities.

Demand Management Scenarios

Based on existing trends and examples from other Front Range water utilities, we next developed two straightforward, achievable demand reduction scenarios that utilize very modest conservation and efficiency measures to reduce the base water use projections described above.[10]

Conservation and efficiency represent a solid "no regrets" strategy – one that does not tie the utilities to expensive infrastructure or rising electricity costs, with no detrimental impacts on river systems or rural communities. While conservation programs come with a price tag, they are much smaller than the one for the proposed NISP components.[11]

Previous research has determined that many Front Range communities are planning to reduce use by 1% per year in the coming decade (Figure 4).[12] Savings will be largely realized through incentives to install more advanced and efficient fixtures, indoors and out; stronger water pricing; regulation; and behavioral changes. Based on observed conservation savings over the last decade 1% per year savings is not only achievable, but likely a conservative estimate. Moreover, many of these communities have significantly stronger and more established conservation programs in place than the NISP participants. They are also comparable to NISP participants in location, climate and quality of life. Consequently, a 1% per year reduction in water use is reasonable and in agreement with regional standards and has therefore been used to project more sensible demand requirement for NISP participants in each of the two scenarios below.

[10] Two recent studies contain examples of widely used demand reduction measures from Colorado and the Western U.S.: The Colorado Water Conservation Board's *Statewide Water Supply Initiative (SWSI) Phase 2 Report* (http://cwcb.state.co.us/IWMD/SWSITechnicalResources/SWSIPhaseIIReport/, viewed on 8/31/2008) and Western Resource Advocates (2008) *Smart Water: A Comparative Study of Urban Water Use Efficiency Across the Southwest* (http://www.westernresourceadvocates.org/media/pdf/SmartWaterBrochure.pdf, viewed on 8/31/2008).

[11] Conservation and efficiency measures per yielded acre foot range from $55 to about $10,000, averaging about a tenth of the cost per acre foot of firm yield from NISP. Demand reduction can be achieved through incremental payments built into utility fee structures without having to finance the large capital costs of major projects like NISP.

[12] Western Resource Advocates. 2007. *Front Range Water Meter: Water Conservation Ratings and Recommendations for 13 Colorado Communities.* 2260 Baseline Road Suite 200, Boulder, CO 80302. http://www.westernresourceadvocates.org/watermeter/WaterMeterReport.pdf, viewed on 8/31/2008.

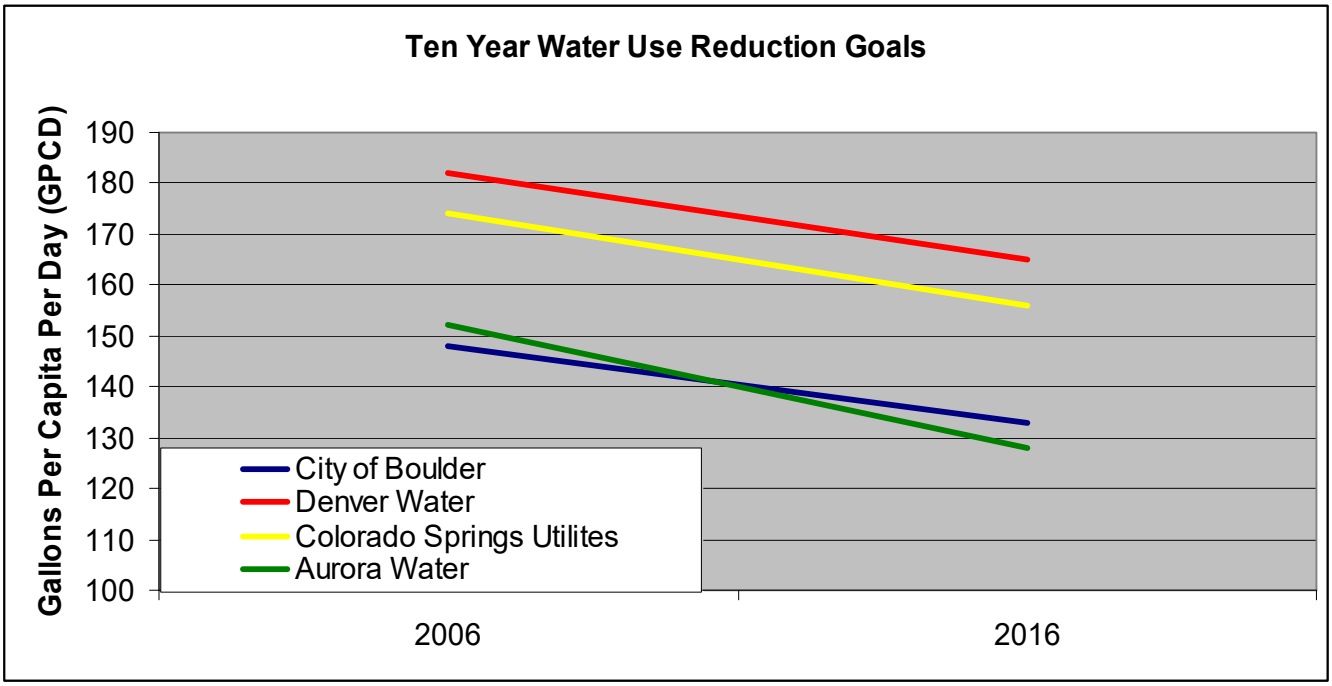


Figure 4. Ten year goals for reduction in system wide water use by various Front Range Water providers.

Our scenarios follow:

Scenario 1: In addition to the modified population projections above, scenario 1 assumes that integration of conservation and efficiency measures would lead to a 1% per year reduction in use, up to a total of 10%. For example, Fort Morgan, which in 2003 had a per capita demand of 233, would set a goal of reaching 210 GPCD system-wide. This demand-reduction figure would then be used to determine long term demand using the following formula.

$$\frac{\text{GPCD X POPULATION X 365days/year}}{\text{325,851Gallons/AF}} = \text{AF of Demand per year}$$

A 10% system-wide loss is added on top of the demand figure to yield TOTAL DEMAND.

Scenario 2: Using the 2003 use figures as a baseline, a higher level of conservation and efficiency is applied. This scenario assumes a 1% per year reduction, up to 20%. Fort Morgan, for example, which had a 2003 per capita demand of 233, would have a goal of reaching 184 GPCD, system-wide. This new GPCD figure would then be used to determine long term demand using the above formula. Again, a 10% system-wide loss is added on top of the calculated demand figure.

The result is a more refined and noticeably lower demand requirement to meet the needs of the NISP participants without sacrificing quality of life.

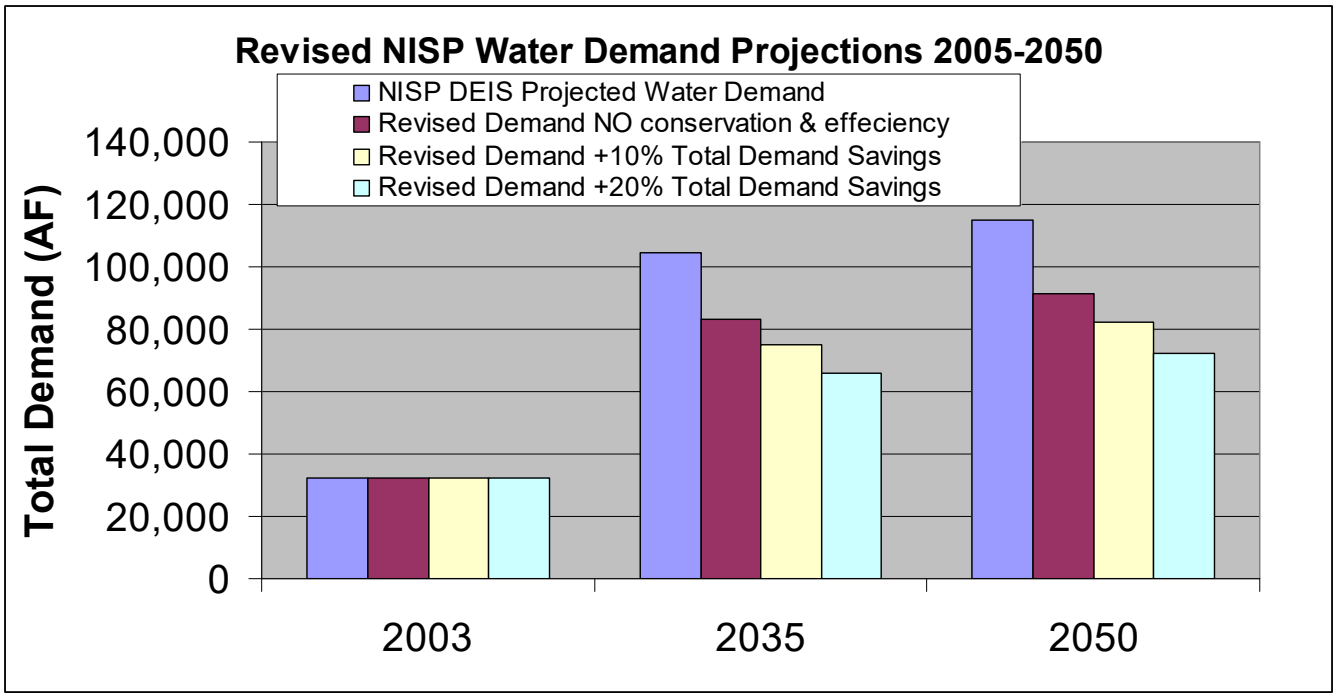


Figure 5. Revised NISP participants firm supply projections based on straightforward, achievable conservation and efficiency measures implemented over time to reduce demand.

According to the DEIS, Table1-2, current firm yield of NISP participants is 50KAF, projected to increase to more than 115,000 AF in 2050, which is 25,000 AF greater than the NISP proposed firm yield. Future demand, under the more conservative scenario 1 is projected to increase to nearly 85,000 AF annually, leaving 35,000 AF in additional water requirements above existing supply (Figure 5).

In summary, through conservative, realizable demand management scenarios the NISP participants will save themselves the cost to acquire, treat, deliver, and manage 30,000 AF of water. In the section that follows we show two recommendations for how to meet their projected water needs that won't require draining the Cache la Poudre River of any further water.

Alternative Water Supply Options

We evaluated three alternative water supply sources for the NISP participants. These supplies are "alternative" only in the sense that they do not require new water diversions from the Poudre River, building major debt-financed facilities, or relocating existing water diversions to new locations upstream. These alternative water sources utilize existing means practiced by water utilities around Colorado and the West.

After presenting potential sources for new water, we critique the NISP DEIS no-action alternative and present two possible scenarios for water supplies that meet the NISP participants' needs.

Development-Displaced Water

The NISP participants have developed major plans to expand their boundaries and dry up irrigated lands within their new growth boundaries. According to the 2002 U.S. Census of Agriculture conducted by the Department of Agriculture, and the Natural Resource Conservation Service (NRCS) National Resources Inventory (NRI), irrigated lands in the NISP participants region comprise 63-67% of the land onto which the participants intend to expand (Figure 6).

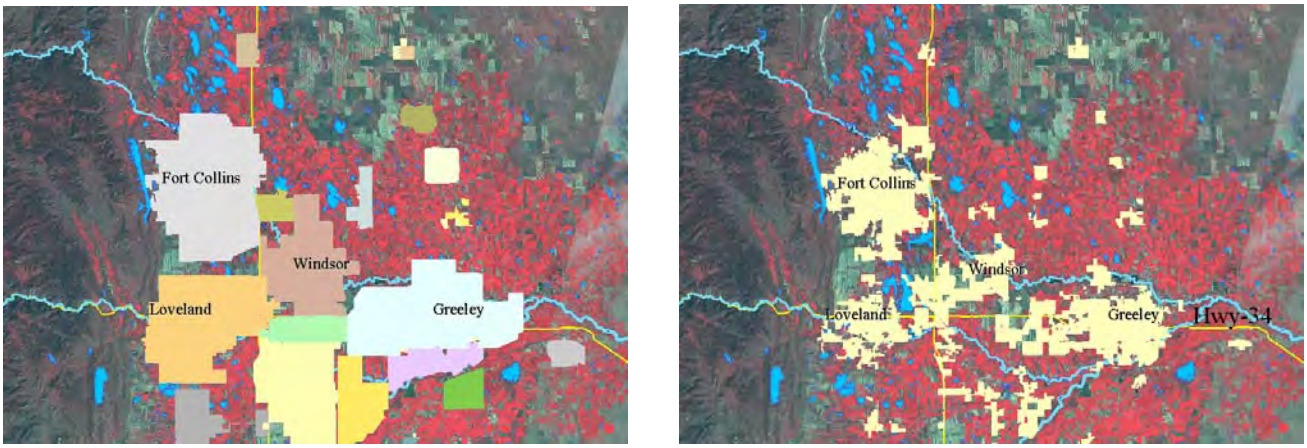


Figure 6. Projected development buildout in the Northern part of the NISP participant region by 2035 (left) compared with development in 2007 (right). The bright red circles and rectangles in the images are irrigated agricultural lands. Source: Northern Colorado Water Conservancy District.

Careful water use would allow them to use the water from these formerly irrigated lands to supply their needs. But the NISP DEIS does not address this critical source of supply. Why not?

If there is to be an open and honest discussion about helping agriculture and providing sources of water supply for the exurban expansion of the NISP participants, water supply projections must include irrigation water tied to lands developed within the NISP participants' annexations. This discussion must also include the measures that the participants are taking and, in most cases, not taking, to reduce their water supply requirements and therefore reduce the need to dry up irrigated land for municipal and industrial (M&I) development.

Based on the NISP DEIS population projections, we estimate the participant towns and water districts would occupy a developed land "footprint" or about 126,000 acres, which would be about 76,000 acres more land than they occupied in 2005 under the revised population growth scenario above. Irrigated agriculture occupies about 48,000 acres of that new land that would be developed,[13] on which about 33,300 AF of water is used for irrigation and should be available for M&I uses.[14, 15, 16]

It appears that nearly all of the water that would be provided by the NISP project would be available from the displacement of irrigation water off of newly developed lands.

Rotational Fallowing Agreements

Rotating Fallow Agreements are contracts between municipal and agricultural water uses whereby municipalities pay irrigators to regularly fallow some of their fields in return for contract payments equal to or exceeding the value the water would yield if used to irrigate crops. It has been successfully applied at large scales in California and other parts of the West.

Some advantages of rotating fallow agreements include but are not limited to:

- Provide financial stability to irrigators who are routinely affected by fluctuating crop prices.
- Irrigators remain in operation while M&I uses a portion of agricultural water supplies.

[13] 76,000 acres x 63% (average proportion of ag land in irrigated agriculture) = about 48,000 acres of irrigated land.
[14] U.S. Department of Agriculture Census of Agriculture. http://www.agcensus.usda.gov/
[15] U.S. Department of Agriculture National Agricultural Statistics Service. http://www.nass.usda.gov/
[16] Broner, I. and J. Schneekloth. 2003. *Seasonal Water Needs and Opportunities for Limited Irrigation for Colorado Crops.* Extension Bulletin 4.718, Colorado State University Extension Service, Fort Collins, Colorado.

- Irrigators use cropland fallow intervals to rest cropland, benefitting soils and improving crop yields, while allowing for irrigation infrastructure improvements and critical maintenance operations that improve system efficiency.
- M&I users and irrigators establish long-term economic linkages that benefit the community and the region.
- Irrigators may choose to retire lands that are difficult to irrigate or suffer from soil salinity, compaction, erosion, declining crop yields, or other issues.

The NISP DEIS alternatives analysis features a rotating fallow agreement scenario that we believe artificially inflated implementation costs while creating a contracting scenario of unrealistic complexity.[20] The scenario required purchasing 103,000 AF of water and then leasing back 91,000 AF to irrigators, yielding 12,000 AF, only 10% of the purchased volume.

A recent survey of South Platte basin irrigators found that that 63% of interviewed farmers would be willing to participate in a rotational land fallowing program, if compensated adequately with a mode for compensation estimates of $400/ acre-foot.[17]

The four largest ditch operators in the Poudre River system are the North Poudre Canal, Larimer County Canal, Larimer & Weld Irrigation Canal, and the New Cache la Poudre Co. Ditch (aka Greeley No. 2). About 55% of the native and imported water in the river,[18] or 226,092 AF, is diverted by these ditches.[19] Rotating fallow agreements with just these four companies have the potential to yield at least 22,600 AF of water, assuming 50% consumptive use and fallowing intervals of once every five years. This represents just a small portion of the opportunities for rotating fallow agreements in the Poudre River, Big Thompson, Little Thompson, St. Vrain, and South Platte watersheds, when combined.

Alternative Water Supply Scenarios

The NISP DEIS conducted an alternatives analysis that sought to identify possible sources of water supply for the project.[20] The alternatives analysis set an arbitrary 30% threshold figure for the firm yield supply, whereby an alternative would be required to provide a minimum of 30% of the proposed 40,000 AF firm yield in order to be included in the project. The alternatives analysis provided no substantive basis for using a firm yield cutoff threshold value. We eliminate the threshold in this analysis in order to provide greater flexibility for lower cost supply options, in conjunction with the revised demand value, having corrected for errors in the population forecasts and per capita water use figures adjusted for cost-effective conservation measures. Based on the analysis presented in the above section on population growth and demand management, we assume that demand can be reduced by 5,000 AF from 40,000 AF to 35,000 AF, well within the range of reasonable reductions.

In our analysis, we first look at the NISP DEIS No Action Alternative (NAA), assuming that the NISP participants would purchase and transfer existing agricultural water rights and C-BT shares if NISP was not built. The primary changes to what is found in the DEIS will be to reduce the demand forecast from 40,000 AF to 35,000 AF in accordance with our revised estimates to assume that phase the purchase and development of agricultural rights and C-BT shares in accordance with their needs or that they will lease water back to irrigators

[17] James Pritchett, Jennifer Thorvaldson, Neil Hansen, Ajay Jha. 2008. Water Leasing: Opportunities and Challenges for Colorado's South Platte Basin. Presented at WAEA Annual Meeting, June 26th, 2008, Big Sky, Montana. http://www.kysq.org/Lease.pdf, viewed on 8/31/2008.

[18] We use the word *native* to identify water that originates in the Cache la Poudre River Watershed. More than a hundred thousand acre feet of water is *imported* into the watershed from the Laramie River (via the Laramie River Tunnel), The Michigan River (Via the Michigan Ditch), and the Colorado River (via the Grand Ditch). Most of the *imported* water is diverted from the river for irrigation and M&I uses near the mouth of the Poudre River Canyon.

[19] NISP DEIS p. 3-11.

[20] HDR Engineering 2007. NISP Alternatives Analysis.

until needed, either of which will reduce the cost to the participants.[21] We then reexamine the assumptions of the NAA to incorporate modified estimates of what storage will actually be required by agricultural transfers and by what C-BT shares might yield and, finally, we incorporate rotational fallowing along with agricultural transfers and C-BT purchases.

These scenarios assume no changes in existing points of diversion, or that points of diversion are moved to the furthest possible point downstream to improve flows.

Re-evaluating the Cost of the NISP DEIS No Action Alternative

The basis for costing the NAA is Table 2.5 (DEIS, page 2-44). The NAA assumes: 1) individual participant acquisition of water *as needed over time* in response to growing demand for urban water; 2) that such supplies will be broadly available and are not dependent on a small number of select canals; and 3) that, with the exceptions of the Eastern Group and Ft. Lupton, every acre foot (AF) of purchased agricultural water will require an acre-foot of storage (an assumption we will examine below).[22] The table proposes (or implies) that the needed water would be provided by acquisition of 58,400 AF of agricultural water rights (to provide 29,200 AF of firm yield, i.e., a consumptive use estimate of 50 percent) and 21,600 units of C-BT (each share providing 0.5 AF of yield).[23]

According to Table 2.5, the DEIS assumes that the cost of acquiring the agricultural water will be $6,000 per acre-foot (of which 50 percent will be available for transfer) and that an acre-foot of storage will cost $4,000,[24] and that C-BT shares will be $11,000.

For purposes of assessing the effect of phasing on costs we will use the same assumptions that Charles Howe employed in his DEIS comments.[21] We assume that: 1) the water will be acquired in four equal increments of 8,750 AF; 2) the shares will be purchased at 10 year intervals, starting now; and 3) the ratio of agricultural shares to C-BT shares will be that of Table 2.5. Based on these assumptions, each increment, undiscounted, will cost $173.9 million. With all of these assumptions in place we estimate the present value of costs assuming inflation free discount rates of 4%, 5%, and 6%. The results appear in Table 2 below.

Table 2. Present Value (PV) of the NISP No Action Alternative, assuming need of 35,000 AF by 2050 and staging of development.

	Discount Rate, 4%	Discount Rate, 5%	Discount Rate, 6%
PV, 1st Increment	$173.9 million	$173.9 million	$173.9 million
PV, 2nd Increment	$117.5million	$106.7 million	$97.1 million
PV, 3rd Increment	$79.3 million	$65.6 million	$54.2 million
PV, 4th Increment	$53.6 million	$40.1 million	$30.3 million
TOTAL	$424.3 million	$386.3 million	$355.5 million

[21] For a fuller discussion of phasing and its impact on costs see Charles W. Howe letter to Chandler Peter, June 11, 2008.

[22] According to Table 2-5, the Eastern Group will only need 6,200 AF of storage of 9,800 AF of purchased agricultural rights and Ft. Lupton will need 3,000 AF of storage for 6,000 AF of purchased agricultural water rights.

[23] The 0.5 acre-foot figure seems very conservative since a quota of 0.5 is the lowest ever imposed by NCWCD and is typically imposed in wet years when outdoor water demands will be low.

[24] The NISP DEIS grossly underestimates the availability of alternative storage on the Poudre River and South Platte basins. Storage capacity is widely available in existing reservoirs and gravel pits, to the extent that there is a widely known and well-established cost for existing storage of $4,000/AF (Source – *Aggregates Manager* Magazine, June 2006). For a recent analysis of available storage, see Don W. Deere, P.E., Colby J. Hayden, P.E., and Glen G. Church, P.E. 2007. *Gravel Pit Reservoirs: Colorado's Water Storage Solution.* pp. 158-173 in Wiltshire, R.L., Parekh, M.L., and Gross, C.M. (editors), GEO-Volution: The Evolution of Colorado's Geological and Geotechnical Engineering Practice (Proceedings of the 2006 Biennial Geotechnical Seminar, Nov. 10, 2006, Denver, CO; Sponsored by The Geotechnical Group of the Colorado Section of ASCE, Rocky Mountain Section of the Association of Environmental and Engineering Geologists; and Colorado Association of Geotechnical Engineers). Reston, VA: ASCE / Geo Institute, 978-0-7844-0890-2, 2007, 215 pp., Geotechnical Practice Publication No. 4 (Barcode: RMI MK31592).

These costs are well below the costs of over $800 million for the NAA offered in the DEIS.

We believe these costs provide a good starting point for examining alternatives that will meet NISP participant needs and, at the same time, not further degrade the already stressed Cache la Poudre River.

Option 1: an Alternative with Modified Assumptions about Storage Needed for Agricultural Transfers and the Value of C-BT Shares

The DEIS assumes that agricultural water transfers generally provide 0.5 AF of transferrable water for every acre-foot purchased, but that the storage requirement is, as described above, equivalent to the AF purchased. It is true that agricultural water rights are usually limited to the months from May through October,[25] so that providing water for year-round urban need does require storage, but we challenge the need as assumed in the DEIS, i.e., one unit of storage for every unit of purchased water. We believe that the storage requirement should be adjusted both for the consumptive use component of the water that can be transferred and for the pattern of use. Urban demand follows a seasonal variation in which between 70% and 75% is used in the months from May through October and 25% to 30% from November through April.[26, 27] Between the consumptive use correction and the need to store water for winter use we assume that the storage requirement can be reduced by 60% of that which appears in Table 2-5 of the DEIS (i.e., from 51,800 AF to 21,000 AF) and by an additional 2,880 AF to account for the reduced future demand from 40,000 AF to 35,000 AF, leading to a storage requirement estimate of 18,120 AF.

The need for C-BT shares in the NAA is based on an assumed "quota" of 0.5 AF/unit/year to establish a "firm" yield. The latter figure seems unduly conservative to us since a quota of 0.5 is the lowest ever imposed by the NCWCD and is imposed in wet years when outdoor water demands are low. The long-term average share value is 0.7 and we think it is the more proper figure to use. The C-BT system has substantial storage and with this in mind we believe that "conservative assumption" about share value ignores this as well as the decision process used by the NCWCD to set a share value. We use 0.7 in this second alternative and based on this assumption approximately 13,500 shares would be needed to provide 9,450 AF of yield.

The first ten year increment of costs for this alternative would now be $138.8 million and the subsequent incremental costs would be discounted as they were above. The results, again assuming discount rates of 4%, 5%, and 6%, are shown in Table 3.

Table 3. Option 1: Present Value (PV) of Costs Assuming Need of 35,000 AF, Staging of Development, Reduced Storage Needs, and Higher C-BT Share Value. Dollar figures are in millions.

	No Discount	Discount Rate, 4%	Discount Rate, 5%	Discount Rate, 6%
PV, 1st Increment	$ 131.9	$ 131.9	$ 131.9	$ 131.9
PV, 2nd Increment	$ 131.9	$ 89.1	$ 80.9	$ 73.7
PV, 3rd Increment	$ 131.9	$ 60.2	$ 49.7	$ 41.1
PV, 4th Increment	$ 131.9	$ 40.7	$ 30.5	$ 23.0
TOTAL	$ 527.6	$ 321.9	$ 293.0	$ 269.7

These cost estimates represent a substantial reduction from the cost of the NISP DEIS proposed action alternative.

[25] U.S. Geological Survey, National Water Information System. Stream flow data from station 06752260, Cache la Poudre River at Fort Collins, CO. http://waterdata.usgs.gov/co/nwis/uv/?site_no=06752260&PARAmeter_cd=00065,00060, viewed on 8/31/2008.
[26] Western Resource Advocates. 2007. *Front Range Water Meter: Water Conservation Ratings and Recommendations for 13 Colorado Communities.*
[27] City of Fort Collins. 2007. *Water Conservation Plan.* http://www.ci.fort-collins.co.us/water/pdf/conservation-plan-20071004.pdf, viewed on 9/10/2008.

Option 2: An Alternative that Incorporates Rotational Fallowing with Agricultural Transfers and C-BT Shares

For purposes of this alternative we assume that rotational fallowing can supply slightly more than a third of our estimate of demand or 12,000 AF/year and that two thirds (or 8,000 AF) of this will supplant the agricultural transfers component of our above alternatives and one-third the C-BT component. In other words, to meet a demand of 35,000 AF of demand, 12,000 AF will come from rotational fallowing, 15,800 AF from agricultural transfers, and 7,200 AF from C-BT shares (not unreasonable for C-BT, given the flexibility of share purchases).

Assuming that the fallowing will come with a storage requirement comparable to agricultural transfers, the storage will be increased from 18,120 AF to approximately 21,600 AF. Regarding costs of rotational water, we assume that the basic cost (i.e., compensation to irrigators) is $400/ acre-foot, that additional administrative costs will be 25% or $100/AF and that the present value of the time stream of costs ($500/year/acre-foot) is approximately (depending on the discount rate) $5,000/acre-foot. With these assumptions the first increment of costs is $112.3 million. With this as the incremental cost, the discounted present value for this alternative, again for three discount rates, is in Table 4.

Table 4. Option 2: Present Value (PV) of Costs Assuming Need of 35,000 AF, Staging of Development, Reduced Storage Needs, Higher C-BT Share Value, and Agricultural Fallowing.

	No Discount	Discount Rate, 4%	Discount Rate, 5%	Discount Rate, 6%
PV, 1st Increment	$ 112.3	$ 112.3	$ 112.3	$ 112.3
PV, 2nd Increment	$ 112.3	$ 75.8	$ 68.9	$ 62.7
PV, 3rd Increment	$ 112.3	$ 51.2	$ 42.3	$ 35.7
PV, 4th Increment	$ 112.3	$ 34.6	$ 26.0	$ 19.6
TOTAL	$ 449.2	$ 273.9	$ 249.5	$ 229.6

The introduction of rotational fallowing, given the cost assumptions we have made, leads to another alternative cost reduction.

Revised Cost Estimates for the NISP DEIS Action Alternatives

In their analysis of the cost projections for the NISP project,[28] Western Resource Advocates found that the NISP DEIS and technical reports did not include more than $350 million in costs associated with the project. These costs include: (a) construction costs inflation linked to the spike in energy and raw materials prices, (b) funds needed to renovate existing drinking water and wastewater treatment facilities affected by the project, and (c) finance costs not included in the project costs, discussed below.

Energy/Cement/Steel Price Inflation Impacts NISP

The construction cost estimates in the NISP DEIS and technical reports are based on reports from 2003 to 2006, before the recent spike in construction materials and energy prices. Since that time, price inflation for critical construction cost line items such as diesel fuel, cement, and steel have risen nearly 100%, leading to dramatically rising construction costs for major projects like reservoirs. Since 2006, major construction projects in Colorado have run over predicted budgets by 30 to 50%.[29, 30, 31] In their analysis of the NISP project costs,[28] Western Resource Advocates applied inflation indices used by the Corps of Engineers to previous costs

[28] Western Resource Advocates. 2008. *Revised Construction Cost Estimates for the NISP Project.* 2260 Baseline Road, Suite 200, Boulder, CO 80302.

[29] Elkhead Reservoir construction costs increased by 50% from $20 million to $30 million. Source: Colorado River Water Conservation District, Elkhead Reservoir Enlargement Project website, http://www.crwcd.org/page_28, viewed August 31, 2008.

[30] FasTracks in Denver is expected to cost $1.8 billion more, a 30% increase. Source: *Fastbacks Price Tag Jumps.* Denver Post, August 21, 2008. http://www.denverpost.com/breakingnews/ci_10259704, viewed August 31 2008.

[31] Costs for the Lake Powell Pipeline escalated 22% between 2005 and 2008.

estimates done by the project proponents, finding that construction costs are likely to be at least $77 million (18%) higher than the DEIS estimate.

Renovations to Existing Drinking Water and Sewage Treatment Facilities

The City of Fort Collins reported in their summary of comments on the NISP DEIS that the city would incur additional costs of $75-125 million to upgrade water treatment facilities in order to meet post-NISP discharge permit conditions.[32] If the proposed pipeline is built between the existing Horsetooth Reservoir and the proposed Glade Reservoir, $50-90 million in additional costs to upgrade potable water treatment facilities would be required. Additional yearly operating costs of at least $3 million would be incurred. This represents a total cost burden (in 2008 dollars) to the City of Fort Collins of $125 - $215 million.

Several other utilities would be affected by the NISP project, but have not published estimates of the financial impacts of the NISP project would have on their facilities or operating costs. These include the Eastern Larimer County Water District and the Fort Collins-Loveland Water Districts, which use water from Horsetooth Reservoir, and the Boxelder Sanitation District and sewage treatment facilities for Timnath, Severance, Windsor, and Greeley, all of whom discharge treated sewage into the Poudre River and draw from the Poudre River for drinking water supplies.

Project Financing Costs

The NISP Master Financing Plan recommends that the Participants finance the NISP project using a combination of cash payments, revenue bonds, and a guaranteed loan from the Colorado Water Conservation Board's revolving loan fund.[33] Using the scenarios recommended in the plan, we project the financing costs to be $140 – $260 million (in present value).

Total Revised Cost for NISP

Tables 5 and 6 show the revised cost estimate for the NISP project based on the above analyses:

Table 5. Comparison of total costs (not discounted) of NISP, including financing costs, under the Draft EIS estimate and two revised estimates. Dollar figures are in millions. Financing assumes a down payment of $85,200,000 (20% of the Draft EIS cost projection), a 30 year term, and 4.45% bond rate. The third row includes cost of upgrades to the Fort Collins water and sewage treatment facilities, which range from $125,000,000 to $215,000,000.

Cost Category	Construction Costs	Financing Costs	Total Cost
Draft EIS Estimate	$ 426	$ 220	$ 646
Revised Construction Costs Estimate	$ 503	$ 269	$ 772
Revised Construction Costs + Upgraded Treatment Plants	$ 628-718	$ 350-408	$ 978-1,126

[32] City of Fort Collins. Agenda item #24 summary for September 2, 2008 City Council Meeting. http://citydocs.fcgov.com/?cmd=convert&vid=72&docid=1303915, viewed on 8/29/2008.
[33] Red Oak Consulting. November, 2006. NISP Master Financing Plan Final Report, prepared for the Northern Colorado Water Conservancy District.

Table 6. Comparison of total costs (discounted into 2008 dollars) of NISP, including financing costs, under the Draft EIS estimate and two revised estimates. All costs are in millions of dollars. Financing assumes a down payment of $85,200,000 (20% of the Draft EIS cost projection), a 30 year term, and 4.45% bond rate. The financing costs are discounted into present value (2008 dollars) based on a 5% discount rate. With a higher bond rate, financing costs will be more substantial.

Discount Rate	4%	5%	6%	Financing Costs	Total Cost assuming 5% discount rate
NPV - DEIS Estimate	$ 331	$ 311	$ 293	$ 140	$ 451
NPV - Revised Construction Costs, No Treatment Plant Upgrades	$ 390	$ 367	$ 346	$ 172	$ 539
Revised Construction Costs + Upgraded Treatment Plants	$ 493-567	$ 465-536	$ 440-507	$ 223-260	$ 688-796

Based on a total non-discounted project cost of $978 - $1,126 million, the cost per acre foot would be $24,450–28,150, at the upper end nearly three times that described in the NISP DEIS. The total discounted cost at 5% would be $688 – $796 million, or $17,200 – $19,900 per acre foot.

We wish to emphasize that these revised estimates are conservative. They are based on the low end of the range of bond interest and inflation rate figures that will likely apply to NISP if it is built. For example, cost overruns like those seen in other recent projects, which were 2.5 to 4 times higher than the Corps of Engineers inflation indices, would drive construction costs far higher than even these revised estimates. Higher revenue bond interest rates (possibly up to 5.5%) would drive financing costs higher. Either of these contingencies, either separately or combined, would drive the total project cost well over $1 billion.

Cost for the Healthy Rivers Alternative

We estimate the demand reduction measures will cost the NISP participants $28-92 million, based on the range of conservation and efficiency costs from the Colorado Statewide Water Supply Initiative (SWSI), Phase II report.[34] The actual costs would depend on the measures best suited for each NISP participant. Based on the preceding analysis, we estimate the non-discounted cost for the Healthy Rivers Alternative to be $449 - $528 million, or $11,225 - $13,200 per acre foot. Discounted costs would be $250 - $393 million, or $6,250 - $9,825 per acre foot.

Comparing NISP with the Healthy Rivers Alternative

The NISP DEIS projected devastating consequences for agriculture if the document's action alternatives were not enacted. Our own analysis and that of other expert reviewers indicates that the DEIS analysis was faulty, transparently flawed and subject to major revision.[35] Here is a summary of the problems in the analysis:

- Total agricultural lands impacted by the no-action alternative were artificially inflated upwards by the use of faulty calculations and incorrect equation factors. As a result the document proposed agricultural impacts from the no-action alternative that were more than twice what is likely.

[34] http://cwcb.state.co.us/NR/rdonlyres/C65D6406-3EE0-4E44-9C5E-E1655D814CB8/0/S2_ConservationEfficiency.pdf, viewed on 8/31/2008.
[35] Save The Poudre Coalition. 2008. *A Review of the Likely Agricultural Impacts from the Northern Integrated Supply Project.* http://www.SaveThePoudre.org.

- The action alternatives received a cursory analysis that did not include issues that affect tens of thousands of farmland. For example, diverting and storing the Grey Mountain Right (which is the last remaining peak flows left in the river) would harm hundreds of irrigators in the Lower Poudre and South Platte watersheds who depend on the Grey Mountain Right for well augmentation. The Grey Mountain Right is likely diverted for irrigation from the South Platte in Colorado and Nebraska, drying up at least 13,000 irrigated acres if NISP went forward.

- Thousands of acres of cropland served by the South Platte Water Conservation Project would likely become saline, and existing crops could require up to 60% more irrigation water just to maintain current yields because of the salinity of South Platte River water.

- The DEIS used a blatantly faulty method to estimate the farmland irrigation-associated wetlands affected by the no-action alternative, providing an estimate of wetlands affected (1,384 acres) that is probably at least ten times too large. It downplayed the poor habitat value of most irrigation-associated wetlands, while virtually ignoring most riparian-associated wetlands along the Poudre River.

- The DEIS failed to document the agricultural lands displaced by the expansion of the NISP participants, estimate at about 76,000 acres between now and 2050.

Our analysis of the NISP project impacts on irrigated agriculture suggest that the NISP no action alternatives would impact about the same amount of irrigated land as would the action alternatives. Table 7 indicates that all of the NISP project alternatives would affect roughly the same amount of irrigated land. The complexity of water use and water law in Colorado, and the high degree of demand in all sectors means that the Grey Mountain Right and virtually all other water that originates in the Poudre River basin is currently diverted and used either in the Poudre River or downstream on the South Platte.

The proponents of the NISP project are simply squeezing the water supply balloon — they claim NISP reduces pressure on Ag water supplies in the Poudre River basin, but in reality it increases pressure on irrigators drawing water from the South Platte River. And it places even greater pressure on South Platte Basin irrigators drawing from wells, who rely increasingly on the Grey Mountain right and existing flows in the Poudre for their well augmentation. We did not estimate those impacts, but including them would drive the NISP impacts on agriculture even higher.

We would also like to point out that the exurban expansion plans of the NISP participants may be the least agriculture-friendly aspect of this project. Whether they seek water supplies from NISP, the Healthy Rivers Alternative, or some other means, their expansion plans will lead to developing about 76,000 acres of agricultural land, of which about 48,000 is currently irrigated. This would free up about 60,000 AF of water supply for the participants.

The Healthy Rivers Option 2 offers the greatest potential to reduce the impact on agriculture. Adopting comprehensive conservation and efficiency measures and implementing rotating fallow agreements with farmers reduces demand for agricultural water transfers, while providing a reliable income stream to irrigators. Adopting very modest conservation measures to reduce water demand by 20% in 2050 would require 8,500 AF less water for the NISP participants in addition to the savings already in the Healthy Rivers Alternative. Doubling the proportion of their supply from rotating fallow agreements would require 12,000 AF less from agricultural water transfers.

Table 7. Summary of NISP DEIS irrigated cropland loss estimates compared with the Healthy Rivers Alternative.

Irrigated Agriculture	Irrigated Acreage Lost	Dryland Acreage Lost	Total Ag Acres Impacted
NISP DEIS No Action Alternative			
Ag Water Transfers	20.938	-	20.938
C-BT Transfers	6,563	-	6,563
total	**27,501**	-	**27,501**
Alternative 2-4 (Action Alternatives)			
Grey Mountain Right Diversion	13,889	-	13,889
Soil Salinity Impacts	1,600	-	1,600
Saline Irrigation Water Impacts	2,400	-	2,400
Reservoir Development	200	3,121 - 6,037	3,321 – 6,237
total	**18,089**	**3,121 - 6,037**	**21,210 – 24,126**
Healthy Rivers Alternative, Option 2[36]			
Ag Water Transfers	10,972	-	10,972
C-BT Transfers	5,000	-	5,000
Rotating Fallow Agreements	-	-	-
total	**15,972**	-	**15,972**

Based on expert reviewer analysis of the NISP DEIS, we offer the following comparison between the Healthy Rivers Alternative Option 2 with the NISP DEIS action alternatives (Table 8).

[36] From Save The Poudre Coalition's analysis of the impacts of NISP on Agriculture, at 1.44 AF/acre, 15,800 AF of water would irrigate about 10,972 acres of land in the Poudre River basin.

Table 8. Summary of impacts of the NISP DEIS action alternatives compared with the Healthy Rivers Option 2.

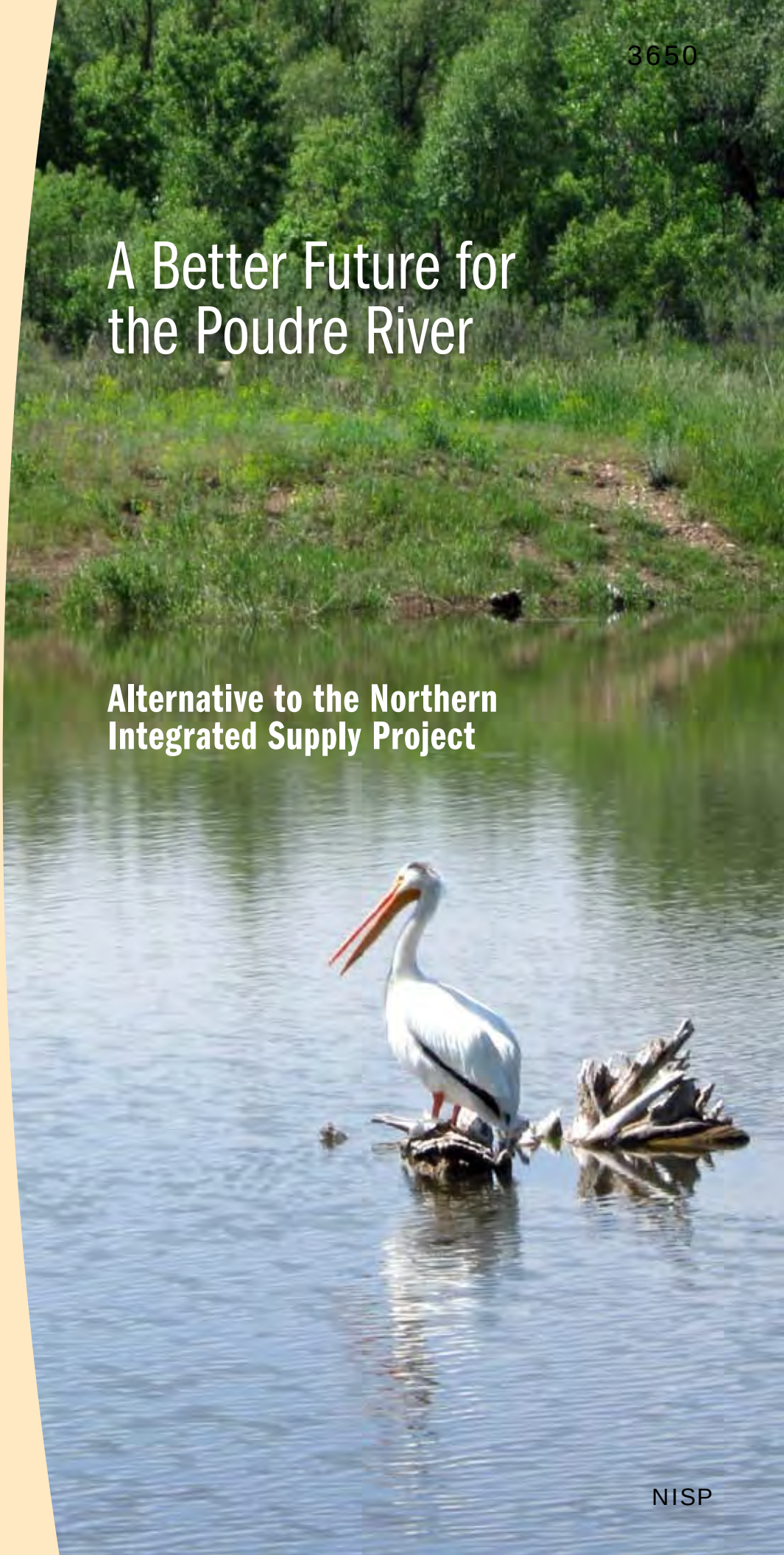
Impact Category	NISP Action Alternatives	Healthy Rivers Option 2
Water Quality	↓ Regulatory action by the State of Colorado and the Federal Environmental Protection Agency would be likely in order to protect public health and safety.	↔ Maintains the remaining peak flows in the Poudre river, supports restoration of base flows and addition to peak flows, greatly improving water quality and eliminating the need for regulatory actions.
Maintain and Support Agriculture	↓ Lead to the dry up at least 60,000 acres of irrigated land, and lead to increased salinity of irrigated soils in the farmland served by the proposed Galeton Reservoir. Crop yields would drop significantly and at least 6,000 acres of land likely would need to be retired because of salt buildup.	↑ Implementing conservation and efficiency measures though demand-side management while securing water supplies through rotating fallow agreements and development-displaced water reduces pressure for agriculture water transfers and provides a new secure income stream to farmers and ranchers, particular during drought years.
Riparian-associated wetlands	↓↓ Lost river flows would drop the water table, impacting existing cottonwoods and willows. Loss of peak flows would end the process that builds new seedbeds for cottonwoods and willows, leading to long-term decline of the riparian forest.	↔ Retaining peak flows makes river restoration efforts possible and much more likely to succeed.
Irrigation-associated wetlands	↓↓ NISP would dry-up more than 60,000 acres of irrigated farmland, leading to the loss of wetlands associated with the irrigation of those lands. The salinity of South Platte River water used to replace much cleaner Poudre River water would degrade existing irrigation-associated wetlands. Loss of irrigated lands through reduced flows on the South Platte would degrade existing irrigation-associated wetlands.	↔ Implementing water conservation and efficiency measures, and securing water through rotating fallow agreements with farmers will minimize the impacts of irrigated land dry-up. Pursuing aggressive conservation and efficiency measures and rotational fallowing agreements could mean relatively little irrigated land dry-up. Depending on the mix of water supply options the NISP participants choose, agricultural water transfers and purchasing C-BT units from agriculture would impact irrigation-associated wetlands.
Aquatic ecosystem	↓↓ Peak flows are critically important to the Poudre River aquatic ecosystem. Loss of peak flows would lead to a cascade of impacts leading to a likely collapse of the current aquatic ecosystem. River Restoration efforts that would improve the aquatic ecosystem would be much less likely to succeed.	↔ Retaining peak flows maintains the existing aquatic ecosystem and water quality levels, while making river restoration efforts possible and much more likely to succeed.
Riparian ecosystem	↓↓ Peak flows are critically important to the Poudre River riparian ecosystem. Loss of peak flows would lead to a cascade of impacts leading to the long-term, highly visible decline of the riparian ecosystem. River Restoration efforts that would improve the riparian ecosystem would be much less likely to succeed.	↔ Retaining peak flows maintains the existing riparian ecosystem on the river, while making river restoration efforts possible and much more likely to succeed.
Recreation	↓ Loss of peak flows likely to lead to the collapse of the existing aquatic ecosystem due to silt buildup, higher water temperatures, buildup of algae, loss of native plants, and channel constriction. Existing quality trout fishery between the Poudre River Canyon mouth and I-25 would be highly degraded. Whitewater sports downstream of the Poudre River Canyon	↔ Retaining peak flows sustains the existing trout fishery, supports water-based recreation such as kayaking, canoeing, tubing, and supports whitewater parks. Preserving the riparian and aquatic ecosystem will maintain current recreation and support current investments in open space, natural areas, and recreation infrastructure along the river. Successful

	mouth would be limited to a few weeks a year only in wet years. Whitewater parks in Bellvue, LaPorte, Fort Collins, Windsor, Greeley, or other locations downstream of NISP diversion dams would not be possible.	restoration efforts are highly likely to improve recreation substantially.
Total Cost	↑↑ Revised costs for NISP proposed action conservatively estimated at $ 688 - $ 796 million, or $17,200–19,900 per AF (discounted into present value). Estimate likely to rise as other utility districts evaluate NISP impacts on water supply and sewage treatment plant permit requirements. Additional construction cost inflation and revenue bond interest rate increases would raise costs much higher.	↓ Costs conservatively estimated at $265 - $301 million, or $6,626 - $7,516 per AF. Construction cost inflation could raise costs of alternative storage options.
Protect threatened and endangered species	↓ The long-term survivial of the Preble's meadow jumping mouse would be placed in jeopardy. Construction of the proposed Glade reservoir jeopardizes Bell's twinpod, a globally-imperiled plant species found only on the hogback at the Glade site and a very few other sites in Colorado.	↔ Helps to maintain existing populations of Preble's meadow jumping mouse. Prevents degradation of habitat for Bell's twinpod. Successful restoration efforts likely to improve existing habitat and may create new habitat for Preble's meadow jumping mouse as well as two threatened plant species found in Colorado (Ute ladies' tresses orchid and Colorado butterfly plant).
Groundwater quality	↓ Removing peak flows will degrade the Poudre River alluvial aquifer, likely lead to reduced water quality, and hamper the efforts of downstream irrigators to continue irrigating from groundwater sources.	↔ Maintaining existing flows sustains existing alluvial aquifer levels and supports downstream irrigators' efforts to continue irrigating using groundwater sources. Successful restoration efforts are highly likely to improve aquifer levels and support well augmentation efforts by downstream irrigators.
Cleanup of superfund site under proposed Glade Reservoir	↓ The trichloroethylene (TCE) plume under the site for the proposed Glade Reservoir forebay would be much more difficult to clean up due to increased groundwater flow pressures from Glade, and water quality in the reservoir would be threatened by TCE contamination via the forebay.	↑ Existing proposed cleanup efforts are much more likely to succeed without groundwater flow pressure from Glade.

3650

A Better Future for the Poudre River

Alternative to the Northern Integrated Supply Project



WESTERN RESOURCE ADVOCATES

BCC 08/17/20

NISP

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WESTERN RESOURCE ADVOCATES

Western Resource Advocates is a nonprofit conservation organization dedicated to protecting the West's land, air, and water.

Western Resource Advocates
2260 Baseline Road, Suite 200
Boulder, Colorado 80302
Tel: (303) 444-1188
www.WesternResourceAdvocates.org

Contents

Definitions

acre-foot (AF)

Volume of water equal to 325,851 gallons. It is approximately the volume used by two to four families in a year. An acre-foot is enough water to cover an acre, one foot deep.

active conservation

Water demand reductions that result from conservation programs and measures implemented by water utilities and their customers. Active conservation can be voluntary or mandatory through regulations. Examples of active conservation include leak detection programs, tiered water rate structures that increase with higher use, improved irrigation management, switching to more water efficient landscaping, and toilet rebates.

Colorado-Big Thompson (CBT) Project

A U.S. Bureau of Reclamation project that diverts approximately 260,000 acre-feet of water each year from West Slope Colorado River headwaters to the South Platte Basin on the east slope. Northern Water apportions the water amongst irrigators and communities that receive municipal and industrial water from the project.

Colorado Water Conservation Board (CWCB)

A Colorado state agency whose responsibilities range from protecting Colorado's streams and lakes, to water conservation, flood mitigation, watershed protection, stream restoration, drought planning, water supply planning, and water project financing.

consumptive use

The portion of water that is used in a process that does not return to the adjacent hydrologic system. For example, water that evaporates or is transpired by plants during agricultural use, or water that is used up or evaporates in an industrial process.

Environmental Impact Statement (EIS) and Draft, Supplemental Draft, and Final EIS (DEIS, SDEIS, FEIS)

The National Environmental Policy Act (NEPA) requires federal agencies to consider the environmental impacts of proposed actions (projects) and reasonable alternatives to those actions. The detailed analyses contained in an EIS meets NEPA requirements.

firm yield

A measure of dependable water supply that can be expected in most (including dry) years, typically used in water supply planning. Average and wet year yields can be significantly higher than firm yield.

gallons per capita per day (gpcd)

A metric for measuring average water use. May include only residential use or be used to represent average system-wide use (residential and other uses, such as commercial, industrial, and institutional) in a community. In this report, gpcd refers to total per capita system-wide use.

Northern Colorado Water Conservancy District (Northern Water)

A public agency created in 1937, the Northern Colorado Water Conservancy District and its municipal subdistrict (both identified in this report as "Northern Water") serve a large portion of northeastern Colorado, providing water to irrigators, cities, towns, rural-domestic water districts, and industries from the CBT and Windy Gap projects.

present value of costs

A figure reflecting the time value of money, calculated by applying a discount rate to a series of expenditures and revenues over time. Using present value allows for an apples-to-apples comparison of costs and revenues that may occur over a wide variety of time frames.

water (or water resources) charge

Several NISP participants receive water treated by other utilities. These utilities apply a water resources charge, or fee, in the form of water supplies provided by the NISP participant to the treating utility. In the Harvey Report and the Better Future Alternative, the water charges are calculated as a percentage of "water deliveries."

water deliveries

The volume of water that is used by NISP participants' customers at the tap. It is what is needed to meet customer demands and is usually metered at a property (home, businesses, irrigation tap, etc.). This volume does not include system losses and water charges.

water losses (or system losses)

Water loss that occurs in treating and delivering water to end use taps.

passive conservation

Water demand reductions that are associated with the impacts of improved technology and state and federal policy measures that result in lower flow standards for fixtures and appliances. Passive conservation savings are realized as more efficient new homes are built or fixtures and appliances are replaced over time in older homes.

Record of Decision (ROD)

The ROD is the final step in the process of creating an Environmental Impact Statement. It includes a decision on the alternative that has been selected.

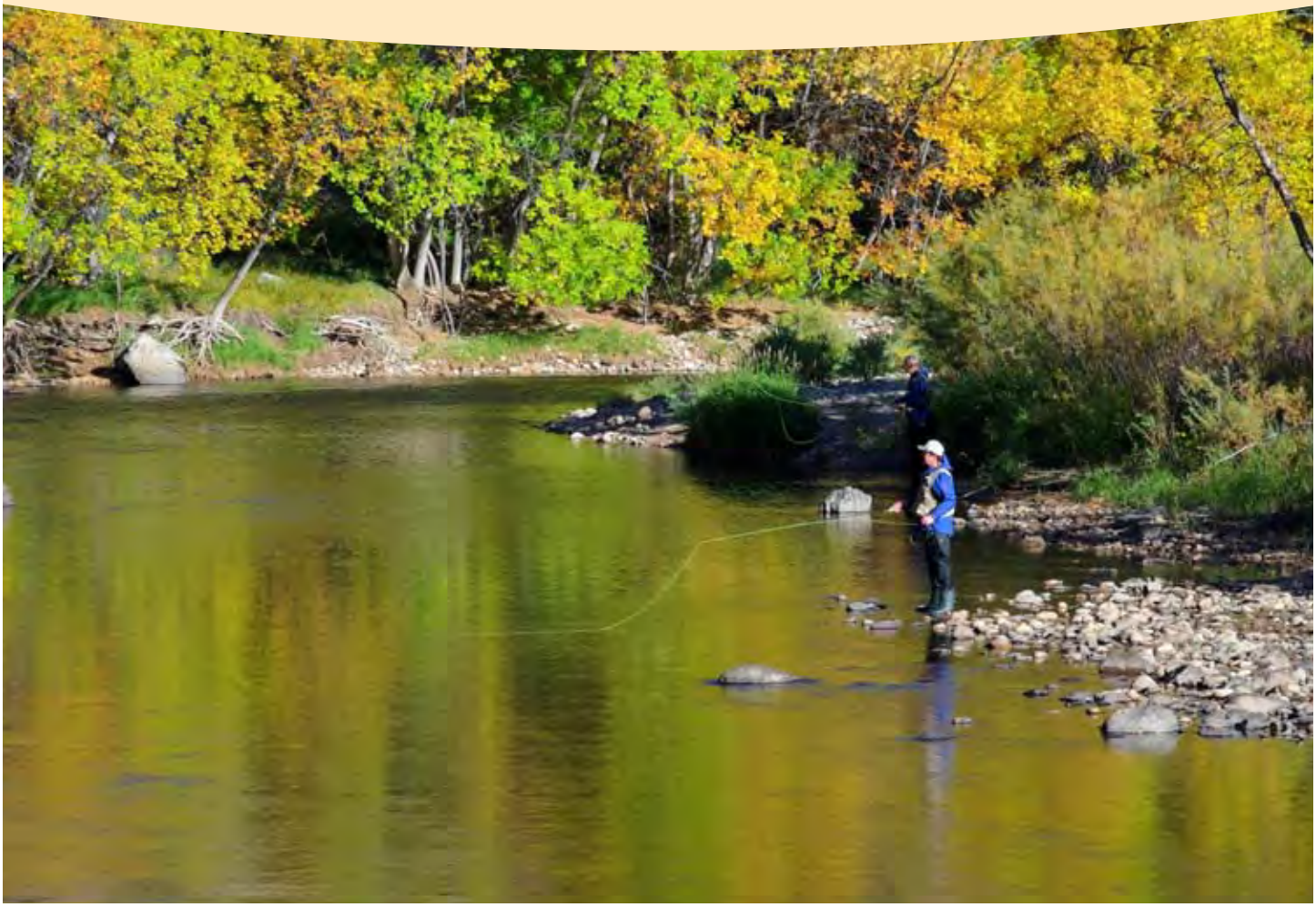
Statewide Water Supply Initiative 2010 (SWSI or SWSI 2010)

Report that provides a comprehensive picture of Colorado's current and future projected water needs and existing and potential supplies. It is updated by the state every few years.

total water requirements

In order to get "water deliveries" to NISP customers' taps, additional water is needed both to cover system losses (e.g., losses during treatment and transit) and to cover "water charges" applied to treat and deliver water to NISP participants. "Total water requirements" is the total volume of "water deliveries" plus "water losses" plus "water charges."

> "I applaud the advanced thinking that has gone into the Better Future Alternative. This report identifies innovative, workable, and viable water policy solutions that Colorado legislators and policy makers are well-advised to consider today as we work to plan our water future."
>
> — Randy Fischer, State Representative, Colorado House District 53



Executive Summary

The Better Future for the Poudre River Alternative ("Better Future Alternative" or "Better Future") is an alternative to the Northern Integrated Supply Project (NISP). NISP is a water supply project proposed by the Northern Colorado Water Conservancy District* (Northern Water) to provide 40,000 acre-feet† (AF) of water annually to help meet the future water needs of 15 towns and water districts in northern Colorado.‡ The Save the Poudre Coalition and Western Resource Advocates (WRA) first developed an alternative to NISP, the "Healthy Rivers" alternative, in 2008. The Better Future Alternative was developed by WRA to incorporate more current Colorado State Demography Office population projections, revised NISP participant demands and supplies from a 2011 report by Harvey Economics, data from the Colorado 2010 Statewide Water Supply Initiative, and other recent reports.

A Better Future provides water supplies sufficient to meet and exceed NISP participants' water demands while maintaining flows critical to aquatic and riparian environments and recreational opportunities in the Cache la Poudre River (Poudre River). In contrast, NISP would divert between 43% and 48% of the remaining flows from the Poudre River each year.

The Better Future Alternative relies on water from growth onto agricultural lands, conservation, reuse, and cooperative agreements with agriculture. It offers several benefits not provided by NISP:

* The Northern Colorado Water Conservancy District and its municipal subdistrict (both identified here as "Northern Water") serve a large portion of northeastern Colorado, providing water to irrigators, cities, towns, rural-domestic water districts, and industries.

† An acre-foot of water is equal to 325,851 gallons. It is approximately the volume used by two to four families in a year. An acre-foot is enough water to cover an acre (about a football field without the end zones) one foot deep in water.

‡ The NISP participants are Central Weld County Water District, Dacono, Eaton, Erie, Evans, Firestone, Fort Collins–Loveland Water District, Fort Lupton, Fort Morgan, Frederick, Lafayette, Left Hand Water District, Morgan County Quality Water District, Severance, and Windsor.

- The Better Future Alternative meets the needs of NISP participants through 2060. In contrast, NISP is designed to meet projected demands only through 2030.

- Rather than depending on large new reservoirs and diversions, a Better Future includes a diverse supply portfolio.

- By relying on a phased approach (i.e., increasing water supplies incrementally and avoiding large, up-front investment by participants), the Better Future Alternative provides water supply flexibility and financial risk management to communities. If population growth is not as rapid as predicted, communities can delay investment and avoid burdening existing residents with debt.

- Cooperative agreements with the agricultural community provide towns with long-term secure supplies while maintaining agricultural ownership of water. Less than 1% of agricultural consumptive-use water from the South Platte Basin will be necessary for the Better Future Alternative each year.

- The cost of NISP — in present value* — is approximately $364 million. Though not directly comparable to NISP, the Better Future Alternative's present value to provide 40,000 AF† of water (NISP's yield) — excluding some infrastructure costs — is $109 million.

- The Better Future Alternative protects the Poudre River, wetlands, and other important environmental and recreational resources as well as the communities and businesses that depend on them.

Better Future Alternative Water Supply Portfolio

Based on Colorado State Demography Office population estimates, recent NISP participant per capita water use, and applying passive conservation savings, the Better Future Alternative calculates that water requirements for NISP participants will total 72,100 AF in 2030 and 109,100 AF in 2060. This is 27,000 AF and 34,300 AF less than current NISP projections for 2030 and 2060, respectively.

The Better Future Alternative water supply portfolio (Figure 1), excluding Windy Gap Firming Project (WGFP) supplies, includes total firm yield

* The present value of costs reflects the time value of money by applying a discount rate to a series of expenditures and revenues over time. Using present value allows for costs and revenues that may occur over a wide variety of time frames to be similarly examined.

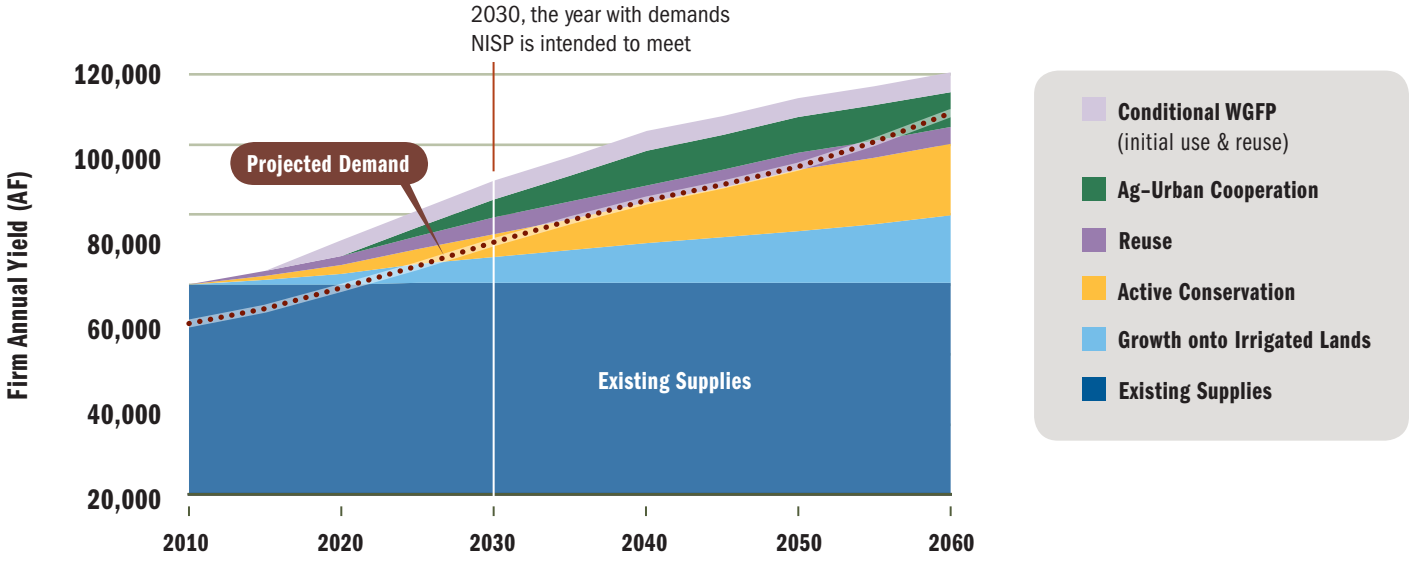
† The Better Future Alternative provides a total of more than 60,000 AF of new firm yield supplies by 2060, in addition to existing NISP participant supplies. The Better Future Alternative is projected to yield 40,000 AF of new firm yield supplies, equivalent to the NISP yield, between 2035 and 2040.

supplies of 84,200 AF in 2030 and 115,100 AF in 2060. This portfolio exceeds NISP's projected total water requirements by 12,100 AF in 2030 and by 6,000 AF in 2060. The components of the portfolio are:

- Current firm yield supplies = 60,550 AF
- Annual firm yield from traditional agricultural transfers from urban growth onto previously irrigated lands = 7,360 AF by 2030 and 19,150 AF by 2060
- Active conservation savings = 6,401 AF by 2030 and 20,482 AF by 2060
- Reuse of existing supplies = total of 4,900 AF by 2030
- Agricultural-Urban (Ag-Urban) cooperation = 5,000 AF by 2030 and 10,000 AF by 2060

Several NISP participants have also requested Windy Gap Firming Project supplies. Because this project has not yet been approved, and because of potential impacts to West Slope streams and rivers, a Better Future only conditionally includes WGFP supplies (first-time use and reuse) of 5,500 AF. When WGFP water is included, Better Future Alternative supplies exceed demands by 17,700 AF in 2030 and 11,500 AF in 2060. NISP participant projected demands are met with or without the WGFP.

FIGURE Nº 1 BETTER FUTURE ALTERNATIVE SUPPLIES MEET AND EXCEED NISP PARTICIPANTS' PROJECTED 2060 DEMANDS.



Recommendations

Planning for and meeting the water needs of NISP participant communities is critical, as is ensuring the health of the Poudre River and the recreational, economic, and other benefits it provides. We believe that Northern Water and NISP participants can chart an innovative path forward, one that differs from the traditional approach of building very large reservoirs. The Better Future portfolio instead relies on a combination of supplies from conservation, reuse, water transferred as a result of growth onto irrigated agricultural lands, and voluntary agreements with agriculture.

We encourage the U.S. Army Corps of Engineers to incorporate elements of the Better Future Alternative into its No Action Alternative when completing the NISP Supplemental DEIS.

Western Resource Advocates offers the following key recommendations for Northern Water, NISP participants, and the U.S. Army Corps of Engineers to consider carefully in planning for the region's future water needs:

- ✓ Meet projected demands with balanced strategies that are the least environmentally damaging, in contrast to large traditional reservoir and pipeline projects.
- ✓ Protect Colorado's rivers and streams as an integral part of any future water development strategy. Nonconsumptive uses of water—for fishing, boating, and other uses—are extremely valuable to the local economy and are critical to our quality of life.
- ✓ Use reliable and up-to-date population data and projections from the State Demography Office.
- ✓ Implement more aggressive water conservation strategies. Conservation is often the cheapest, fastest, and smartest way to meet new demands, and NISP participants have significant opportunities to boost their existing water conservation efforts.
- ✓ Conservation savings—passive and active—must be integrated into water supply planning.
- ✓ Include all existing supplies, supplies from growth onto irrigated lands, and NISP participants' water dedication requirements in future supply projections
- ✓ Maximize the role of water reuse in meeting future needs. Include NISP participants' existing and planned reuse—as well as additional Better Future reuse supplies—in any analysis.
- ✓ Include increased cooperation between agriculture and local communities in the form of voluntary water sharing agreements that benefit both NISP participants and the agricultural community without permanently drying up irrigated acres. Alternatives to "buy and dry" transfers present excellent opportunities for meeting future municipal demands.

By following these recommendations, NISP communities can more than meet their future water needs while minimizing impacts to rivers and streams.

Background

The Northern Integrated Supply Project

Northern Water has proposed the Northern Integrated Supply Project (NISP) to provide 40,000 acre-feet (AF) of annual yield to help meet projected 2030 demands for 15 towns and water districts in northern Colorado (Figure 2). If approved, NISP would create two new off-stream reservoirs: Glade Reservoir,* which would inundate a valley north of the mouth of the Poudre Canyon, and Galeton Reservoir, northeast of Greeley (Figure 3). The NISP reservoirs would be supplied by increased diversions from the Poudre River, eliminating remaining peak flows that are critical to stream and riparian health, habitat maintenance, river recreation, and the businesses that rely on it. In addition to Poudre River diversions, water diverted from Colorado's West Slope may be used during Glade Reservoir's initial fill as well as during droughts. Diversions from the South Platte River would also be used to supply Galeton Reservoir.

In 2006, Harvey Economics (hired by Northern Water) developed a survey of NISP participants' supplies and projected future water demands. The report by Harvey Economics provided the basis for the preferred alternative in the Draft Environmental Impact Statement (DEIS) released by the U.S. Army Corps of Engineers in 2008.† Many concerns about the DEIS were raised and, as a result, the Army Corps of Engineers is now in the process of completing a Supplemental DEIS. Because of the amount of time that had elapsed since the demand projections were first developed in 2006, an updated report was prepared by Harvey Economics in January 2011 (referred to herein as the "Harvey Report").‡ The Harvey Report projects demands through 2060, though NISP is planned only to meet 2030 projected demands. Additional supplies will be needed to meet demands beyond 2030 levels.

* NISP's proposed Glade Reservoir would have a very large capacity of 170,000 AF. For comparison, a) Aurora Reservoir's normal storage capacity is 32,400 AF; b) Standley Lake in Westminster holds 42,000 AF when full; and c) Denver's Lake Dillon holds 257,304 AF. Sources: a) Aurora Water. 2008. "Fact Sheet—Aurora Water Reservoirs." https://www.auroragov.org/cs/groups/public/documents/document/002386.pdf. b) City of Westminster, Colorado. "Standley Lake Regional Park History." Accessed September 24, 2012. http://www.ci.westminster.co.us/ParksRec/Parks/StandleyLakeRegionalPark/History.aspx. c) Denver Water. "Dillon Reservoir." Accessed September 24, 2012. http://www.denverwater.org/Recreation/Dillon.

† U.S. Army Corps of Engineers, Omaha District. 2008. *Northern Integrated Supply Project Draft Environmental Impact Statement*. Applicant: Northern Colorado Water Conservancy District. April.

‡ Harvey Economics. 2011. *Water Supplies and Demands for Participants in the Northern Integrated Supply Project Final Report*. Report prepared for the Northern Colorado Water Conservancy District and the Northern Integrated Supply Participants. January 21.

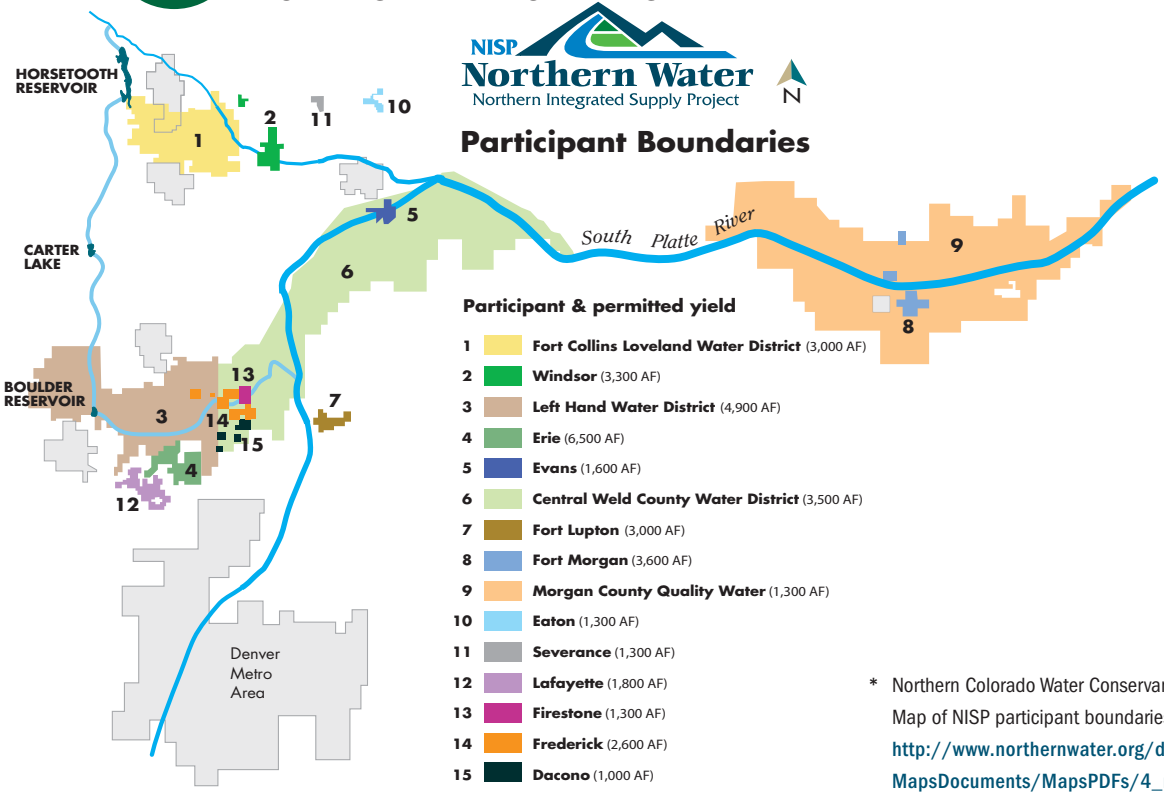
Importance of Maintaining Poudre River Flows

The Poudre River is highly valued as a recreational and scenic mecca for Colorado residents. NISP would divert between 43% and 48% of remaining flows from the Poudre River near the canyon mouth each year, on average, with greatest impacts during peak flows months. During these months, up to 71% of monthly flows would be diverted.* The impact on aquatic and riparian habitats, the species that depend on them, and the river recreation corridor could be dramatic. The Poudre River from the canyon mouth to the confluence with South Platte River is habitat for many fish, including species that are listed by the state as being "endangered, threatened, and species of concern." Sections of this reach also provide "significant riparian and wetland habitat."†

* U.S. Army Corps of Engineers, Omaha District. 2008. *Northern Integrated Supply Project Draft Environmental Impact Statement*. Applicant: Northern Colorado Water Conservancy District. April.

† CDM. 2010. "Appendix C: Environmental and Recreational Subcategory Flow Charts." In *Colorado's Water Supply Future: Nonconsumptive Needs Assessment Focus Mapping Final Report*. Report prepared for Colorado Water Conservation Board. July.

FIGURE Nº 2 MAP OF SERVICE AREA BOUNDARIES FOR NISP PARTICIPANTS.*



* Northern Colorado Water Conservancy District. 2010. Map of NISP participant boundaries. http://www.northernwater.org/docs/NISP/MapsDocuments/MapsPDFs/4_nisp_participants.pdf.

The NISP DEIS says, "On average, about 430,000 AF of the annual flow of the Poudre River is diverted for [agricultural, municipal, and industrial] use."‡ This current flow regime ("Without NISP" in Figure 4) has already led to degradation of the Poudre River in many places. To address current impacts to the river, the Save the Poudre organization and others have developed proposals to protect river flows and restore the river.§,¶ NISP diversions would exacerbate flow issues through large additional withdrawals during the spring peak flow ("With NISP" in Figure 4). While the biggest impact would be felt on the Poudre River, NISP diversions would also decrease South Platte River flows below the confluence.

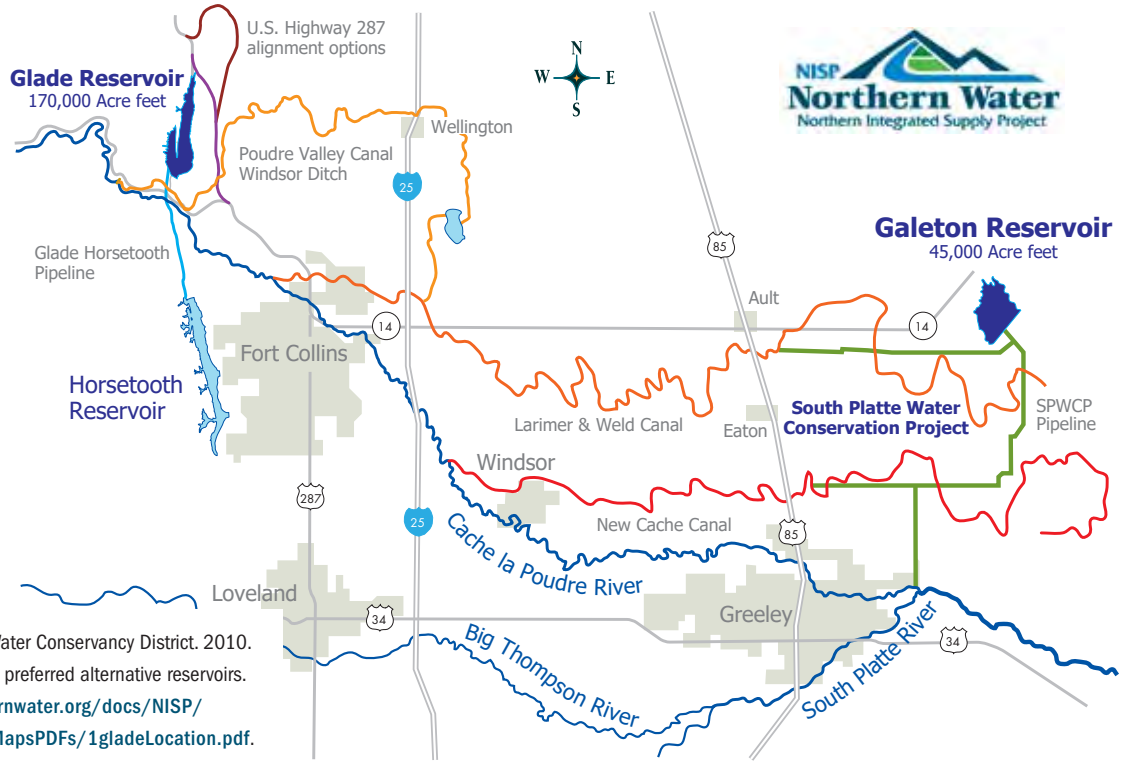
Peak flows serve many important functions. They maintain the stream channel by mobilizing sediment, forming pool and riffle zones, enhancing

‡ U.S. Army Corps of Engineers, Omaha District. 2008. *Northern Integrated Supply Project Draft Environmental Impact Statement*. Applicant: Northern Colorado Water Conservancy District. April.

§ Easter, M. 2008. *Healthy Rivers, Healthy Communities: A Balanced Proposal for the Cache la Poudre River in Colorado*. Fort Collins, Colo.: Save the Poudre Coalition.

¶ Bartholow, J. M. 2010. "Constructing an Interdisciplinary Flow Regime Recommendation." *Journal of the American Water Resources Association* 46: 892–906. doi: 10.1111/j.1752-1688.2010.00461.x.

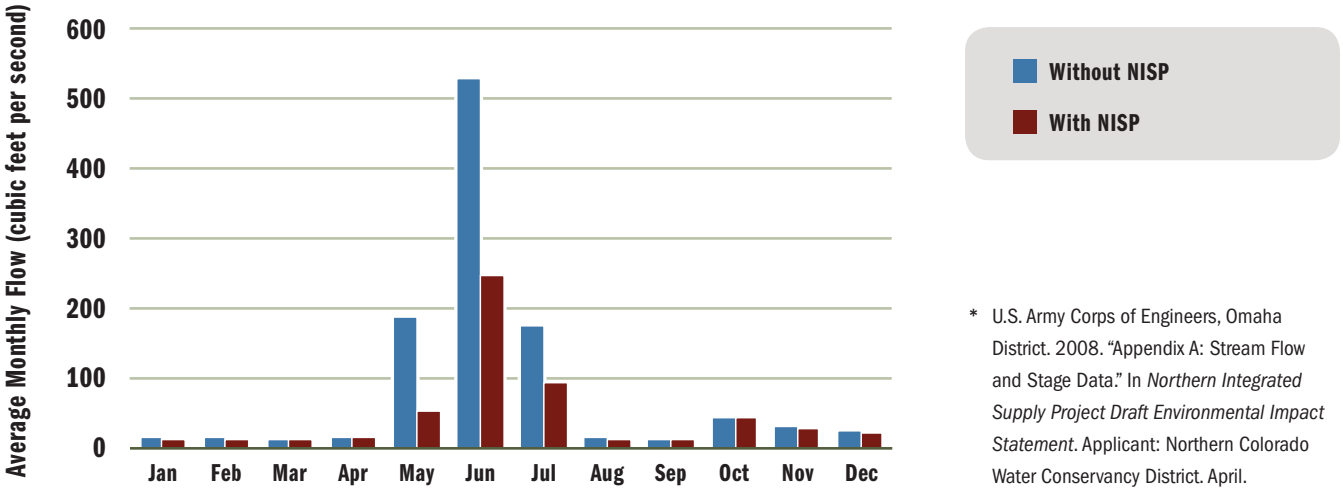
FIGURE Nº 3 LOCATION OF THE TWO PROPOSED NISP RESERVOIRS, GLADE AND GALETON.†



† Northern Colorado Water Conservancy District. 2010. Map of the two NISP preferred alternative reservoirs. http://www.northernwater.org/docs/NISP/MapsDocuments/MapsPDFs/1gladeLocation.pdf.

FIGURE Nº 4 MONTHLY AVERAGE FLOWS FOR THE POUDRE RIVER.

Measured at the Lincoln Gage in Fort Collins, for average years with and without the impacts of NISP.* Flows are lower in nearly all months, and large decreases in peak flows are apparent.



* U.S. Army Corps of Engineers, Omaha District. 2008. "Appendix A: Stream Flow and Stage Data." In *Northern Integrated Supply Project Draft Environmental Impact Statement*. Applicant: Northern Colorado Water Conservancy District. April.

> "NISP would destroy the Cache la Poudre River. As a lifetime resident and fly fisher of the Poudre, it is clear that turning a river into an irrigation channel would destroy its fundamental role in the hydrological cycle."
>
> —Rico Moore, Fly Fisherman

wetlands, removing encroaching vegetation, and flushing away debris and pollutants. High flows are also important in the life cycles of aquatic and riparian species. Decreased flows result in sediment buildup, increased algae, loss of native plants, and channel constriction. Lower flows also degrade water temperature and quality and lead to lowered alluvial groundwater tables, impacting riparian cottonwoods, willows, and other vegetation.

The Better Future Alternative demonstrates that NISP—and the detrimental impacts it would have on the Poudre River—are unnecessary. NISP communities should pursue reasonable, lower-impact supply alternatives prior to making large new diversions that would irreparably change the Poudre River.

The Better Future Alternative

The Better Future Alternative meets and exceeds NISP participant demands through 2060 while maintaining peak flows in the Poudre River, which are critical to recreation and the aquatic environment. It relies on a combination of supplies from conservation, reuse, water transferred as a result of growth onto agricultural lands, and voluntary agreements with agriculture. It is a regional alternative that evaluates NISP participant supplies and demands together rather than evaluating each participant individually. Such regional planning is appropriate and is similar to many other initiatives, including Colorado's Statewide Water Supply Initiative (SWSI), the Colorado River Water Availability Study, the Colorado River Basin Study, and WRA's *Filling the Gap* reports.

In the Better Future Alternative, WRA calculates baseline demands using current State Demography Office population projections, NISP participants' historical water use, and estimated future passive conservation savings.* The following diverse supply portfolio is then relied upon to meet demands:

1. **Existing supplies** — Firm yield from existing water supplies as specified in the Harvey Report, including an additional small volume that was documented but not included in the report's current supply total

2. **Growth onto irrigated lands** — Water that will be transferred to towns as they grow onto previously irrigated lands (such transfers or alternative supplies are required by many town ordinances)

3. **Active conservation** — 60% of savings from active conservation measures applied towards future demands (40% of savings held for drought response and to improve system reliability)

4. **Reuse** — Current, planned, and additional reuse of existing supplies

5. **Ag-Urban cooperation** — Voluntary and compensated leasing of water from agriculture to provide municipal water supply security while maintaining agriculture and agricultural communities.†

* Passive conservation savings occur without active efforts by towns, water providers, or residents. They are water demand reductions resulting from technological advances and state and federal policies that set lower flow standards for fixtures and appliances.

† Agricultural-Urban (Ag-Urban) cooperation would maintain irrigator control of water rights while providing the long-term security needed by municipalities. The participation of a group of irrigators in an Ag-Urban cooperation program (discussed in detail below in the "Ag-Urban Cooperation" section) would provide a permanent and reliable water supply for municipalities.

We also *conditionally* include initial use and reuse from the Windy Gap Firming Project (WGFP), which would provide supplies for five NISP participants. A Final EIS for this project was released in November 2011, but a Record of Decision (ROD) has not yet been released. This project would divert additional water to the Front Range, further impacting Colorado River headwaters. Because the WGFP has not yet been approved—and because of concerns about potential impacts—a Better Future discusses water supplies both with, and without, the WGFP. The inclusion of the WGFP in a Better Future should not be construed as support of the project. It is included, however, because it is in the final stages of approval and may be considered a reasonably foreseeable project.

The Better Future Alternative water supply portfolio exceeds expected 2060 demands (water needs) by nearly 6,000 AF. When the WGFP is included, water supplies exceed 2060 demands by nearly 11,500 AF (Figure 1). As documented in Appendix A, Better Future analyses are conservative and likely result in an underestimation of future water supplies. For municipal planning, this is appropriate to ensure that adequate water supplies are available to meet future needs. See Appendices B, C, D, and E for more detailed calculations and documentation of Better Future Alternative supply assumptions.

NISP Participant Water Demands

Key Definitions

This study utilizes data provided in the Harvey Report and compares NISP participant demands from that report to Better Future demands. In reviewing this study, it is important to understand that the Harvey Report and the Better Future Alternative discuss "water deliveries" as well as "total water requirements."

- **Water deliveries:** The volume of water that is used by NISP participant customers at the tap. It is what is needed to meet customer demands and is usually metered at the property (home, businesses, irrigation tap, etc.). This volume does not include system losses and water charges required to deliver water to the tap.

- **Water (or water resources) charges:** Several NISP participants receive water treated by other utilities. These utilities apply a water resources charge, or fee, in the form of water supplies provided by the NISP participant to the treating utility. In the Harvey Report and the Better Future Alternative, the water charges are calculated as a percentage of "water deliveries."

- **Total water requirements:** In order to get "water deliveries" to customers' taps, additional water is needed to cover both system losses (e.g., losses during treatment and transit) and "water charges" applied to treat and deliver water to NISP participants. "Total water requirements" is the total volume of "water deliveries" plus system losses plus "water charges."

A Better Future is designed to satisfy both water deliveries and total water requirements.

Projected Populations

The Harvey Report states that NISP participants utilized a host of different methodologies to develop demand projections that, in some cases, were then modified by Harvey Economics. Because population projections are the major driver for increasing future water demands, it is critical to have accurate and up-to-date projections for planning efforts.

Population projections are also heavily dependent on the near-term rates of population growth, and any deviations from projections in the first few years are compounded over time. The Harvey Report population projections include an unrealistic (now known to be incorrect) initial jump between the last year of historical data (2009) and first year of projected data (2010)—a 3.5% increase in population, the highest growth rate in the entire 50-year planning period. U.S. Census data from 2010 was not available when the Harvey Report was being developed, so the report had to estimate 2010 NISP participant populations. Comparing the Harvey Report's 2010 estimates for NISP participant towns to now-available 2010 U.S. Census data* shows that the report's estimates are 5.5% higher than actual populations. This comparison includes only NISP participant towns and does not include water districts that cover larger geographic areas (Central Weld County Water District, Fort Collins–Loveland Water District, Left Hand Water District, and Morgan County Quality Water District—see Figure 2) because discrete Census Bureau data are not available for these districts.

Better Future population estimates improve upon the older, pre-economic slowdown data used in the Harvey Report, much of which is based on inconsistent assumptions. The Colorado State Demography Office (SDO) is the official governmental agency responsible for population projections. Consequently, SDO projections should be used unless there are specific reasons to do otherwise.† A Better Future relies on 2011 SDO-projected county growth rates‡ through 2040 (the last year for which state projections are available) and the Harvey Report's projected growth rates for 2045 through 2060.

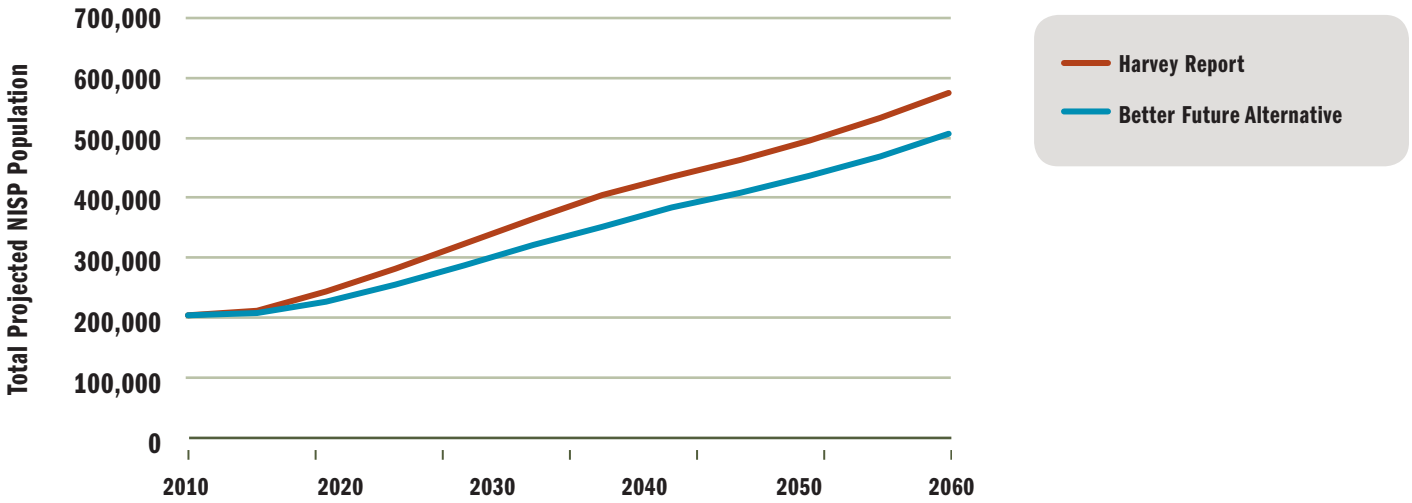
The Better Future 2060 projected population is 507,033, which is 12% lower (68,606 people fewer—about the current size of the towns of Eaton, Erie, Evans, Firestone, Fort Lupton, and Frederick, combined) than the Harvey Report estimate of 575,639 people (Figure 5). See Appendix B for more detailed calculations.

* Colorado Department of Local Affairs, State Demography Office. 2010. Excel file Census PopulationByAge2010_IncorporatedPlace.xls. Accessed May 25, 2012. Available at "2010 Census Data for Colorado" under Population by Age by City/Town http://dola.colorado.gov/dlg/demog/2010censusdata.html.

† In *Pagosa Area Water and Sanitation District and San Juan Water Conservancy District v. Trout Unlimited,* the Colorado Supreme Court found that the districts should use population projections corresponding to State Demography Office projections unless there was valid reason to do otherwise.

‡ Colorado Department of Local Affairs, State Demography Office. 2011. "Population Totals for Colorado Counties." Updated September. http://www.colorado.gov/cs/Satellite?c=Page&childpagename=DOLA-Main%2FCBONLayout&cid=1251593346867&pagename=CBONWrapper.

FIGURE Nº 5 BETTER FUTURE ALTERNATIVE POPULATION PROJECTIONS (DEVELOPED USING STATE DEMOGRAPHY OFFICE DATA) ARE LOWER THAN HARVEY REPORT PROJECTIONS.



As populations grow, some development will occur on agricultural lands.

Baseline Demands

Better Future NISP participant demands were developed to reflect baseline water use rates applied to our population estimates. **Total Better Future Alternative water requirements are 72,100 AF in 2030 and 109,100 AF in 2060.** This is 27,000 AF and 34,300 AF less than Harvey Report projections in 2030 and 2060, respectively.

A review of data provided in the appendices of the Harvey Report shows that for the period from 2004 to 2009, NISP participants used an average of 185 gallons per capita per day (gpcd), based on water deliveries. A Better Future uses this recent historical average to project water demands.* Passive conservation savings of 10.2%, a SWSI estimate,† were then assumed to occur gradually through 2050, after which per capita use was held constant.‡ Passive savings accrue without active—or purposeful—conservation efforts on the part of towns, water providers, residents, or industry. Passive savings result from technological improvements and state and federal policies, such as new fixture and appliance flow-rate regulations. Passive savings are evident in new homes that use less water than existing homes and are realized in older homes when fixtures and appliances are replaced with new equipment that uses less water.

The Better Future Alternative projects that NISP participant populations will increase by nearly 150% from 2009 to 2060 (Figure 5). As a result, the majority of homes and businesses will be new and will use less water due to passive conservation effects. To reflect this trend, Better Future per capita use rate decreases from 185 gpcd in 2009 to 166 gpcd in 2050 (and remains constant at this rate through 2060) (Figure 6). Applying Better Future baseline demands to our population projections results in total Better Future water requirements of 72,100 AF in 2030 and 109,100 AF in 2060. See Appendix B for more detailed calculations.

The Harvey Report bases future demands on average per capita usage rates that increase from a projected 193 gpcd in 2010 to a high of 212 gpcd in 2030 (an increase of 10%), before falling back to 193 gpcd in 2060 (Figure

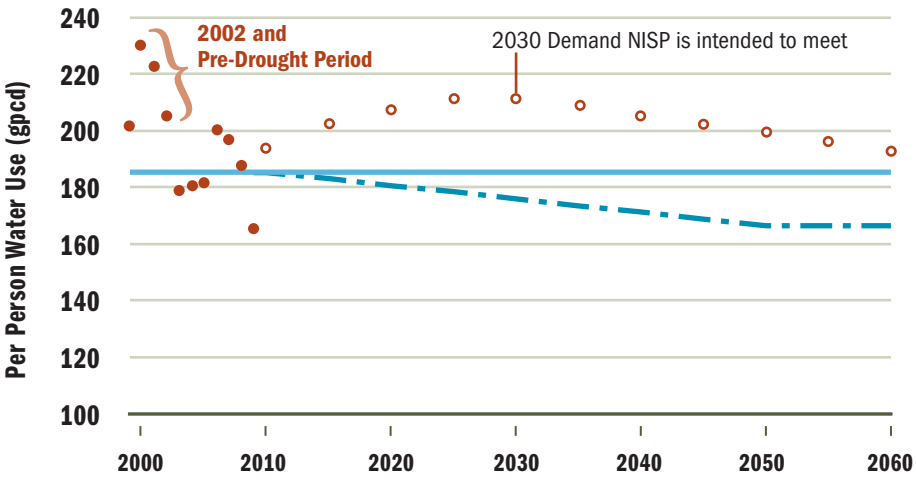
* The Better Future Alternative average, which is based upon Harvey Report data, is higher than the 177 gpcd that Northern Water frequently refers to for NISP participants and is higher than the rates provided in Table III-1 of the Harvey Report.

† Colorado Department of Natural Resources, Colorado Water Conservation Board. 2011. "Appendix L: SWSI 2010 Municipal and Industrial Water Conservation Strategies," prepared by Aquacraft, Inc. and Headwaters Corporation, January 2011. In *Colorado's Water Supply Future, Statewide Water Supply Initiative 2010, Final Report*. January.

‡ Savings were implemented through 2050, which is the end of the SWSI planning period. 2050 use rates were then held constant for the Better Future Alternative through 2060.

FIGURE Nº 6 PER CAPITA DATA* BASED ON SYSTEM-WIDE WATER DELIVERIES.

Better Future baseline usage is based on recent historical data with SWSI passive conservation savings applied. Harvey Report estimates include no conservation savings and increase (without explanation) to a peak in 2030 before decreasing.



- **Harvey Report Historical**
- **Harvey Report Projected**
- **Recent Historical Average** (2004–2009)
- **Better Future Baseline** (includes passive conservation)

* Harvey Report Historical, Harvey Report Projected, and Recent Historical Average per person water use rates were calculated by WRA utilizing the population and demand data provided in the Harvey Report appendices. Rates for the Better Future Baseline were developed by WRA, as described above.

6).§ Interestingly, the peak per capita year, 2030, is the year with demands that NISP is intended to meet. No explanation for increased per capita use is provided and, in fact, the projection is contrary to a wide body of data that show use rates decline over time as a result of passive and active conservation.¶,**,††,‡‡ The impact of overestimated demands is then compounded in the Harvey Report when losses and water charges are applied as a percentage of water deliveries (see the "Key Definitions" section). To develop baseline demands, it is more reasonable to use recent per capita use rates and project modest decreases over time.

§ WRA calculated historical and projected average per capita usage for NISP participants utilizing the population and demand data provided in the Harvey Report appendices.

¶ LeChevallier, M. W. 2011. "Promoting Conservation Without Taking a Bath: The Cost-Benefit of Wise Water Use." Paper presented at the third annual Colorado WaterWise Conservation Workshop, Denver, Colo., October 14.

** Colorado Department of Natural Resources, Colorado Water Conservation Board. 2011. "Appendix K: SWSI Conservation Levels Analysis," prepared by Great Western Institute, June 2010. In *Colorado's Water Supply Future, Statewide Water Supply Initiative 2010, Final Report*. January.

†† Cohen, M. J. 2011. *Municipal Deliveries of Colorado River Basin Water*. Oakland, Calif.: Pacific Institute. June.

‡‡ Rockaway, T.D, P. A. Coomes, J. Rivard, and B. Kornstein. 2011. "Residential Water Use Trends in North America." *Journal AWWA* 103:2, February.

Better Future Supplies

Existing Supplies

The Better Future Alternative includes 60,550 AF of current firm yield supplies. Existing supplies include the 59,400 AF of yield assumed in the Harvey Report as well as 1,150 AF of additional water that was documented in Appendix P of the Harvey Report but not applied to future demands in that report.

These additional supplies include:

- 270 AF of firm yield from Fort Lupton's Fulton Ditch shares was not included in the town's existing supplies.* Per Fort Lupton's water conservation plan,† this water is currently used by the City to irrigate the golf course and cemetery and for augmentation of the City's wells.

- 680 AF of firm yield from the consumptive use portion of North Poudre Irrigation Company shares,‡ owned by Eaton (205 AF), Severance (54 AF), and Windsor (421 AF), which have not yet been changed to municipal use. A Better Future acknowledges that issues may arise while transferring agricultural water to municipal use. Also, once a right is changed, there can be additional issues accessing the water at the time and location it is needed. However, these shares are owned by the specified NISP participants, and it is reasonable to assume this water will become available to meet municipal needs. To provide for time to transfer the rights, the Better Future Alternative assumes yield from these shares is available beginning in 2025.

- A math error in Appendix P of the Harvey Report appears to have underestimated Fort Morgan's existing firm yield supplies by 200 AF. The Better Future Alternative assumes this water is currently available.

* The Harvey Report lists total firm yield from these shares as 700 AF. Per Fort Lupton's water conservation plan, 270 AF is the consumptive use portion of these shares, though some of this water continues to be used for irrigation so may have a higher yield.

† Clear Water Solutions, Inc. 2007. *City of Fort Lupton Water Conservation Plan*. August. http://www.fortlupton.org/DEPARTMENTS/FINANCE/water_conservation_plan/Water.pdf.

‡ North Poudre Irrigation Company has both Colorado-Big Thompson Project (see sidebar on page 43) and native (Poudre River Basin) shares. This 680 AF is native portion shares.

Growth onto Irrigated Lands

The Better Future Alternative estimates the annual firm yield from traditional agricultural transfers from urban growth onto previously irrigated lands will be 7,360 AF by 2030 and 19,150 AF by 2060.

As NISP participant populations increase, a portion of new growth will occur on previously irrigated agricultural lands that are adjacent to NISP towns. These are lands that are sold willingly by farmers for a variety of reasons, which may include retirement, the decision to downsize, a preference to relocate, or changes in commodity markets, among others.

To ensure that adequate supplies are available to meet the needs of new development, most towns and cities require that the water previously used for irrigation on annexed lands (also sold voluntarily by farmers) be transferred to the respective water supply utility, and that additional water supplies (frequently including storage), or at times "cash in lieu" (cash instead of water), be provided (see sidebar). Normally, only the historical consumptive use portion of irrigation water can be transferred, and the process of changing a water right can be complicated and takes time. When new supplies are acquired, additional collection infrastructure, storage, and water treatment may be required in order for municipalities to utilize the water.

A Better Future includes only the consumptive use portion of supplies that are anticipated to be transferred directly from previously irrigated lands upon which growth occurs.* It does not estimate other water dedications required by towns. Data from the state's South Platte Decision Support System, the U.S. Census Bureau, and the NISP No Action Alternative† were used to estimate a minimum volume of agricultural water that will be transferred to NISP participants. To be conservative, for this analysis the Better Future Alternative assumes a relatively high density of 5 people per acre. This is much higher than current NISP community densities (Table 1) and so minimizes the assumed acreage from which water will be transferred. The Better Future Alternative encourages higher density development for a variety of reasons, including its potential to reduce water use (through less outdoor irrigation), infrastructure costs, and water loss when compared to typical suburban, low-density developments.‡

TABLE Nº 1

2010 POPULATION DENSITIES FOR NISP PARTICIPANTS AND OTHER FRONT RANGE COMMUNITIES.*

NISP Participant	People/Acre
Erie	1.65
Evans	2.84
Fort Lupton	1.60
Fort Morgan	4.66
Lafayette	4.04
Windsor	1.05
Firestone	1.53
Frederick	1.01
Better Future Assumed NISP Participant Density	**5.0**

Large Front Range Communities	People/Acre
Denver	6.13
Boulder	6.17
Fort Collins	4.15
Longmont	5.15

* U.S. Census Bureau. 2010. "State and County Quick Facts." Revised September 18, 2012. Available at http://quickfacts.census.gov/qfd/states/08000.html. Data were not available for NISP communities not listed here.

* In Colorado, only the historically consumed portion of an agricultural water right can be transferred to ensure that other water users aren't negatively impacted by such a transfer. Better Future estimates of water transferred from growth onto agricultural lands include only the consumptive use portion of historical water use.

† An EIS requires the analysis of a No Action Alternative (or status quo) option. In this case of NISP, the No Action Alternative evaluated other options for meeting participant demands without the project.

‡ Western Resource Advocates. 2009. *New House, New Paradigm: A Model of How to Plan, Build, and Live Water-smart*.

NISP Participants' New Development Water Requirements

One of the largest costs for developers is water service. Water dedication policies vary by town and water district. Potential supplies are also evaluated for desirability based on their specifics (e.g., location, quality, seniority, storage). Some towns and water districts may require that they be given first option on any water supplies associated with a parcel. Others may not want a specific water right if it is difficult to transfer the diversion location to their water supply intake. Others may require supplies from specific sources or accept cash in lieu (cash instead of water) rather than requiring the transfer of historical water rights. Furthermore, some supplies may not be suitable for potable use, but may be useful for outdoor irrigation of parks, open space, and other common areas. In some cases, water has already been sold off from land, so either other supplies or cash in lieu are required. The following are examples of the water dedication policies for several NISP participants.

City of Evans (Municipal Code Chapter 13.08)
...It is the intent and purpose of this chapter to require the dedication or transfer of water or water rights to the city sufficient to satisfy any new or additional demand for city water service...

...any person who seeks approval of any of the following: 1. An extension of water service; 2. Annexation of land to the city; 3. Any change in land use, within or outside the limits of the city, if such change in land use will increase the demand for city water service, shall dedicate or transfer to the city a water allotment contract with the Northern Colorado Water Conservancy District (C-BT contract) for sixty-five hundredths (0.65) of an acre-foot (which will yield an average of approximately forty-six hundredths (0.46) of an acre-foot) for each EQR [equivalent residential] unit calculated

...Prior to any extension of service, any person required to comply with the provisions of this chapter shall also grant to the city the option for one year to purchase any and all water rights which are appurtenant to the land to be annexed, or on which the land use is proposed to be changed, but which are in excess of the dedication or transfer requirement of this chapter...

Fort Lupton (Municipal Code Sec. 13-122)
...Any person annexing land to or developing within the City...shall make a cash-in-lieu-of-water payment in an amount as determined by the City or...convey water rights or shares of sufficient quantity and water quality as determined by the City...

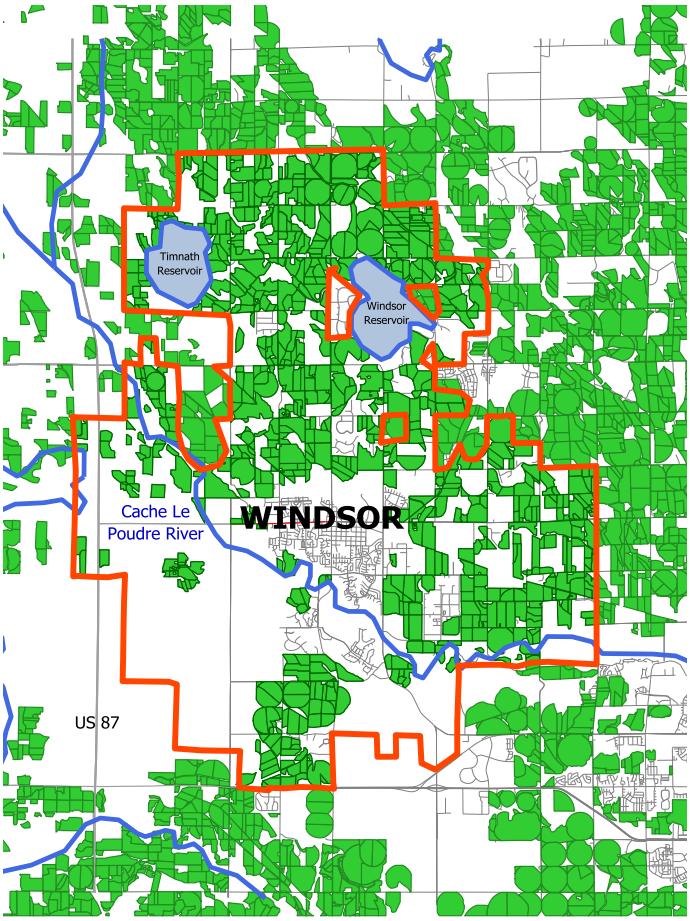
Fort Morgan (Municipal Code Sec. 18-2-210)
... At the time of annexation, property owners shall transfer all other water rights associated with the property to be annexed...The property owner shall also purchase water from a source that can be integrated into the City's potable water system sufficient to meet the needs of the property development or the current use of the property...

City of Lafayette (Municipal Code Sec. 120-91)
...The dedication and conveyance of CBT [Colorado-Big Thompson] water, direct flow and/or storage water rights to the city shall be required as a condition precedent to the approval of the subdivision or replatting of any land zoned and/or used as residential property. The dedication and conveyance of CBT water, direct flow and/or storage water rights to the city for all property other than residential shall be required as a condition precedent to the approval of a water service application...

Windsor (Municipal Code Sec. 13-2-80)
All premises requesting original water service...shall furnish...without cost to the Town, water rights in the amount of three (3) acre-feet of water for each acre of land zoned Single-Family Residential SF-1 District, Single-Family Attached Residential SF-2 District and Planned Mobile Home Park PD-MHP Development, and annexed to the Town...The Town may accept cash in lieu of water...

FIGURE Nº 7

EXAMPLE OF NISP PARTICIPANT WINDSOR'S GROWTH MANAGEMENT AREA* AND SURFACE-WATER-IRRIGATED LANDS†.



Red outline = Windsor's Planned Growth Area
Green parcels = Surface-Water-Irrigated Lands

Surface-water-irrigated parcels in Windsor's Growth Management Area. The Better Future Alternative assumes a growth footprint less than half the size of this area.

* Town of Windsor, Colorado. 2007. *2006 Update of 2002 Windsor Comprehensive Master Plan*. January 4. http://windsorgov.com/DocumentCenter/Home/View/1665.

† South Platte Decision Support System geographical information system and modeling data available at http://cdss.state.co.us/basins/Pages/SouthPlatte.aspx.

At 5 people per acre, the Better Future Alternative's projection of 302,748 new people by 2060 results in 60,550 acres being developed. Mapping by WRA was used to estimate growth footprints around each NISP participant community (see the example of Windsor provided in Figure 7).* Evaluating South Platte Decision Support System data for growth areas found that, on average, 42% of NISP growth will occur on lands that are currently irrigated by surface water.† Based on SWSI‡ and NISP No Action Alternative§ consumptive use data, a Better Future assumes that the water-supply-limited transferable yield¶ averages 1.0 AF/acre for parcels irrigated with surface water. To account for uncertainty and the complexities associated with changing irrigation water to municipal use, the Better Future Alternative further limits yields by assuming that only 75% of transferrable water is acquired and utilized by NISP participants. This results in an annual yield from growth onto previously irrigated lands of 7,360 AF in 2030 and 19,150 AF in 2060.** See Appendix C for more detailed calculations.

The above calculations differ from the Harvey Report, which did not include any water supplies associated with new development growing onto agricultural lands, nor required dedications from developers.

* Water districts covering large geographic areas (Central Weld County Water District, Fort Collins–Loveland Water District, Left Hand Water District, and Morgan County Quality Water District), in which other water providers may operate, were not included in the analysis of percentage of surface-water-irrigated lands in the growth footprint.

† Due to potential complexities, the Better Future Alternative does not consider groundwater supplies and does not include parcels that are irrigated with a combination of surface water and groundwater.

‡ Colorado Department of Natural Resources, Colorado Water Conservation Board. 2011. *Colorado's Water Supply Future: Statewide Water Supply Initiative 2010, Final Report*. January.

§ MWH. 2010. *Northern Integrated Supply Project No Action Alternative*. Prepared for Northern Colorado Water Conservancy District. April.

¶ Many farmers in northern Colorado irrigate, at least in part, with Colorado-Big Thompson (CBT) water. Because CBT water can easily be moved around, a Better Future assumes CBT supplies may not be available for direct transfer for lands, so uses a consumptive use value (1.0 AF/acre) that is lower than water-supply-limited consumptive use in the No Action Alternative. For additional information on the CBT project, see sidebar on page 43.

** Better Future yields from agriculture as a result of NISP participants' growth footprints are different than those in Save the Poudre's "The Farm Facts about NISP" (accessible at http://www.savethepoudre.org/docs/farm-facts-april2011.pdf). This does not undermine Save the Poudre's analysis, but is the result of the different methodology used in the Better Future Alternative.

Active Conservation

Water conservation has grown significantly in the past decade and will be a key part of meeting future water demands in northern Colorado communities. **The Better Future Alternative applies active conservation savings of 6,401 AF by 2030 and 20,482 AF by 2060 towards NISP participant demands.**

All NISP participants, with the exception of Central Weld County Water District and Morgan County Quality Water District, have conservation plans that detail active conservation measures they plan to implement in the coming years (Table 2). These measures will produce water demand savings in excess of passive conservation, which occurs as a result of new development and as older, more inefficient fixtures and appliances are replaced.

The Better Future Alternative uses the SWSI high conservation strategy goal of decreasing South Platte Basin†† per capita use by 38.3% by 2050.‡‡ Of this, 10.2% is from passive conservation already accounted for above in the Better Future baseline demands. Here we evaluate only those savings (28.1%) associated with active conservation. SWSI conservation goals include system losses of 7%, which is consistent with average NISP participant loss projections.§§ When planning for future demands, water providers are frequently cautious about relying on recent or expected changes in water use resulting from conservation. To address these concerns, the Better Future Alternative assumes that only 60% of active conservation savings are applied to meet future demands and that 40% is reserved to improve system reliability or for drought reserves and is not included in our portfolio.¶¶ See more detailed calculations in Appendix D.

The conservation measures required to achieve the high conservation strategy utilized in the Better Future Alternative are best management practices (standard practices that have been found to achieve results) and should be implemented prior to making additional diversions from the Poudre and

†† South Platte Basin planning area does not include the Denver metro area, which is evaluated separately in the SWSI report.

‡‡ Colorado Department of Natural Resources, Colorado Water Conservation Board. 2011. "Appendix L: SWSI 2010 Municipal and Industrial Water Conservation Strategies," prepared by Aquacraft, Inc. and Headwaters Corporation, January 2011. In *Colorado's Water Supply Future, Statewide Water Supply Initiative 2010, Final Report*. January.

§§ Harvey Economics. 2011. Table II-3. In *Water Supplies and Demands for Participants in the Northern Integrated Supply Project Final Report*. Report prepared for the Northern Colorado Water Conservancy District and the Northern Integrated Supply Participants. January 21.

¶¶ This methodology of assuming SWSI high conservation strategy savings, applying 60% of the savings, and retaining 40% for system reliability or drought reserve is consistent with previous WRA reports. This methodology is also consistent with portfolios developed by the Colorado River and Yampa-White Basin Roundtables – see CDM Smith. 2012. *Technical Memorandum: Basin Roundtable Portfolio and Trade-off Analysis.* February 23. http://cwcb.state.co.us/about-us/about-the-ibcc-brts/Documents/RoundtableSummit2012/TM-Basin%20Roundtable%20Summit.pdf.

TABLE Nº 2 NISP PARTICIPANTS' WATER CONSERVATION PLAN NEAR-TERM GOALS ARE SUBSTANTIAL.

NISP Participant	Water Conservation Plan Goal[a] (% Reduction in Use)	Achieve Goal by (Year)
Central Weld County Water District (CWCWD)[1]	No quantifiable goals	Not available
Dacono[2]	10%	2021
Eaton[3]	8%	2021
Erie[4]	17% (achieve 190 gpcd)[b]	2014
Evans[5]	13%	2018
Firestone[6]	4.7% residential, 13.4% commercial, 12.1% parks, 19% open space	2017
Fort Collins–Loveland Water District (FCLWD)[7]	13%	2017
Fort Lupton[8]	5% by 2016, 7% by 2030	2016
Fort Morgan[9]	No quantifiable goals	NA
Frederick[10]	18.40%	2021
Lafayette[11]	12.7% + loss decreased by 3%	2016
Left Hand Water District (LHWD)[12]	11.3%	2017
Morgan County Quality Water District (MCQWD)	No plan	Not available
Severance[13, c]	7.9%	2019
Windsor[14]	12%	2017

a Reductions in system loss are included in several providers' goals.

b Erie has a goal of 190 gpcd, which it already achieves at times. This goal is equivalent to a 17% reduction as compared to use without conservation. In comparison, the Harvey Report projects Erie's per capita use rate to increase as high as 310 gpcd in 2030 (gpcd calculated by WRA based on data provided in Harvey Report, Appendix D).

c Severance doesn't have a water conservation plan, but portions of the town are served by the North Weld County Water District, whose plan has a goal of reducing use by 7.9% by 2019.

1 Central Weld County Water District. 2005. Central Weld County Water District Water Conservation Plan. April.

2 Clear Water Solutions, Inc. 2011. City of Dacono 2011 Water Conservation Plan.

3 Clear Water Solutions, 2011. "Town of Eaton 2011 Water Conservation Plan – Draft."

4 CDM. 2008. Town of Erie Water Conservation Plan. January.

5 Clear Water Solutions, Inc. 2009. City of Evans 2009 Water Conservation Plan.

6 Clear Water Solutions, Inc. 2007. "Town of Firestone Water Conservation Plan – Draft." February.

7 Clear Water Solutions, Inc. 2008. Fort Collins–Loveland Water District Water Conservation Plan. September.

8 Clear Water Solutions, Inc. 2007. City of Fort Lupton Water Conservation Plan. August. http://www.fortlupton.org/DEPARTMENTS/FINANCE/water_conservation_plan/Water.pdf.

9 City of Fort Morgan, Colorado. 2007. City of Fort Morgan Water Conservation Plan.

10 Civil Resources, LLC. 2011. "Town of Frederick Water Conservation Plan – 75% Draft." March.

11 City of Lafayette, Colorado. 2009. City of Lafayette Water Conservation Plan. Revised April 2010.

12 Clear Water Solutions, Inc. 2008. Left Hand Water District Water Conservation Plan. July.

13 Clear Water Solutions, Inc. 2009. North Weld County Water District 2009 Water Conservation Plan.

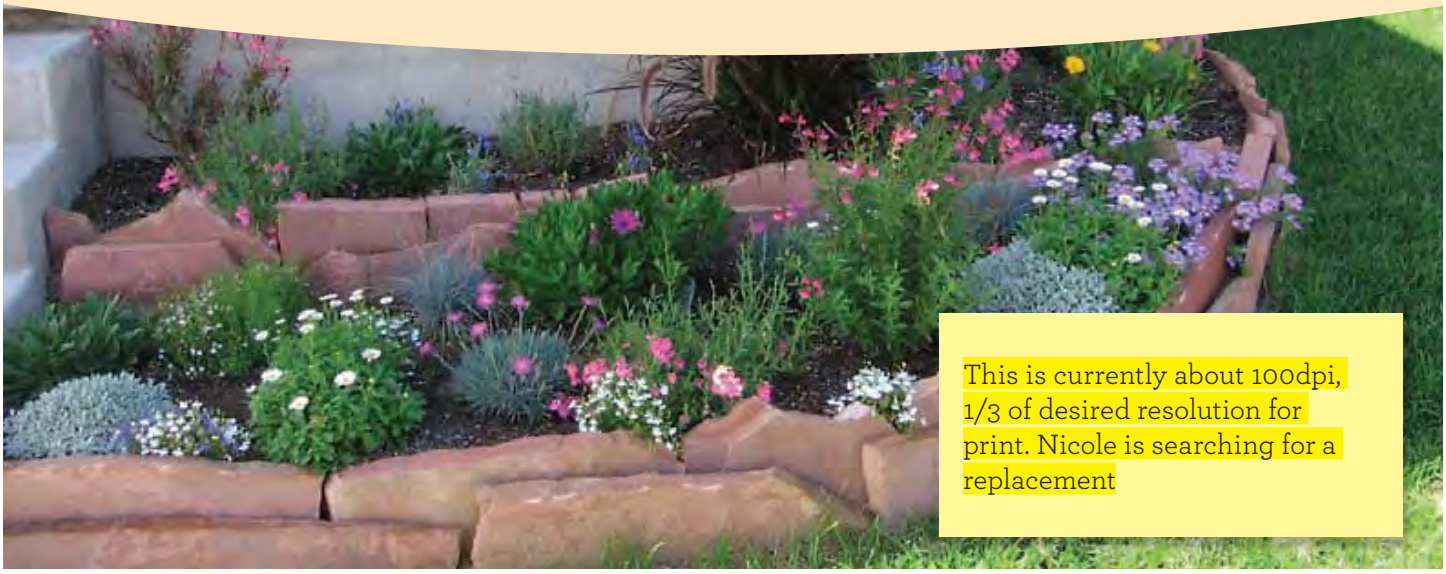
14 Clear Water Solutions, Inc. 2008. Town of Windsor 2008 Water Conservation Plan.

SWSI Municipal and Industrial Low, Medium, and High Water Savings Strategy Measures*

This table from the 2010 SWSI Report illustrates the type of conservation measures assumed to be applied to realize low, medium, and high conservation savings. Measures may be included under all strategy levels (i.e., marked in multiple columns), but levels of implementation or penetration can vary. Additional details regarding implementation assumptions can be found in Table D-2 in Appendix D.

Conservation Measures	Water Saving Strategy		
	Low	Medium	High
Passive water conservation savings from natural replacement of fixtures and appliances	X	X	X
Public information and education	X	X	X
Reduction in customer side leakage	X	X	X
Conservation-oriented plumbing and building codes	X	X	X
Landscape water use reductions	X	X	X
Improved utility water loss control measures	X	X	X
Conservation-oriented and water budget-based water rates		X	X
Smart metering with leak detection		X	X
Submetering of new multi-family housing		X	X
Targeted utility audits for high demand non-residential landscape customers		X	X
Irrigation efficiency improvements		X	X
Informational landscape water budgets and customer feedback		X	X
Landscape water budgets tied to the rate structure and customer feedback	X	X	X
Landscape transformation from high water requirement turf to low water requirement		X	X

* Colorado Department of Natural Resources, Colorado Water Conservation Board. 2011. "Appendix L: SWSI 2010 Municipal and Industrial Water Conservation Strategies," prepared by Aquacraft, Inc. and Headwaters Corporation, January 2011. In *Colorado's Water Supply Future, Statewide Water Supply Initiative 2010, Final Report*. January.



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South Platte rivers (see page 29). Notably, the vast majority of measures will not require significant behavioral changes on the part of customers.

Lower per capita usage resulting from conservation provides system security, which is of utmost importance to water providers. If more people's needs are met with less water, this decreases the impacts of drought. Additionally, lower demands under the Better Future conservation strategy reduce the need for additional water storage. Water conservation also decreases water treatment costs, as water demands increase more slowly, providing utilities with more time to upgrade or develop new facilities. Decreasing demands through conservation also leads to lower losses and system delivery charges.

It is in the best interest of Northern Water and NISP participants to support and encourage water conservation. A 2012 survey of Northern Water municipal customers about water conservation found that municipal suppliers support conservation for the following key reasons: it's the right thing to do, for drought preparedness, to reduce peak expansion cost, and to offset increased demand of future growth.* This is supported by the fact that nearly all NISP participants have water conservation plans (Table 2) with quantifiable goals, many of which are comparable to — or exceed — SWSI high conservation strategy reductions of around 1% per year. Most water conservation plans have planning periods of 7 to 10 years (Table 2). As a result, additional savings beyond current goals are very likely by 2060.

The Harvey Report's analysis did not include any new water conservation savings, passive or active, from 2009 forward. This is inconsistent with a recent brochure published by Northern Water titled "NISP Communities' Water Conservation Efforts: A Key Component to Meeting Future Water Needs"† and at odds with the water conservation goals established by NISP participant communities. It is also confusing because the Harvey Report includes an entire section on water conservation but does not apply any savings towards future demands. As discussed above, rather than including conservation savings, the Harvey Report's demand projections assume the opposite, that per capita use increases from current levels (Figure 6). This is contrary to a wide body of research and data, and NISP participants' own experiences, about the effects of water conservation.

* Northern Water. 2012. *NISP Communities' Water Conservation Efforts: A Key Component to Meeting Future Water Needs.* http://www.northernwater.org/docs/Brochures/conserve_brochure_NISP_Feb2012.pdf

† 2,000 AF or more was assumed to be the threshold of reusable supplies for which the benefit of developing direct and/or indirect reuse would be sufficient for a community to pursue, though this can also be feasible for communities with fewer reusable supplies. Left Hand Water District has 1,700 AF of reusable supplies, which is close to the 2,000 AF threshold selected for the Better Future Alternative, but due to its large and distributed service area, the Better Future Alternative does not include reuse for the district. All other NISP participants have less than 1,000 AF of existing potentially reusable supplies.

TABLE Nº 3 BETTER FUTURE ALTERNATIVE NISP PARTICIPANT REUSE.

NISP Participant	Potentially Reusable Supplies (AFY)		Reuse (AFY)	
	Irrigation Company Shares	Conditional WGFP	Irrigation Company Shares	Conditional WGFP
Erie	124	2,000	76	1,224
Lafayette	4,235	800	1,906	360
Evans	6,496	500	2,923	225
TOTAL	**10,856**	**3,300**	**4,905**	**1,809**

Planned and Additional Reuse

As new water supplies become more difficult and expensive to acquire, many utilities are integrating reuse of existing supplies into their water supply portfolios. **The Better Future Alternative assumes reuse supplies of 4,905 AF**, all of which are available from current supplies. The Better Future Alternative evaluated *existing* reusable supplies (see sidebar) for each NISP participant utilizing the supply data provided in Harvey Report Appendix P and requested Windy Gap Firming Project yield. Note that while reuse of WGFP supplies is discussed in this section for ease of explanation, no WGFP reuse is included in the assumed "Reuse" yield of 4,905 AF. WGFP reuse yield is instead captured in the "Conditional Inclusion: Windy Gap Firming Project" section below.

Only three towns have 2,000 AF or more of existing reusable supplies‡ — Lafayette, Erie, and Evans (Table 3) — two of which already have reuse plans in place. *Note that agricultural water transferred as a result of growth onto irrigated land and through Ag-Urban cooperation will provide significant additional reuse opportunities not accounted for in the Better Future Alternative.* Also, Better Future calculations consider only first-time reuse, though return flows from these supplies can be reused to extinction, which increases the potential yield. An additional 1,809 AF of WGFP reuse is accounted for below in the "Conditional Inclusion: Windy Gap Firming Project" section of this report.

Erie — The Town of Erie's water conservation plan§ says that Erie plans to reuse 690 AF each year by 2014. Because some of this is Windy Gap water (see Table 3), and a WGFP Record of Decision has not yet been issued, a Better Future assumes Erie's reuse of 690 AF starts in

‡ 2,000 AF or more was assumed to be the threshold of reusable supplies for which the benefit of developing direct and/or indirect reuse would be sufficient for a community to pursue, though this can also be feasible for communities with fewer reusable supplies. Left Hand Water District has 1,700 AF of reusable supplies, which is close to the 2,000 AF threshold selected for the Better Future Alternative, but due to its large and distributed service area, the Better Future Alternative does not include reuse for the district. All other NISP participants have less than 1,000 AF of existing potentially reusable supplies.

§ CDM. 2008. *Town of Erie Water Conservation Plan*. January.

2020. Erie's 2007 *Non-Potable Municipal Water System Master Plan*[*] includes a plan to develop approximately 1,300 AF of dry year direct reuse by build-out. However, the SWSI Portfolio Tool[†] includes Erie reuse ranging from 3,700 to 4,300 AF as an Identified Project and Process (IPP).[‡] Relying on the lower Erie planning document estimates, a Better Future assumes that reuse will increase from 690 AF in 2020 to 1,300 AF in 2050, of which only **76 AF (non-WGFP reuse) is included in the reuse total** (the remaining 1,224 AF is included below in the conditional WGFP yield).

Lafayette — The City of Lafayette's water conservation plan[§] says the city currently reuses 60% of its return flows through exchange, and that the City has a conceptual design for a pipeline between its water reclamation plant and a reservoir complex that would maximize the full use of return flows from this plant. Lafayette's water conservation plan documents 1,479 AF of existing reuse. Based on the supplies identified in the Harvey Report, Appendix P, and assuming that 50% of reusable supplies are used indoors and 90% of indoor water returns and can be reused, we estimate that first-time reuse of existing supplies by Lafayette can increase to 2,266 AF. The Better Future Alternative assumes current reuse for Lafayette is 1,479 AF and that reuse increases to the full 2,266 AF by 2030. **1,906 AF of reuse** is assumed to be from existing supplies (the remaining 360 AF is included below in the conditional WGFP yield).

Evans — Evans' potentially reusable supplies are approximately 7,000 AF. Evans' water conservation plan[¶] refers to a small amount of reuse at its wastewater treatment plant. A Better Future includes 3,148 AF of reuse for the Town of Evans, assumed to be in place by 2030, calculated using the same indoor and outdoor distribution and return flow assumptions used for Lafayette. **2,923 AF of reuse** is assumed to be from existing supplies (the remaining 225 AF is included below in the conditional WGFP yield).

This analysis is consistent with the Metro Roundtable assumption of a 50% reuse factor.[**] The 50% reuse factor means that for 1.0 AF of reusable supply, with reuse that supply increases to 1.5 AF. The Better Future Alternative's implied reuse factor is slightly lower, at 47%.

* CDM. 2007. *Town of Erie Non-Potable Municipal Water System Master Plan.* September.

† Colorado Department of Natural Resources, Colorado Water Conservation Board. 2010. "Colorado's Water Supply Future Portfolio and Trade-off Tool." Available at http://cwcb.state.co.us/technical-resources/portfolio-tool/Pages/main.aspx.

‡ WRA followed up with the Colorado Water Conservation Board in a personal communication on May 24, 2012, which confirmed the higher reuse yield estimates for Erie.

§ City of Lafayette, Colorado. 2009. *City of Lafayette Water Conservation Plan*. Revised April 2010.

¶ Clear Water Solutions, Inc. 2009. *City of Evans 2009 Water Conservation Plan.*

** Interbasin Compact Committee, Metro Roundtable. 2012. "Selection of a Reuse Factor for the Portfolio Tool Planning Exercise – Draft." March 9.

What water can be reused?

Colorado water law is very specific in the types of water that can be reused. These are limited to:

- Non-native water that has been imported into a basin (i.e., transbasin diversions, such as WGFP water).
- The consumptive use portion (CU) of agricultural water that has been transferred to another use (such as the consumptive use portion of irrigation company shares).*
- Nontributary groundwater.
- Water diverted under a water right with a decreed reuse right.

How can you reuse water?

Reuse can be accomplished in two ways:

- **Direct Reuse**—Return flows from reusable supplies can be physically reclaimed for potable and nonpotable purposes. For example, a water utility captures reusable water leaving its wastewater treatment plant and uses this water again for urban, agricultural, recreational, environmental, or industrial purposes.
- **Indirect Reuse**—Return flows can be reused under substitution or exchange arrangements.† An example of indirect reuse is when a water utility lets reusable water leaving its wastewater treatment plant flow downstream for diversion by an irrigator, and the utility diverts an equivalent amount of water into its system upstream.

What are the impacts of reuse on downstream users?

Reuse can only occur within Colorado's priority system. That means that water cannot be reused if it will injure a senior water right holder. However, streams and downstream users may have historically benefitted when potentially reusable supplies were not used and flowed downstream. If water is then reused, either directly or indirectly, this will typically decrease streamflows and downstream supplies that had previously been available to others. This is within the rights of the owner of the reusable supplies. When water is transferred from irrigation to other uses, only the consumptive use portion can be converted. Historical return flows (which are not included in the yield from the transferred consumptive use portion of Better Future supplies) must be maintained so as to not injure other water users. Additionally, when historical wastewater return flows are reused, some very important environmental benefits can be diminished, e.g., streamflows and wetlands, impacting fish and wildlife. The environmental impacts of reuse, as compared to impacts associated with alternative water supply options, should be considered when evaluating reusable supplies.

The environmental impacts of reuse should be considered when evaluating reusable supplies.

* The consumptive use portion of water used for other purposes, such as industrial uses, may also be transferred. However, typically transfers from agriculture are discussed in this context.

† An exchange is generally an arrangement in which a junior water user makes water available to a senior water user (e.g., reusable treated effluent) in exchange for permission to use or divert an equivalent amount of water to which the senior would otherwise be entitled. A substitution or augmentation arrangement provides water supplies to replace out-of-priority diversions.

Though both Erie and Lafayette have existing and/or planned reuse and Evans has significant reusable supplies, the Harvey Report did not include any existing or planned reuse.

FIGURE Nº 8

ANNUAL SOUTH PLATTE BASIN AGRICULTURAL CONSUMPTIVE USE (CU) COMPARED TO ASSUMED BETTER FUTURE YIELD FROM AG-URBAN COOPERATION.

Ag-Urban Cooperation proposed under the Better Future Alternative would share less than 1% of agricultural consumptive use with municipalities.

South Platte Basin Current (2008) Annual Agricultural CU = 1,117,000 AF

Better Future Ag-Urban Cooperation Yield = 10,000 AF (< 1% of total CU)

Ag-Urban Cooperation

The Better Future Alternative assumes Ag-Urban cooperation supplies 10,000 AF. A Better Future relies on Ag-Urban cooperation, or alternative agricultural transfers, to provide water supplies to NISP participants. Nearly 90% of water used in NISP counties (Boulder, Larimer, Morgan, and Weld) is currently used for crop irrigation.* SWSI estimates that in 2008 there were 831,000 irrigated acres in the South Platte Basin, with an annual consumptive use of 1,117,000 AF.† A Better Future assumes that water from only a very small portion of this (less than 1%) will be necessary each year to provide a yield of 10,000 AF from Ag-Urban cooperation (Figure 8).

Given the large presence of agriculture and seniority of many rights, alternative agricultural transfers are feasible as a potential future supply for NISP participants. These agreements are between willing farmers and cities and provide farmers with reliable income and cities with reliable water supplies. Though hurdles remain to implementation, interest in such agreements has gained traction in recent years, and they are seen by many—especially irrigators and their communities—as preferable to "buy and dry" agricultural water transfers where the water is permanently severed from farmland.

* Ivahnenko T. and J. L. Flynn. 2005. *Estimated Withdrawals and Use of Water in Colorado*, 2005. Prepared in cooperation with the Colorado Water Conservation Board. Washington, D.C.: U.S. Geological Survey. Scientific Investigations Report 2010–5002.

† Colorado Department of Natural Resources, Colorado Water Conservation Board. 2011. *Colorado's Water Supply Future: Statewide Water Supply Initiative 2010, Final Report*. January.

Alternative agricultural transfers may include:

- Interruptible supply agreements
- Long-term rotational fallowing
- Water banks
- Deficit/partial irrigation practices
- Alternate cropping types‡

Ag-Urban cooperation is similar to a concept already integrated into NISP, which states that "…NISP will have the option of entering into contracts with agricultural water users to lease water that can be subsequently diverted and stored in NISP facilities"§ when Glade inflows fall below a certain volume.

When discussing Ag-Urban cooperation, water providers frequently state that they are unwilling to depend on supplies from agreements where agriculture retains ownership of the water rights. However, two new pilot projects are working to address both agricultural and municipal concerns, the Arkansas Valley Super Ditch and the Lower South Platte Water Cooperative (LSP Co-op). These two projects are advancing the concept of umbrella organizations that facilitate the involvement of many irrigators, and which could guarantee supply volumes to municipalities and others while maintaining irrigator ownership of water rights. The LSP Co-op's mission statement, for example, is to "Create a member-based organization controlled by local water users to facilitate more efficient uses of water to better meet current and future water supply needs in both local and regional areas."¶ The LSP Co-op is evaluating means to deliver firm yield and water needed on a periodic basis while maintaining member control of water supplies.

In the Arkansas Basin, farmers' interest in the Super Ditch is exceeding expectations. In a 2011 *Pueblo Chieftain* article, Peter Nichols, attorney for the Lower Arkansas Valley Water Conservancy District, is quoted as saying, "Water rights holders representing 67 percent of the land and 70-75 percent of the water under seven ditches proposed for inclusion in Super Ditch … [indicated] they might be interested in selling water through a lease program."** Similarly, a survey of South Platte Basin irrigators found that 63% of interviewed farmers would be willing to participate in a rotational land

‡ CDM. 2011. *Colorado's Water Supply Future: Alternative Agricultural Water Transfer Methods Grant Program Summary, Final Report*. May 2.

§ U.S. Army Corps of Engineers, Omaha District. 2008. *Northern Integrated Supply Project Draft Environmental Impact Statement*. Applicant: Northern Colorado Water Conservancy District. April.

¶ Lower South Platte Water Cooperative. 2012. Frequently asked questions presentation at update meeting on February 24.

** Woodka, C. 2011. "Most Farmers Interested in Super Ditch." *Pueblo Chieftain*. January 20. http://www.chieftain.com/news/local/most-farmers-interested-in-super-ditch/article_97faaeaa-2463-11e0-a4d2-001cc4c03286.html.

fallowing program, if compensated adequately (the most common estimate of compensation was $400 per AF).*

Additional storage may be needed to re-time a portion of deliveries from historical irrigation months to meet year-round municipal demands. Existing and improved storage, smaller off-channel reservoirs, local gravel pits, and other storage could be pursued for this purpose. Examples of potential storage locations from the DEIS† include the following:

- Erie, Lafayette, Left Hand Water District — gravel pits along Boulder Creek downstream of Longmont
- Eaton, Severance, Windsor — gravel pits along the Poudre River downstream of Fort Collins
- Fort Morgan, Morgan County Quality Water District — gravel pits along the South Platte River upstream of Fort Morgan
- Central Weld County Water District — gravel pits along the South Platte River to the east of Frederick, Firestone, and Dacono
- Evans — gravel pits on the South Platte River in the vicinity of Evans
- Fort Collins–Loveland Water District — gravel pits on the Poudre River and enlargement of a North Poudre Irrigation Company Reservoir
- Fort Lupton — gravel pit along the South Platte River in the vicinity of Fort Lupton

The Colorado-Big Thompson (CBT)‡ system also provides for unique opportunities for Ag-Urban cooperation as all NISP participants receive CBT water. Water can — and is — moved around with relative ease among CBT participants.

Many details of Ag-Urban cooperation will need to be worked out, including overcoming technical issues, legal challenges, and existing reluctance on the part of municipalities and irrigators.§ At the same time, a great deal of interest and political will exists to advance the concept, and significant resources are being invested by the state to this end. Because such supplies will not be needed by NISP participants for at least a decade,¶ this provides time for

* Pritchett, J., J. Thorvaldson, N. Hansen, and A. Jha. 2008. "Water Leasing: Opportunities and Challenges for Colorado's South Platte Basin." Paper presented at Western Agricultural Economics Association annual meeting, Big Sky, Montana, June 26.

† U.S. Army Corps of Engineers, Omaha District. 2008. *Northern Integrated Supply Project Draft Environmental Impact Statement*. Applicant: Northern Colorado Water Conservancy District. April.

‡ The CBT Project is a U.S. Bureau of Reclamation project that diverts approximately 260,000 AF of water each year from West Slope Colorado River headwaters to the South Platte Basin on the east slope. Northern Water apportions the water amongst irrigators and communities that receive municipal and industrial water from the project.

§ *A Better Future* does not evaluate specific ditches and supplies because temporarily transferring agricultural water rights for municipal use can be extremely complex, requiring analysis for each specific situation, including NISP participant needs, potential supplies, timing, storage, delivery infrastructure, costs, water quality, and treatment, among other factors.

¶ *A Better Future* includes Ag-Urban supplies beginning in 2025, but these are supplies in excess of demands so they could be developed later.

specifics to be worked out and for the necessary administrative and market frameworks to develop.

As the framework for Ag-Urban cooperation is being developed in Colorado, two successful examples can be found in California. In 2005, a 35-year-long transfer program began in which land is fallowed in the Palo Verde Irrigation District to provide water to the Metropolitan Water District of Southern California (Metropolitan). Discussing the benefits of this agreement, Bart Fisher, a farmer and Palo Verde Irrigation District board member, said, "Being compensated by Metropolitan for fallowing serves both ends: It doesn't diminish the bottom line and it allows farmers to make the land more productive." Fisher added, "The community also is already seeing the benefits of the additional revenues that are flowing in."** Another example is the Imperial Irrigation District, which is transferring water to the San Diego County Water Authority and Coachella Valley Water District under a 45-year agreement finalized in 2003.

The Harvey Report does not include any supplies resulting from Ag-Urban cooperation. The NISP No Action Alternative (NAA) evaluation conducted by MWH dismissed rotational fallowing and dry year leases from among viable NISP alternatives. This conclusion was based on assumptions that more than 40,000 AF of annual supply would be needed via this source alone and that land would be fallowed in 1 out of 10 years, necessitating the involvement of a large number of acres.††

The Better Future Alternative assumes Ag-Urban cooperation is one among several supplies contributing to meeting local water demands. Additionally, fields could be fallowed more frequently than 1 out of 10 years, thus requiring the participation of fewer acres. For example, a 1:4 ratio (land fallowed 1 out of every 4 years) is consistent with both the Super Ditch and Palo Verde Irrigation District/Metropolitan agreements. The NAA also dismissed dry year leases because the alternative assumed the water would be needed in all years. Because all Better Future supplies are firm yield supplies (water expected to be available in dry years), more water is available in average and wet years. As a result, NISP participants could choose to rely on Ag-Urban cooperation—such as interruptible supply agreements—in dry years only.

** Berman, M. 2006. "A Tale of Two Transfers: Palo Verde, Imperial Valley Farmers Take Different Roads." *Aqueduct Magazine* 72(3):1 Summer.

†† MWH. 2010. *Northern Integrated Supply Project No Action Alternative*. Prepared for Northern Colorado Water Conservancy District. April.

Conditional Inclusion: Windy Gap Firming Project

The Windy Gap Firming Project is designed to improve the reliability of the existing Windy Gap Project, which has not delivered anticipated yields. A new reservoir, Chimney Hollow, would store water for the future needs of 13 WGFP participants, five of whom are also NISP participants (Central Weld County Water District, Erie, Evans, Fort Lupton, and Lafayette).

In November 2011, the U.S. Bureau of Reclamation released a Final Environmental Impact Statement for the project. A Record of Decision has not yet been released. This project would divert additional West Slope water to the Front Range, further impacting Colorado River headwaters. Because the WGFP has not yet been approved—and because of concerns about potential detrimental impacts to West Slope streams and rivers—the Better Future Alternative discusses WGFP water supplies both with and without the project. The inclusion of the WGFP in a Better Future should not be construed as support of the project. It is included, however, because it is in the final stages of approval and, as such, may be considered a reasonably foreseeable project.

A Better Future conditionally assumes 3,700 AF of WGFP firm yield for NISP participants beginning in 2020, as documented in the WGFP Final EIS.* WGFP reuse of 1,809 AF is also assumed, as discussed above in the "Planned and Additional Reuse" section. **Total conditional yield for NISP participants, both first-time use and reuse, from the WGFP is assumed to be 5,509 AF. Note that the Better Future Alternative meets NISP participant water demands with or without this project.**

The Harvey Report analysis does not include WGFP supplies.

* U.S. Department of the Interior, Bureau of Reclamation, Great Plains Region, Eastern Colorado Area Office. 2011. *Windy Gap Firming Project Final Environmental Impact Statement*. Volume 1 FEIS 11-29. November.

Water Supply and Drought

Water supplies can vary greatly from year to year depending on hydrologic conditions, a community's specific water rights portfolio, and the amount of water remaining in storage from previous years. For this reason, "firm yield" supplies—water that is expected to be available even in dry years—typically are used in water supply planning, as opposed to planning around average or wet year supplies. This ensures that communities have sufficient water available to meet demands in most years. However, multi-year droughts can decrease the availability of supplies, albeit on a temporary basis. For example, with 100% of the state experiencing some level of drought during the summer of 2012, many communities did not implement drought measures because reservoirs were relatively full from a very wet 2011. If those supplies are drawn down and the drought continues, subsequent years will be more challenging and may require mandatory water use restrictions. Long-term drought and climate change increase the likelihood of more frequent and intense droughts in the future.

Many communities or water providers have drought response plans that can be put in place temporarily to ensure that critical water needs are met. Colorado has a statewide Drought Mitigation and Response Plan and encourages and financially supports water providers to develop drought mitigation plans specific to their service areas. Drought mitigation measures are temporary and are different from ongoing water conservation programs. Examples of temporary drought mitigation activities include imposing more stringent limits on outdoor irrigation, setting tighter water budgets, serving water only upon request at restaurants, setting water savings goals for large water users, and implementing industry-specific water restriction programs.

To account for drought, all of the supplies in the Better Future Alternative are "firm yield" supplies. Additionally, the Better Future Alternative applies only 60% of active conservation savings to future demands. The remaining 40% is not included as a supply, but rather is assumed to be set aside to provide a buffer in times of drought and other uncertainties, and to improve system reliability. All NISP participants also have Colorado-Big Thompson shares that typically provide more water in dry years because the project was designed to provide supplemental supplies when other supplies are insufficient. A Better Future (and the Harvey Report) assumes that NISP participants' existing CBT supplies yield 0.60 AF/share, yet in past dry years the yield has typically been higher. For example, in 2002 the CBT quota was 0.70 AF/share and in 2012 it was 1.0 AF/share. Lastly, the Better Future Alternative relies on a variety of supplies that provide flexibility, rather than relying heavily on one project. For these reasons, and because the Better Future Alternative portfolio exceeds demands, our alternative provides secure water supplies, even in periods of drought.

The Smart Principles

Western Resource Advocates, in collaboration with Trout Unlimited and the Colorado Environmental Coalition, has developed a set of Smart Principles to guide future water supply management and development efforts:

- Make full and efficient use of existing water supplies and reusable return flows before developing new diversion projects.
- Improve use of existing water supply infrastructure by integrating systems and sharing resources among water users to avoid unnecessary new diversions and duplication of facilities.
- Recognize the fundamental political and economic inequities and the adverse environmental consequences of new transbasin diversions.
- Expand or enhance existing storage and delivery before building new facilities in presently undeveloped sites, and expand water supplies incrementally to better utilize existing diversion and storage capacities.
- Recognizing that market forces now drive water reallocation from agricultural to municipal uses, structure voluntary transfers, where possible, to maintain agriculture and in all cases to mitigate the adverse impacts to rural communities from these transfers.
- Involve all stakeholders in decision-making processes and fully address the inevitable environmental and socioeconomic impacts of increasing water supplies.
- Design and operate water diversion projects to leave adequate flows in rivers to support healthy ecosystems under all future scenarios, even if water availability diminishes in the future as a result of climate change or other factors.
- Seek to develop “multi-purpose projects” to spread project benefits as well as costs.

While NISP meets a few of the Smart Principles, it is in stark contrast to others.

While NISP meets a few of the Smart Principles, like integrating systems and sharing resources, it is in stark contrast to others, such as leaving adequate flows in rivers to support healthy ecosystems. The Smart Principles are meant to be taken as a whole, and NISP does not meet that requirement. NISP’s major impacts on streamflow, combined with exaggerated populations and demands, and the lack of inclusion of water conservation (efficient use) and other reasonable supplies (reuse, water transferred as a result of growth onto irrigated lands, voluntary cooperation with agriculture) mean that NISP does not meet the Smart Principles.

Cost Analysis

The Better Future Alternative allows participants to be more flexible with growth and investments in water supplies. In addition, it may cost significantly less than NISP. Below, we summarize our cost analysis and assumptions for the key components of the Better Future Alternative (growth-displaced agricultural water supplies, active conservation, additional reuse, and Ag-Urban cooperation).*

A Better Future increases water supplies and costs incrementally as cities grow, allowing participants to defer the capital construction costs to future years, and does not force cities to grow in order to repay project debts. To reflect the value of deferring such investments, we evaluate the Better Future Alternative in terms of a present value. The present value of the cost of providing 40,000 AF of water† through a Better Future, assuming a 5% discount rate, is approximately $109 million. The present value cost of a Better Future through 2060 is moderately higher, at $150 million. In addition to water supplies, the Better Future Alternative will undoubtedly require facilities to store and convey water to participants. The character of these facilities depends on a range of factors, such as individual cities' growth patterns (which determines what agricultural land and water is transferred to cities), capacity in cities' existing water conveyance systems, the seniority of agricultural water rights leased or transferred with land (which determines the size of storage facilities needed), and the location of reuse customers. In some cases, cities may be able to rely on existing infrastructure and avoid large additional costs. Estimating the cost of potentially needed facilities is beyond the scope of this analysis, but would be in addition to the $109 million cost for 40,000 AF of water supplies.

WRA's cost analysis includes water supplies that are in excess of what utilities are already planning or have underway. For example, the City of Erie is already planning to develop 690 AF of reuse water by 2014 and a total of approximately 1,300 AF of reuse by build-out;‡,§ the cost of that water, therefore, is not included in this analysis. Assumptions are outlined below in each individual section.

* The cost analysis does not include the cost of Windy Gap Firming Project supplies because those are being developed independent of the purpose and need for NISP.

† 40,000 AF is the amount of water equivalent to the volume provided by NISP.

‡ CDM. 2008. *Town of Erie Water Conservation Plan*. January.

§ CDM. 2007. *Town of Erie Non-Potable Municipal Water System Master Plan*. September.

The Better Future Alternative is a strategy for meeting NISP participants' water needs *through the year 2060*, providing about 55,000 AF of new water (60,000 AF with the WGFP). In contrast, NISP proposes to meet participants' water needs through 2030, providing 40,000 AF of water. Under NISP, participants' total demands are projected to continue rising beyond 2030. WRA presents two cost comparisons:

1. The cost of a Better Future at the point when it provides 40,000 AF of new water (estimated to be around the year 2037)

2. The cost of a Better Future through the year 2060

Table 4 summarizes the data used to estimate the total cost of the Better Future Alternative; each element is described in greater detail below.

TABLE Nº 4 SUMMARY OF UNIT COSTS OF KEY COMPONENTS OF THE BETTER FUTURE ALTERNATIVE.

Better Future Component[a]	Cost
Growth onto irrigated agricultural land	$11,184/AF (one-time)
Active conservation	$8,183/AF (one-time)
Reuse	$13,500/AF (one-time)
Ag-Urban cooperation (leasing)	$410/AF (annual)

a Ag-Urban cooperation (leasing) would be a cost incurred during each year of the leasing period (regardless of whether or not the water is required each year); all other costs are a one-time, up-front cost.

Growth onto Irrigated Lands

As cities grow, their footprint also grows, often displacing agricultural land and altering associated water use. In this analysis, we include all costs of growth-displaced agricultural water, regardless of whether the city or developer pays for it.

To estimate the cost of purchasing water supplies, we rely on the recent cost of Colorado-Big Thompson water. CBT share prices fluctuate from year to year, depending on demands. The City of Longmont increased its fee for cash in lieu of water rights transfers from $9,868/AF to $11,184/AF in May 2012.* For this analysis, we assume water rights cost $11,184/AF.

The question of "who pays" for water supplies does not affect the overall cost analysis of NISP as compared to the Better Future Alternative. Some cities require developers to provide water supplies to a city, others allow developers to pay a fee to cover the city's cost for developing new water supplies, and others allow for a combination of the two. While these arrangements are important for a city's financial planning, they do not affect the overall cost of a water supply. For example, presumably a city will ultimately pass the costs of NISP on to developers, even though the city will pay the up-front cost of developing the project. Likewise, a city could pay for the cost of CBT water, reuse water, or conservation, and then pass those costs on to developers. In

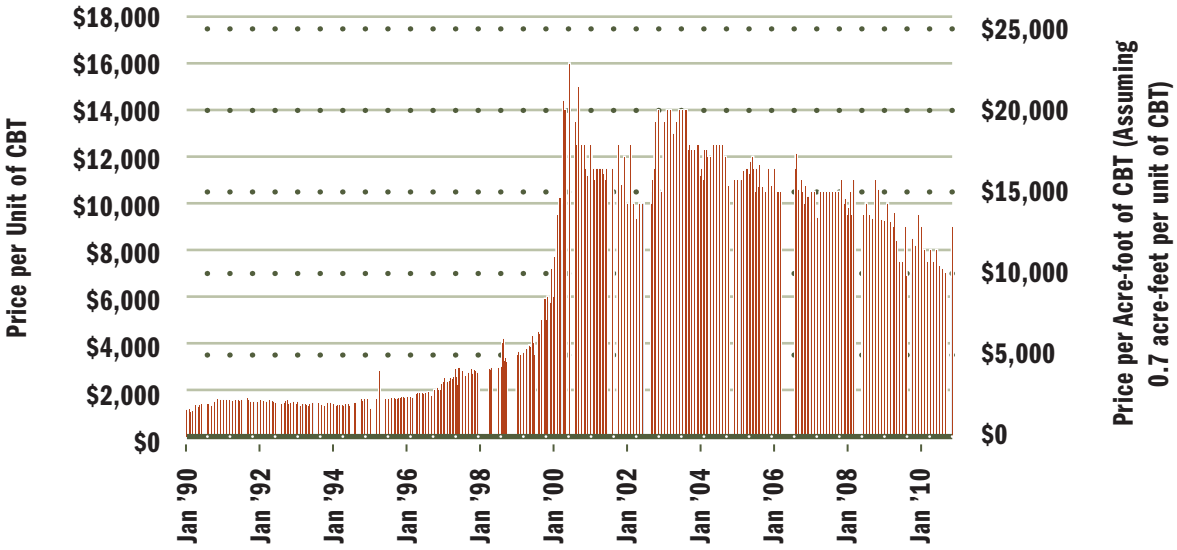
* City of Longmont, Colorado. 2012. "City Council Communication: Resolution Setting the Fee for Cash In Lieu of Water Rights Transfers at $11,184.00 per Acre-Foot." May 8. http://www.ci.longmont.co.us/city_council/agendas/2012/documents/050812_9E.pdf.

Colorado-Big Thompson (CBT) Water Market

An element of the Colorado-Big Thompson project is an active water market. CBT water, which is imported from Colorado's West Slope, is unique in that it can be leased or sold throughout Northern Water's geographic service area with relative ease compared to other water rights. Units are purchased and sold by irrigators and municipalities on a regular basis. As a result, CBT prices impact other water right transaction prices in the area.

Northern Water changes the quota (the volume of water provided per CBT share) regularly to respond to conditions and the needs of CBT users. The delivery in any year is a Northern Water board decision that depends, among other things, on the amount of water that can be put to use. CBT water cannot be imported and then wasted in wet years when demand for supplemental water is low. The chart below shows the historical price per CBT unit or share (left axis) and the price per AF assuming a 0.70 AF/unit quota (right axis). Note that these are prices to purchase CBT units, not lease them.

HISTORICAL PRICE OF COLORADO BIG THOMPSON (CBT) UNITS*



* Leonard Rice Engineers. 2011. "Colorado Big Thompson Water Rights Price Trends." Accessed July 2, 2012. http://lrewater.com/sites/default/files/files/CBT_Water_Rights_Price_Trends.pdf.

order to provide an appropriate comparison, this cost analysis includes all of the new water supplies, regardless of whether the cost is directly borne by developers or the city.

Active Conservation

We include the cost of active conservation savings in excess of those that would result from the low conservation strategy (which we assume will occur whether or not the Better Future Alternative is adopted by NISP participant communities). We estimate the costs of saving 16,800 AF of water* through active, high conservation measures. The SWSI 2010 report estimates that water saved through measures employed under the high conservation strategy typically cost $8,183/AF. While only 60% of the active conservation savings are applied toward meeting demands (40% is held for drought response and to improve system reliability), our analysis reflects the cost of saving the full volume of water (100%). Finally, we assume conservation savings are permanent.

Reuse

As noted above, several NISP participants have plans to develop or expand reuse supplies. Erie, for example, plans to develop 690 AF of reuse water by 2014 and 1,300 AF of reuse water by build-out. Similarly, Lafayette currently reuses almost 1,500 AF of water. We do not, therefore, include these volumes in our cost estimate. The remaining volume of reuse water developed by NISP participants under WRA projections amounts to 3,935 AF in 2060.†

The cost of developing reuse water depends on a host of factors, such as the quality of the wastewater (high dissolved solids, for example, may require reverse osmosis or other treatment), new or expanded transmission and conveyance facilities, the designated use (i.e., potable or nonpotable), and—if direct reuse—the proximity of the wastewater treatment plant to reuse customers.

The Colorado Water Conservation Board estimates the cost of reuse in its *Reconnaissance Level Cost Estimates Report*.‡ According to the report,

* Total Better Future 2060 active conservation savings, less savings attributed to decreased losses and water charges (which should not have conservation costs applied to them), are 29,578 AF. Of this, 14,749 AF can be attributed to savings resulting from the SWSI low conservation strategy, which we assume will occur regardless of NISP or the Better Future Alternative, so low strategy costs are not included. The cost to implement the remaining 16,800 AF of savings from high conservation measures (29,578 – 14,749 = 16,798 AF) is included as a Better Future cost.

† Some of this reuse volume may result from water provided through the Windy Gap Firming Project. While this project may not be built, for simplicity, our cost estimate includes WGFP reusable supplies.

‡ CDM. 2010. *Reconnaissance Level Cost Estimates for Agricultural and New Supply Strategy Concepts*. Prepared for Colorado Water Conservation Board. June 4. http://cwcb.state.co.us/water-management/water-supply-

developing direct, nonpotable reuse has a capital cost of $7,000/AF, whereas indirect potable reuse costs $13,500/AF. The higher cost estimate is based on a hypothetical system similar to the proposed Water, Infrastructure, and Supply Efficiency (WISE) project, in which treated wastewater is discharged into a natural stream, withdrawn, and pumped to South Metro Water Supply Authority cities, where it is treated at a regional treatment facility (using advanced treatment, such as reverse osmosis or ultraviolet radiation). Of note, this treatment process would provide fully potable water. NISP provides high-quality raw water that would still require treatment at cities' treatment plants (or a regional treatment plant). Treatment to potable standards is not included in NISP or in the cost estimates of other elements of the Better Future Alternative. While this is likely more complex and expensive than the probable reuse system that would be developed in NISP participant cities, we use the higher cost estimate ($13,500/AF), which likely represents an upper bound of actual costs.

Ag-Urban Cooperation

Flexible, voluntary transfers of water between agricultural and municipal users represent another component of the Better Future Alternative. These transfers could take many forms; however, in this analysis, we evaluate only the cost of rotational fallowing, using price estimates developed by economists at Colorado State University. Supplies could be relied on in all years or just in times of drought, depending on the structure of agreements. In either case, long-term agreements likely would need to be in place to provide security to both irrigators and municipal water users.

Surveys by researchers at Colorado State University show that a majority of farmers surveyed (75%) indicated a willingness to accept between $225 and $575 per acre fallowed.§ Given the typical consumptive use of water in the region, the median price of leased water would amount to approximately $410/AF. Recent short-term leases on the Front Range exhibit similar prices: Aurora paid farmers in the Rocky Ford-Highline Canal $300/AF for a short-term lease; with revegetation and administrative costs, the total cost was $500/AF.¶ Of note, any fallowing program would have to incorporate the cost of managing the fallowed cropland, which would include revegetation, weed control, and other maintenance costs.

planning/Documents/SWSI2010/Appendix%20N_Reconnaissance%20Level%20Cost%20Estimates%20for%20Strategy%20Concepts.pdf.

§ Pritchett, J., J. Thorvaldson, and M. Frasier. 2008. "Water as a Crop: Limited Irrigation and Water Leasing in Colorado." *Review of Agricultural Economics* 30(3):435-444.

¶ HDR Engineering, Inc. 2008. *Northern Integrated Supply Project Environmental Impact Statement, Water Resources Technical Report*. Prepared for the U.S. Army Corps of Engineers. February.

Better Future Present Value of Costs

Cities and water utilities finance the development of new water supplies in varying ways. Most fund projects through municipal bonds, which are then repaid through tap fees, water rates, and other mechanisms. On rare occasions, cities or utilities fund projects with cash or money that has already been collected through rates or other fees. It is critical that costs are evaluated in terms of the present value — that is, future costs are discounted into present terms. There is a "time value of money" — any money not spent on capital investments, for example, could be gaining interest or used for other needed capital improvements (e.g., highways, libraries, etc.).

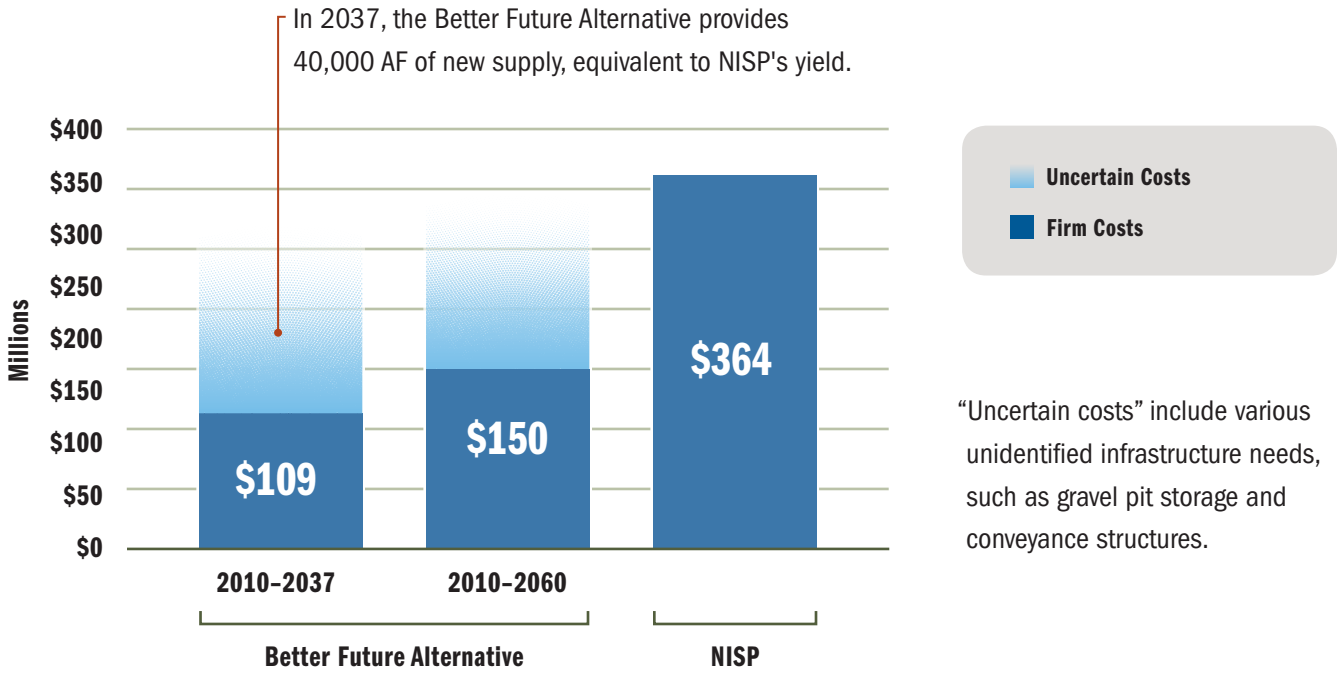
Both public agencies and private businesses evaluate investments in terms of the present value. The discount rate chosen has a substantial effect on the present value of the costs. For this analysis, we calculate the cost (Figure 9) assuming a discount rate of 5% (approximately equal to the current municipal bond rate), which represents the most likely discount rate under present conditions.

A phased approach to developing new supplies allows cities to postpone major investments and also helps cities hedge against the risk of overbuilding supplies and locking existing customers into paying off the debts. This is a particular risk if cities or utilities are counting on new growth (and tap fees) to pay municipal bonds. In Colorado Springs, for example, payments to construct the Southern Delivery System are being funded primarily by existing ratepayers, who have seen double-digit rate increases partially due to slower growth (and thus fewer tap fee sales).*

The present value of costs for Better Future water supplies (Figure 9) are evaluated over the time periods of 2010–2037 (2037 is the year in which the Better Future Alternative provides 40,000 AF of new supply, which is equivalent to the NISP yield) and 2010–2060. We also illustrate conceptually the timing of investments in the Better Future Alternative, broken down by water supply source, for the entire planning period of 2010–2060 (see Figure 10, which assumes that supplies are added incrementally every five years, with the exception of Ag-Urban cooperation, which has annual costs). Not shown in these figures is the cost of storage, pipelines, or other infrastructure that may be required to deliver water to participating cities. Because of these undefined costs, the costs of the Better Future Alternative cannot be directly compared to those of NISP. However, it is important to note that the majority

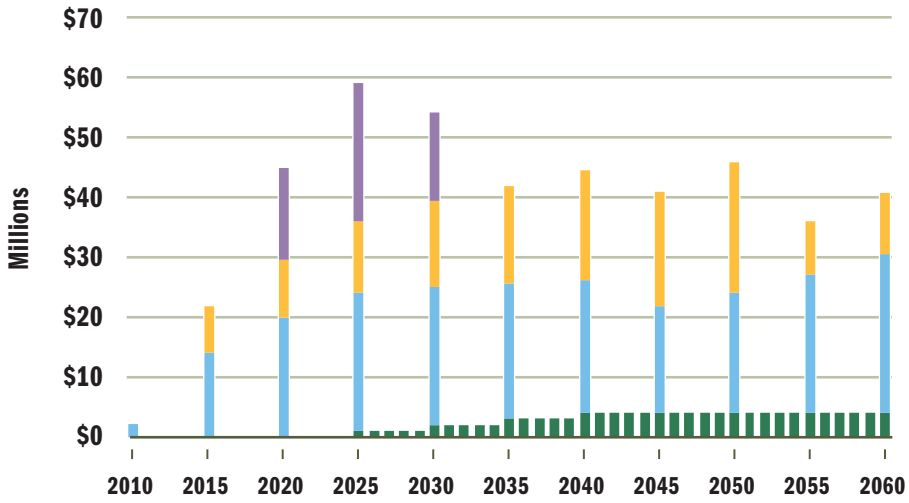
* Colorado Springs Utilities increased water rates by 41% in 2009, 6% in 2010, and was expected to increase rates by 12% per year for the next 6 years. Source: Zubeck, P. 2010. "Paying Through the Hose." *Colorado Springs Independent*, July 8.

FIGURE Nº 9 ESTIMATED NET PRESENT VALUE OF COSTS FOR NISP AND THE BETTER FUTURE ALTERNATIVE.



"Uncertain costs" include various unidentified infrastructure needs, such as gravel pit storage and conveyance structures.

FIGURE Nº 10 ESTIMATED ANNUAL COSTS FOR THE BETTER FUTURE ALTERNATIVE*.



* Five-year intervals are used for planning purposes in both the Harvey Report and the Better Future Alternative. As a result, the Better Future Alternative assumes costs to develop and/or expand reuse programs, active conservation, and growth onto irrigated lands are incurred at five-year intervals. Ag-Urban cooperation would require that irrigators are paid an annual fee whether or not water is being transferred that year, to incentivize them to participate, so Ag-Urban cooperation costs are assumed to be incurred every year.

of NISP capital costs, estimated at approximately $479 million* total, or a present value of $364 million (assuming a 5% discount rate), occur over the next 10 years.†,‡,§ NISP participants also will have additional demands beyond 2030 that are not met by NISP, which will require investment on the part of participants, resulting in costs also not shown.

In this analysis, we address only the capital costs of NISP and the key nonstructural elements of the Better Future Alternative. Both NISP and a Better Future would have annual operations and maintenance (O&M) costs. For NISP, those costs would include operating pumping stations and reservoirs; for a Better Future, those costs could include operating pumping stations and gravel pits. Because we do not include an assessment of infrastructure needs in the Better Future Alternative, it is not possible to estimate annual O&M costs, and not accurate to compare them to NISP's O&M costs.

Finally, the NISP costs do not include uncertain or unforeseen costs. For example, in its comments on the NISP Draft EIS, Fort Collins indicated it may have to upgrade its wastewater treatment facilities in order to meet discharge standards due to the Poudre River's decreased ability to dilute wastewater outflows. This cost may be high but it is uncertain, and, therefore, not included in our cost analysis.

* This amount is slightly lower than costs reported in the news media and on Northern Water's website ($490 million) or through personal communication with Brian Werner, Northern Water ($486.7 million), August 23, 2012. However, it reflects the most detailed cost breakdown WRA had available that sufficiently allowed us to identify the timing of investments in order to estimate a present value cost.

† Integra Engineering and GEI Consultants. 2010. "Northern Integrated Supply Project, South Platte Water Conservation Project Facilities Update and Cost Estimate." Technical Memorandum. January.

‡ Integra Engineering and GEI Consultants, 2010. "Northern Integrated Supply Project, Glade Complex Facilities Update and Cost Estimate." Technical Memorandum – Draft. January.

§ Cost of land acquisition for Glade Reservoir and realignment of Highway 287 only. Source: U.S. Army Corps of Engineers, Omaha District. 2008. *Northern Integrated Supply Project Draft Environmental Impact Statement*. Applicant: Northern Colorado Water Conservancy District. April.

Recommendations

Planning for and meeting the water needs of NISP participant communities is critical, as is ensuring the health of the Poudre River and the recreational, economic, and other benefits it provides. We believe that Northern Water and NISP participants can chart an innovative path forward, one that differs from the traditional approach of building very large reservoirs. The Better Future portfolio instead relies on a combination of supplies from conservation, reuse, water transferred as a result of growth onto irrigated agricultural lands, and voluntary agreements with agriculture.

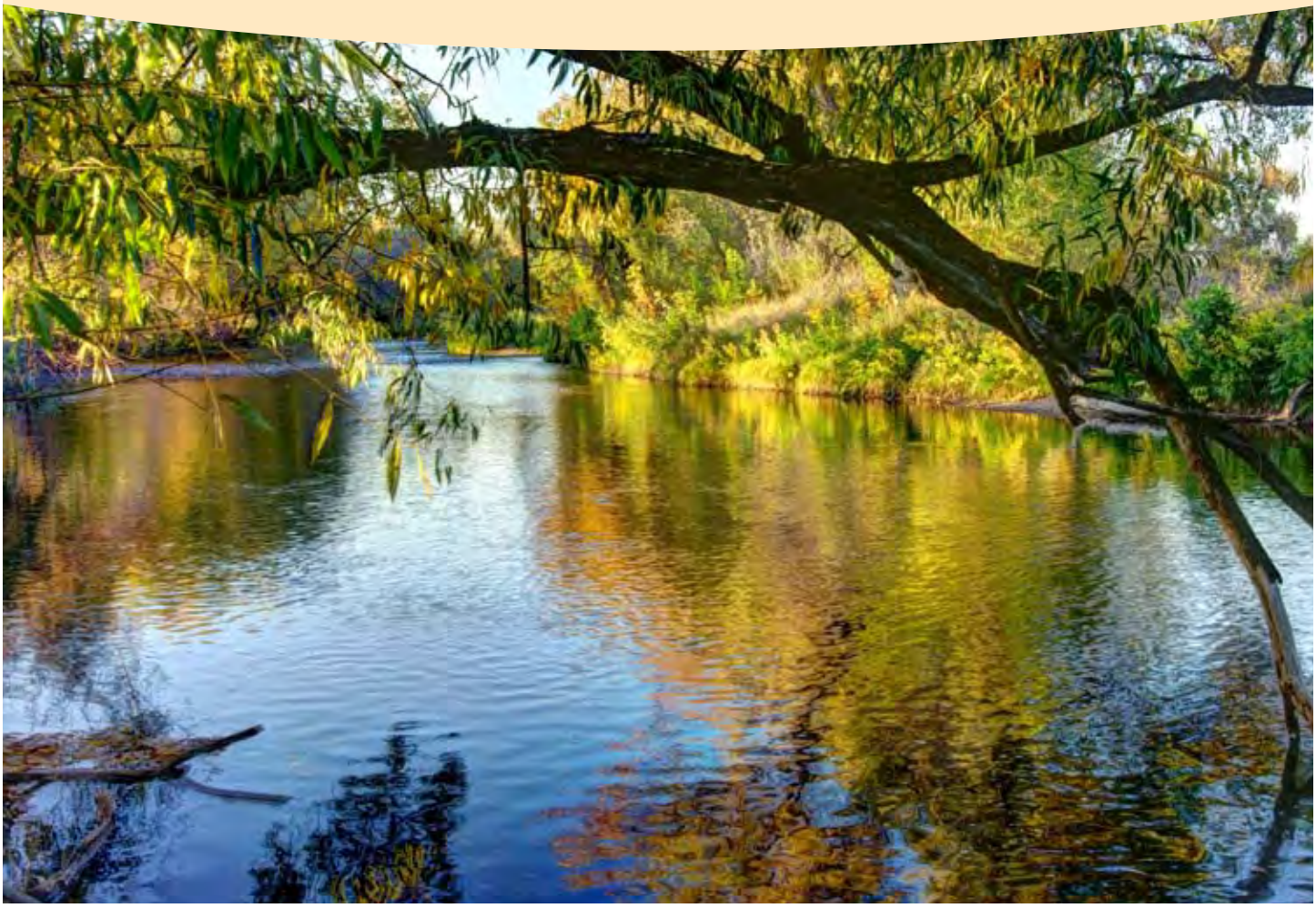
We encourage the U.S. Army Corps of Engineers to incorporate elements of the Better Future Alternative into its No Action Alternative when completing the NISP Supplemental DEIS.

Western Resource Advocates offers the following key recommendations for Northern Water, NISP participants, and the U.S. Army Corps of Engineers to consider carefully in planning for the region's future water needs:

- ✓ Meet projected demands with balanced strategies that are the least environmentally damaging, in contrast to large traditional reservoir and pipeline projects.
- ✓ Protect Colorado's rivers and streams as an integral part of any future water development strategy. Nonconsumptive uses of water—for fishing, boating, and other uses—are extremely valuable to the local economy and are critical to our quality of life.
- ✓ Use reliable and up-to-date population data and projections from the State Demography Office.
- ✓ Implement more aggressive water conservation strategies. Conservation is often the cheapest, fastest, and smartest way to meet new demands, and NISP participants have significant opportunities to boost their existing water conservation efforts.
- ✓ Conservation savings—passive and active—must be integrated into water supply planning.
- ✓ Include all existing supplies, supplies from growth onto irrigated lands, and NISP participants' water dedication requirements in future supply projections
- ✓ Maximize the role of water reuse in meeting future needs. Include NISP participants' existing and planned reuse—as well as additional Better Future reuse supplies—in any analysis.
- ✓ Include increased cooperation between agriculture and local communities in the form of voluntary water sharing agreements that benefit both NISP participants and the agricultural community without permanently drying up irrigated acres. Alternatives to "buy and dry" transfers present excellent opportunities for meeting future municipal demands.

By following these recommendations, NISP communities can more than meet their future water needs while minimizing impacts to rivers and streams.

> At New Belgium, the excellence of our beer and the livelihoods of over 450 people depend on reliable, high-quality water. So both our hearts and our minds demand that we protect the Poudre River. We cannot support a solution that further jeopardizes our environment when there is a portfolio of better options.
>
> —Jenn Vervier, Sustainability Coordinator, New Belgium Brewery



Conclusions

The Better Future Alternative includes a diverse portfolio of water supplies to meet, and exceed, NISP participant demands through 2060. Relying on water from growth onto agricultural lands, conservation, reuse, and cooperative agreements with agriculture, a Better Future provides an alternative to NISP that meets water demands far into the future while maintaining Poudre River flows that are critical to the aquatic environment, recreation, and local economies. The Better Future Alternative includes:

- Total water requirements of 72,100 AF by 2030 and 109,100 AF by 2060 (which is 27,000 AF and 34,300 AF less than Harvey Report projections in 2030 and 2060, respectively)
- 60,550 AF of current firm yield supplies
- Annual firm yield from traditional agricultural transfers from urban growth onto previously irrigated lands of 7,360 AF by 2030 and 19,150 AF by 2060
- Active conservation savings of 6,401 AF by 2030 and 20,482 AF by 2060 applied toward NISP participant demands
- Reuse supplies of 4,900 AF by 2030
- Ag-Urban cooperation supplies of 5,000 AF by 2030 and 10,000 AF by 2060
- Conditional (NISP participant demands are met with or without this project) Windy Gap Firming Project yield (first-time use and reuse) of 5,500 AF by 2030
- Firm yield that exceeds projected demands by 12,100 AF by 2030 and 6,000 AF by 2060 without the WGFP; when the WGFP is included, Better Future supplies exceed demands by 17,700 AF by 2030 and 11,500 AF by 2060

We have been conservative in our analysis of Better Future water supplies, as documented throughout this report and in "Appendix A: Better Future Alternative Safety Factors." As a result, we anticipate that the Better Future Alternative portfolio will yield supplies in excess of those described.

We anticipate that the Better Future Alternative portfolio will yield supplies in excess of those described.

NISP participants will also pursue other supply sources not included in the Better Future Alternative. For example, Erie's water conservation plan says, "Erie anticipates the need to acquire additional water rights to meet future needs. These will likely consist of Windy Gap shares, CBT shares, and ditch water rights."* A Better Future does not include an estimate of these or similar supplies being pursued by other NISP participants. Additionally, the supplies identified are firm yield (i.e., dry year) supplies. In average and wet years, additional water will be available. For example, the Harvey Report includes existing firm yield supplies of 59,400 AF and average year supplies of 82,076 AF. It may be possible to utilize small, incremental storage projects, such as improved gravel pits, to increase firm yields with additional carryover of average and wet year supplies.

The present value cost of the Better Future Alternative to yield 40,000 AF† (NISP's yield) is $109 million, though this doesn't include some infrastructure costs. By relying on a phased approach (i.e., water supplies increase incrementally and do not require a large, up-front investment by participants), a Better Future provides water supply flexibility and financial risk management for communities. If population growth is not as rapid as predicted, communities can delay investment in reuse and water transfers. In contrast, NISP requires large up-front costs, meets demands only through 2030, and diverts critical peak flows from the Poudre River.

The Better Future Alternative is a realistic and reasonable alternative to NISP. The supplies identified in the Better Future portfolio do not require the development of large new reservoirs and river diversions. However, portfolio components may impact streamflows, as historical return flows are reused and if diversion points change as a result of growth on previously irrigated lands or Ag-Urban cooperation. Additionally, water conservation can result in decreased returns flows. New supply development, including the Better Future portfolio, should be undertaken with care to avoid or mitigate significant impacts to stream and ecosystem health.

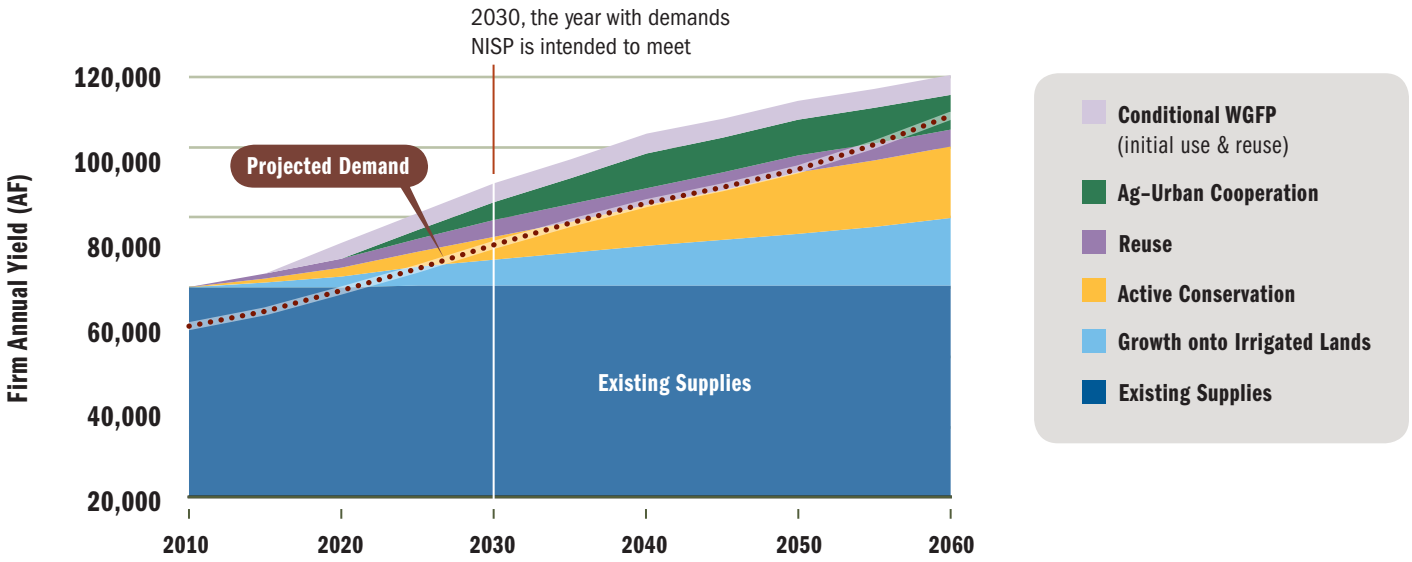
Better Future Alternative portfolio components and projected water requirements are shown in Figure 11. Additional water supply details for the 2010 to 2060 planning period are provided in Table E-1 in Appendix E.

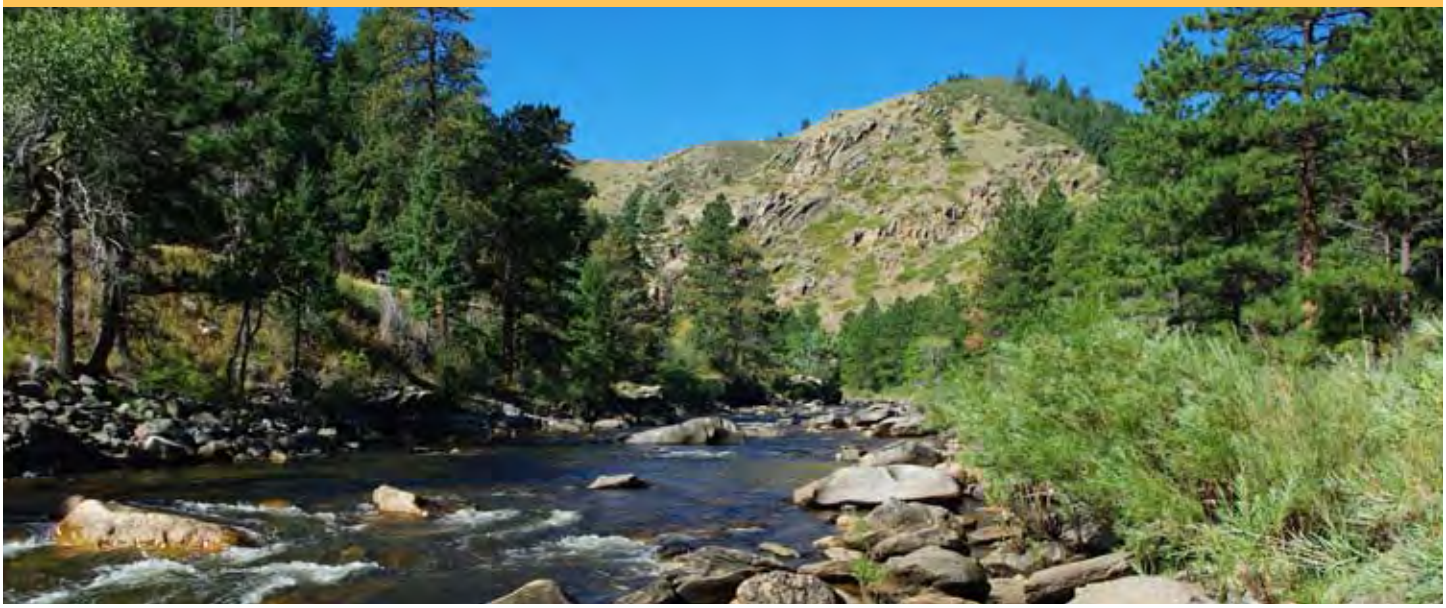
* CDM. 2008. *Town of Erie Water Conservation Plan*. January.

† The Better Future Alternative provides a total of more than 60,000 AF of new firm yield supplies (about 55,000 AF when the WGFP is not included), in addition to existing NISP participant supplies.

> The Better Future Alternative is a common-sense path forward for NISP communities. It protects the Poudre River, safeguards Fort Collins' interests, and provides water to these small towns.
>
> —City of Fort Collins Mayor Pro Tem Kelly Ohlson

FIGURE Nº. 11 BETTER FUTURE ALTERNATIVE SUPPLIES MEET AND EXCEED NISP PARTICIPANTS' PROJECTED 2060 DEMANDS.





> Commercial and private recreational boating opportunities depend on keeping existing flows in the river, and they both provide an important boost to the local economy. I encourage NISP participants to adopt the recommendations listed in the Better Future Alternative Report.
>
> —Patrick Legel, Owner of A Wanderlust Adventure Rafting Company

Appendices

Appendix A describes the various safety factors incorporated throughout this report in order to be conservative in our analysis of Better Future water supplies.

Appendices B-E provide additional details regarding the data, assumptions, and calculations that are the basis of the Better Future Alternative. Data sources include the 2011 Harvey Report, Colorado State Demography Office, and Colorado's 2010 Statewide Water Supply Initiative, among others.

Appendices are not provided for Better Future water supplies that are fully explained in the main report body, e.g., reuse supplies.

- Appendix A: Safety Factors
- Appendix B: Population Projections and Baseline Demands
- Appendix C: Growth onto Irrigated Lands
- Appendix D: Active Conservation
- Appendix E: Summary of Supplies and Demands

Appendix A: Better Future Alternative Safety Factors

Numerous safety factors have been included in the Better Future Alternative to ensure that the alternative provides sufficient supplies to meet future demands. If demands decrease below Better Future projections and/or if additional supplies are realized, that will provide NISP participants with additional security or enable them to scale back and be even more flexible in the supplies they choose to develop. Specific Better Future safety factors are discussed below.

General

- The Harvey Report and the NISP DEIS state that NISP participants are pursuing other supplies in addition to NISP. While there is undoubtedly some overlap with Better Future Alternative supplies, additional supplies that were not included in this analysis will further increase the reliability of NISP participants' systems. For example, Fort Lupton's water conservation plan[*] states that the town has plans to purchase additional Fulton Ditch and Windy Gap shares, but these supplies are not included in the Better Future portfolio. Similarly, Erie's water conservation plan says, "Erie anticipates the need to acquire additional water rights to meet future needs. These will likely consist of Windy Gap shares, CBT shares, and ditch water rights."[†]

Baseline Demands

- To develop baseline demands, the Better Future Alternative applied the 2004–2009 average of 185 gpcd to projected populations. This is higher than the NISP participant average of 177 gpcd that Northern Water frequently refers to[‡,§] and is higher than the current usage rates provided in Table III-1 of the Harvey Report.[¶] If NISP participants are actually using

* Clear Water Solutions, Inc. 2007. *City of Fort Lupton Water Conservation Plan*. August. http://www.fortlupton.org/DEPARTMENTS/FINANCE/water_conservation_plan/Water.pdf.

† CDM. 2008. *Town of Erie Water Conservation Plan*. January.

‡ Northern Water. 2012. *NISP Communities' Water Conservation Efforts: A Key Component to Meeting Future Water Needs.* http://www.northernwater.org/docs/Brochures/conserve_brochure_NISP_Feb2012.pdf.

§ Northern Water. "NISP Participants." Accessed September 6, 2012. http://www.northernwater.org/WaterProjects/NISPParticipants.aspx.

¶ Western Resource Advocates was unable to replicate the data provided in Harvey Report, Table III-1, using the data provided in the report's appendices. Our calculations resulted in higher historical use rates.

less than 185 gpcd currently, demands will be lower than those identified in this report.

- Several high water use customers — including dairies, food and milk processing plants, and power generation facilities — elevate existing per capita use. As populations grow, such large water users will likely account for a smaller percentage of total use, leading to lower total per capita use. No adjustments were made to the Better Future baseline to account for this.

Existing Supplies

- The Harvey Report documents 37,854 AF of existing Colorado-Big Thompson firm yield supplies. This assumes that CBT shares have a firm yield of 0.6 AF. In fact, these shares typically yield more in dry years. For example, in 2012 — a very dry year — CBT shares yielded 1.0 AF. In 2002, CBT shares yielded 0.70 AF. Based on past practice, more CBT water will be available to NISP participants in dry years.

- Fort Lupton's existing supplies decreased from 3,538 AF in the NISP DEIS to 1,864 AF in the 2011 Harvey Report with no explanation (a decrease of 1,674 AF). The Better Future Alternative used the lower 1,864 AF yield number, adjusting it up only by 270 AF to account for the city's existing Fulton Ditch firm yield, which was not accounted for in Harvey Report supplies. If there were an error in the 2011 Harvey Report, Fort Lupton could have as much as 1,674 AF of additional supplies.

- In the Harvey Report, Fort Morgan supplies decreased by 500 AF from the supplies listed in the NISP DEIS with no explanation. A Better Future adjusted Fort Morgan existing supplies up by only 200 AF to account for a math error in Appendix P of the Harvey Report.

- In the Harvey Report, it is unclear if 336 AF of CBT water is accounted for in either Windsor's or Fort Collins–Loveland Water District's firm yield supplies. This existing supply should be included in one of these water provider's supplies but may not be. No adjustments from the Harvey Report data were made in the Better Future Alternative, due to the lack of clarity on this matter.

- The supplies identified in our report are firm yield (i.e., dry year) supplies. In average and wet years, additional water will be available. For example, the Harvey Report states that NISP participants' current firm yield supplies total 59,400 AF, but average year supplies total 82,076 AF. It may be possible to utilize small, incremental storage projects, such as improved gravel pits, to increase firm yields with additional carryover of average and wet year supplies.

Supplies from Growth onto Irrigated Lands

- Better Future calculations of irrigated acreage that will be developed utilize Better Future population projections that are lower than Harvey population estimates. The resulting smaller growth footprint means less water is transferred (from growth onto irrigated lands) than would occur for larger populations.

- Current NISP participant population density is much lower than the 5 people per acre assumed in Better Future calculations. Less dense development would result in a larger growth footprint and more water transferred.

- The Better Future Alternative assumes 1 AF/acre of firm yield from growth on surface-water-irrigated lands and then assumes that water is transferred from only 75% of this land (to account for uncertainty and the complexities associated with changing irrigation water to municipal use), in effect resulting in a low 0.75 AF/acre of firm yield.

- Additional opportunities exist if water used historically for irrigation continues to be used for outdoor irrigation on the same parcel. The full historic yield, rather than just the consumptive use portion, potentially could be utilized. These opportunities were not evaluated in the Better Future Alternative.

- No parcels irrigated by groundwater or a combination of groundwater and surface water were included in our geographical information system (GIS) analysis of the percentage of irrigated acreage in the growth area, though some of this water may be transferred.

- By using the water-supply-limited, non-CBT portion of consumptive use, a Better Future assumes that little or no CBT water is transferred or acquired.

- Many NISP participants have requirements that developers provide sufficient water supplies for new development, including dedication of CBT water in some cases (see sidebar on page 25). The Better Future Alternative includes only the consumptive use portion of water that would be transferred directly from parcels where growth occurs that were previously irrigated by surface water. Additional water dedications required by towns were not included in Better Future supplies.

- The consumptive use portion of transferred agricultural water would be reusable. No reuse of these supplies is included in Better Future calculations.

Conservation

- Only 60% of active high conservation strategy savings were applied to meet future demands, while 40% is retained (not included in the Better Future Alternative portfolio) for assumed use to improve system reliability and provide for drought response.

- Conservation savings were applied to current baseline per capita use rates, though these are skewed higher by several very large water users, including dairies, food processors, and power generation facilities. As residential populations grow, these customers will account for a smaller percentage of total water use, decreasing per capita use rates. A Better Future did not adjust for this and instead worked off the higher rates. (Note this safety factor was also discussed under "Baseline Demands." Here we discuss the relationship to active savings.)

- Conservation savings were based on the SWSI South Platte Basin assumed percentage reduction in per capita use (38.3%) by 2050 rather than SWSI's high conservation scenario per capita use rate of 116 gpcd for 2050, which would result in lower demands. Table D-1 in Appendix D shows that when losses are added in to be comparable to SWSI data, the Better Future Alternative results in 2050 use of 122 gpcd, which is higher than SWSI's 116 gpcd.

- Projected water charge percentages from the Harvey Report (applied to water deliveries) were maintained, though these could decrease over time as treating utilities charge a smaller percentage as volumes increase. Also, as their use increases, NISP participants, who currently pay water charges, may find that it is more cost-effective to treat their own water, which would eliminate water charges.

- The Harvey Report water loss percentage of 7% (applied to water deliveries) was maintained, though utilities will likely—and should—decrease water losses (as a percentage of deliveries) over the next 50 years.

Reuse

- The Better Future Alternative calculated reuse only for participants with 2,000 AF or more of existing reusable supplies yield. An additional 4,900 AF of existing reusable supplies (including WGFP) were not included in Better Future calculations for participants with supplies below the 2,000 AF threshold.

- Most reusable supplies can be used to extinction. A Better Future evaluated only first-time reuse.

- Though many new supplies acquired will be reusable, a Better Future does not include reuse from those supplies here. For example, agricultural water

transferred as a result of growth or via Ag-Urban cooperation will provide additional reuse opportunities not accounted for in the Better Future Alternative. Using the reuse assumptions discussed above, the 19,150 AF yield from growth onto irrigated lands has the potential for over 8,600 AF of first-time reuse.

- A Better Future includes 1,300 AF of Erie reuse per Erie's nonpotable master plan. The state's Water Supply Future Portfolio and Trade-off Tool* includes much more reuse by Erie, ranging from 3,700 to 4,300 AF. A Better Future relies on the lower estimates from Erie's planning documents rather than the higher state estimate.

Cost Analysis

- NISP participants will have additional demands beyond 2030 that are not met by NISP, which will require investment on the part of participants. These costs are not included in our analysis but are critical to consider when comparing NISP and the Better Future Alternative.

- Only the Better Future includes costs associated with water transferred from growth onto irrigated lands, though this water will most likely be transferred to NISP participants under both NISP and Better Future scenarios.

- Reuse unit cost assumptions are based on an expensive indirect use project with many miles of pipelines, pumping, and water treatment to provide for potable use. NISP participant reuse would likely be much less expensive, being more localized and possibly being used primarily to meet nonpotable demands.

- The Better Future Alternative incurs all active conservation costs between the SWSI low and high conservation strategies even though NISP participant water conservation plans may already exceed low strategy programs and measures.

* Colorado Department of Natural Resources, Colorado Water Conservation Board. 2010. "Colorado's Water Supply Future Portfolio and Trade-off Tool." Available at http://cwcb.state.co.us/technical-resources/portfolio-tool/Pages/main.aspx.

Appendix B: Better Future Alternative Population Projections and Baseline Demands

Population Projections

The Better Future Alternative is based on Colorado State Demography Office (SDO) county population estimates† through 2040 (the last year for which state projections are available) and Harvey Report growth rates from 2041 through 2060.

† Population forecasts ***are not*** available for municipalities. Forecasts are available for counties and sub-state regions only.

TABLE B-1 ANNUAL GROWTH RATES FOR NISP PARTICIPANTS CALCULATED FROM FIVE-YEAR DATA.

Year	Better Future	Harvey Report		State Demography Office Annual Growth Rate for Period[a]				
	Growth Rate (annual % increase)	Population	Growth Rate (annual % increase)	Boulder County	Larimer County	Morgan County	Weld County	Weighted NISP SDO Growth Rate
A	B	C	D	E	F	G	H	I
Est. % 2009 Population	–	–	–	22%	14%	9%	55%	–
2009	–	204,285	–	–	–	–	–	–
2010	1.51	211,404	3.48	0.6	1.1	0.6	2.1	1.51
2015	1.85	244,445	2.95	1.1	1.6	1.1	2.3	1.85
2020	2.36	281,746	2.88	1.2	2.0	1.6	3.0	2.36
2025	2.43	322,743	2.75	1.1	1.9	1.8	3.2	2.43
2030	2.17	365,661	2.53	0.9	1.6	1.7	2.9	2.17
2035	1.92	404,864	2.06	0.7	1.4	1.7	2.6	1.92
2040	1.71	435,559	1.47	0.6	1.2	1.6	2.3	1.71
2045	1.28	464,078	1.28	–	–	–	–	–
2050	1.35	496,296	1.35	–	–	–	–	–
2055	1.45	533,285	1.45	–	–	–	–	–
2060	1.54	575,639	1.54	–	–	–	–	–

a Source for county data: Colorado Department of Local Affairs, State Demography Office. 2011. "Population Totals for Colorado Counties." Updated September. http://www.colorado.gov/cs/Satellite?c=Page&childpagename=DOLA-Main%2FCBONLayout&cid=1251593346867&pagename=CBONWrapper.

TABLE B-2 NISP PARTICIPANT POPULATION PROJECTIONS.

Year	Harvey Report Population	Better Future Population	Change in Population From Harvey Report
A	B	C	D
2009	204,285	204,285	0
2010	211,404	207,363	-4,041
2015	244,445	227,255	-17,190
2020	281,746	255,379	-26,367
2025	322,743	287,958	-34,785
2030	365,661	320,576	-45,085
2035	404,864	352,483	-52,381
2040	435,559	383,648	-51,911
2045	464,078	408,768	-55,310
2050	496,296	437,147	-59,149
2055	533,285	469,727	-63,558
2060	**575,639**	**507,033**	**-68,606**

Table B-1 compares the average annual assumed growth rate for NISP participants in the Harvey Report (column D) with State Demography Office projected growth rates for NISP participant counties (columns E, F, G, and H). Harvey Report growth rates (column D) were calculated by WRA based on population data for individual NISP participants provided in Harvey Report appendices. WRA summed these data to total annual NISP population projections (column C) and calculated the annual growth rate (column D). Better Future growth rates (column B) are weighted SDO rates (column I) through 2040 and Harvey Report rates after that. Weighted NISP SDO growth rates (column I) were developed by multiplying SDO county projections (columns E through H) by the estimated percentage of 2009 NISP population in each county from the "Est. % 2009 Population" row (when a NISP participant serves more than one county, the population was assumed to be evenly distributed among those counties).

Table B-2 shows the Better Future Alternative population projections as compared to Harvey Report projections.

Baseline Demands

Table B-3 shows NISP historical populations, water deliveries, and average per capita usage calculated by WRA using data provided in the Harvey Report appendices. Harvey Report demand projections are based on unsupported rates that are higher than recent historical usage (Table B-4, column B). Recent average (2004–2009) use was 185 gpcd. This is the assumed baseline used in the Better Future Alternative. A Better Future then adjusts baseline demands to incorporate passive water conservation from 2010 through 2050 according to SWSI percentage saving (10.2% savings) estimates. The per capita usage rate (Table B-4, column F) was then held constant from 2050 to 2060 since no additional savings are estimated by SWSI for this period.

SWSI projects South Platte Basin municipal and industrial passive savings ranging from 6.0% to 10.2% in the South Platte Basin by 2050.* The Better Future Alternative applies passive conservation savings of 10.2%,† which results in a 2050 through 2060 per capita use rate of 166 gpcd (Table B-4). Better Future annual deliveries were calculated by applying baseline per capita use rates to Better Future population projections. The projected percentage water charges and losses in the Harvey Report analysis (Table B-4, column E) ranged from 13% to 15%. The Better Future Alternative assumes the same annual rates for charges and losses. Better Future total water requirements (Column I) were calculated by applying Harvey Report loss and water charge percentages to annual deliveries.

TABLE B-3 HISTORICAL WATER USE AND POPULATIONS FOR NISP PARTICIPANTS FROM HARVEY REPORT DATA.[A]

Year	Population	Water Deliveries (AF)	Average Per Person Use (gpcd)
A	B	C	D
1999	121,362	27,411	202
2000	130,332	33,612	230
2001	141,407	35,236	222
2002	150,211	34,522	205
2003	159,542	31,930	179
2004	170,558	34,458	180
2005	184,394	37,424	181
2006	192,344	43,156	200
2007	195,723	43,198	197
2008	200,213	42,108	188
2009	204,285	37,852	165
2004–2009 Average			**185**

a Annual totals and per capita data calculated by Western Resource Advocates using individual NISP participant data provided in Harvey Report, Appendices A through O.

* Colorado Department of Natural Resources, Colorado Water Conservation Board. 2011. "Appendix L: SWSI 2010 Municipal and Industrial Water Conservation Strategies," prepared by Aquacraft, Inc. and Headwaters Corporation, January 2011. In *Colorado's Water Supply Future, Statewide Water Supply Initiative 2010, Final Report*. January.

† The higher end of the SWSI passive savings range was used because the Better Future Alternative projects that NISP participant populations will increase by nearly 150% from 2009 to 2060. As a result, the majority of homes and businesses will be new and so will use less water as a result of passive conservation. Additionally, because of the long 50-year Better Future planning period, many existing home will have to replace less efficient fixtures and appliances.

TABLE B-4 BETTER FUTURE ALTERNATIVE BASELINE PER CAPITA USE, WATER DELIVERIES, AND TOTAL WATER REQUIREMENTS COMPARED TO THOSE FROM THE HARVEY REPORT.

Year	Harvey Report[a]				Better Future Alternative			
	Per Capita Use (gpcd)	Water Deliveries (AF)	Total Water Requirements (AF)	Annual Loss and Water Charges[b] (% of Water Deliveries)	Baseline Per Capita Use (gpcd)	Population	Water Deliveries[c] (AF)	Total Water Requirements[d] (AF)
A	B	C	D	E	F	G	H	I
2009	165	37,852	42,786	13%	NA	204,285	–	–
2010	193	45,820	51,900	13%	185	207,363	43,051	48,764
2015	203	55,480	63,300	14%	183	227,255	46,579	53,145
2020	208	65,490	74,800	14%	181	255,379	51,668	59,013
2025	211	76,310	86,800	14%	178	287,958	57,497	65,401
2030	212	86,770	99,000	14%	176	320,576	63,161	72,064
2035	209	94,640	108,300	14%	174	352,483	68,515	78,404
2040	205	100,260	114,700	14%	171	383,648	73,557	84,151
2045	202	105,180	120,400	14%	169	408,768	77,291	88,475
2050	199	110,880	127,400	15%	166	437,147	81,500	93,642
2055	196	117,160	134,800	15%	166	469,727	87,574	100,759
2060	193	124,250	143,400	15%	166	507,033	94,529	109,098
2010 to 2060 % change	0.4%				-10.2%	–	–	–

a WRA calculations based on data in Harvey Report, Appendices A through O.

b Calculated as the difference between total water requirements (column D) and water deliveries (column C) divided by water deliveries (column C).

c Water deliveries calculated by applying Better Future baseline per capita use (column F) by Better Future population projections (column G).

d Total water requirements calculated by multiplying Better Future water deliveries (column H) by Harvey Report annual loss and water charge percentage for that year (column E) and adding that to water deliveries (column H).

Appendix C: Better Future Alternative Growth onto Irrigated Lands

The Better Future Alternative includes supplies transferred from direct growth by NISP communities onto lands that were previously irrigated. This differs from the Harvey Report, which didn't include any water from this source, though such transfers frequently occur. A Better Future projects the total NISP population to increase, from 2009, by approximately 116,300 by 2030 and 302,750 people by 2060. Assuming new development will be relatively dense at 5 people per acre, which is higher than current population densities for the NISP participants (see Table 1, main report body), results in an estimated 60,550 acres being developed. This is a significantly smaller footprint than what would result if current densities were used in estimates.

The volume of water available to be transferred is site- and situation-specific. The Better Future Alternative relies, in part, on data presented in the NISP No Action Alternative* (NAA) and SWSI. The NAA documents the average supply-limited consumptive use (CU) per acre for the several South Platte River sub-basins. The average supply-limited CU for all basins was 1.12 AF/acre (NAA, Table 5). For the NAA, supply-limited consumptive use for specific ditches selected for the alternative was then further adjusted to remove CU resulting from Colorado-Big Thompson deliveries (NAA, Table 6). This was done because CBT water isn't tied to specific parcels as other water rights are so can be moved around. As a result, CBT water is very desirable and may or may not be available for transfer to NISP participants. For the Poudre Basin, the NAA assumed the average transferable CU was 0.70 AF/acre. For the South Platte Basin, the NAA assumed the average transferable CU was 1.13 AF/acre.† SWSI 2010 data shows an average South Platte Basin water supply limited CU of 1.34 AF/acre.‡ Based upon the NAA and SWSI data, a Better Future assumes an average water supply limited transferable CU of 1.0 AF/acre.

Using irrigated crop data layers (2005) from Colorado's Decision Support System, WRA estimates that, on average, 42% of land surrounding NISP communities where growth would occur is currently agricultural land that is irrigated by surface water. This results in growth by NISP communities onto

* MWH. 2010. *Northern Integrated Supply Project No Action Alternative*. Prepared for Northern Colorado Water Conservancy District. April.

† Note that the NAA Table 6 incorrectly lists the South Platte average as 0.77 AF/acre. Calculations erroneously did not include Farmers Independent Ditch. When this ditch is included, the South Platte average is 1.13 AF/acre.

‡ Calculated by WRA using data provided in SWSI 2010 (Table 4-12): 1,117,000 AF water supply limited CU divided by 831,000 acres.

25,534 surface water irrigated acres (42% of 60,550 developed acres is 25,534 acres). WRA's analysis did not include parcels irrigated by groundwater or parcels where both groundwater and surface water are applied. Additionally, the Better Future Alternative further limits water from this source by assuming that only 75% of the water historically used for agriculture is transferred, resulting in 7,356 AF in 2030 and 19,150 AF by 2060 (Table C-1).

TABLE C-1 WATER SUPPLIES FROM NISP PARTICIPANT GROWTH ONTO IRRIGATED LANDS.

Year	Better Future Cumulative Increase in Population	Cumulative Developed Land[a] (acres)	Traditional Ag Transfers from Developed Lands[b] (AF)
A	B	C	D
2009	–	–	–
2010	3,078	616	195
2015	22,970	4,594	1,453
2020	51,094	10,219	3,232
2025	83,673	16,735	5,293
2030	116,291	23,258	7,356
2035	148,198	29,640	9,374
2040	179,363	35,873	11,345
2045	204,483	40,897	12,934
2050	232,862	46,572	14,729
2055	265,442	53,088	16,790
2060	**302,748**	**60,550**	**19,150**

a Calculated by dividing cumulative change in population (column B) by the assumed density of 5 people per acre.

b Calculated by multiplying developed acreage (column C) by average surface-water-irrigated percentage of 42.2%, and then applying 1.0 AF for each acre and multiplying that by the 75% assumed transfer rate.

Appendix D: Better Future Alternative Active Conservation

Better Future passive conservation savings are accounted for in baseline demand projections. Active conservation will result in additional savings. SWSI* includes high, medium, and low conservation strategies, which include both passive and active conservation savings (Table D-2). The Better Future Alternative assumes high conservation savings will be achieved by 2050, over a 40-year period. A Better Future applies 60% of active conservation savings to future demands and reserves the remaining 40% for drought response and system reliability.

SWSI's high conservation strategy is projected to decrease water use from 188 gpcd to 116 gpcd in 2050 in the South Platte Basin, a savings of 38.3% (Table D-1). Because the 38.3% savings also includes passive savings of 10.2% (already accounted for in Better Future baseline demands), a Better Future assumes active conservation savings equalling 28.1%. Applying passive and active conservation to Better Future historical use of 185 gpcd results in 2050 per capita use of 114 gpcd. SWSI estimates include system losses of 7%, which are comparable to the 7% system loss assumed in the Harvey Report, Table II-3, and the Better Future Alternative.

To compare Better Future per capita use rates with the SWSI data, losses must be included. When 7% system loss is added to the Better Future Alternative, recent average historical use increases from 185 gpcd (based on water deliveries) to 198 gpcd (water deliveries plus system losses), and 2050 use—with passive and active conservation—increases from 114 to 122 gpcd. Resulting Better Future rates are higher than SWSI high conservation strategy use rates.

TABLE D-1 SWSI AND BETTER FUTURE ALTERNATIVE PER PERSON WATER USE ASSUMPTIONS.

	SWSI	Better Future
Historical use including system loss	188 gpcd[a]	198 gpcd
Historical use without system loss	---	185 gpcd
2050 use with conservation and system loss	116 gpcd[a]	122 gpcd
Percent conservation savings	38.3%[b]	38.3%
2050 use not including system loss	108 gpcd[b]	114 gpcd
System loss	7%[a]	7%

a Data from Colorado Department of Natural Resources, Colorado Water Conservation Board. 2011. Tables 8 and 16 of "Appendix L: SWSI 2010 Municipal and Industrial Water Conservation Strategies," prepared by Aquacraft, Inc. and Headwaters Corporation, January 2011. In *Colorado's Water Supply Future, Statewide Water Supply Initiative 2010, Final Report*. January.

b Data calculated by WRA based on data from the same tables in the source listed above.

* Colorado Department of Natural Resources, Colorado Water Conservation Board. 2011. "Appendix L: SWSI 2010 Municipal and Industrial Water Conservation Strategies," prepared by Aquacraft, Inc. and Headwaters Corporation, January 2011. In *Colorado's Water Supply Future, Statewide Water Supply Initiative 2010, Final Report*. January.

TABLE D-2 ASSUMED IMPLEMENTATION AND PENETRATION LEVELS (BY 2050) FOR THE THREE SWSI CONSERVATION STRATEGIES.*

Measure	Implementation or Penetration Level by 2050		
	Low Strategy	Medium Strategy	High Strategy
System-wide conservation measures with potential to impact all customers			
• Public information and education	~100%	~100%	~100%
• Integrated resources planning	~100%	~100%	~100%
• Conservation-oriented water rates	~100%	~100%	~100%
• Water budget-based water rates	<=10% of utilities implement	<=30% of utilities implement	<=50% of utilities implement
• Conservation-oriented tap fees	0–5% of utilities implement	5–10% of utilities implement	<=50% of utilities implement
• Smart metering with leak detection	<=10% of pop.	<=50% of pop.	50–100% of pop.
Residential indoor savings and measures			
Reduction in Residential Per Capita Indoor Use	**Res. Indoor gpcd = 40**	**Res. Indoor gpcd = 35**	**Res. Indoor gpcd = 30**
• Conservation-oriented plumbing and building codes, green building, rules for new residential construction	30–50% of state impacted	50–70% of state impacted	70–100% of state impacted
• High efficiency toilets, clothes washers, faucets, and showers	Passive ~100%	Passive ~100%	Passive ~100%
• Submetering of new multi-family housing	0%	~50%	~100%
• Reduction in customer side leakage	33% savings - passive from toilet replacement	37% savings - passive from toilet replacement and active repairs	43% savings - passive from toilet replacement and active repairs
Non-residential indoor savings and measures			
Reduction in Non-Residential Per Capita Indoor Use	**15% reduction**	**25% reduction**	**30% reduction**
• High efficiency toilets, urinals, clothes washers, faucets, and CII equipment	Passive ~100%	Passive ~100%	Passive ~100%
• Conservation-oriented plumbing and building codes, green building, rules for new non-residential construction	30–50% of state impacted	50–70% of state impacted	70–100% of state impacted
• Specialized non-residential surveys, audits, and equipment efficiency improvements	0–10% of utilities implement	10–50% of utilities implement	50–80% of utilities implement
Landscape conservation savings and measures†			
Landscape water use reductions (residential and non-residential)	**15% reduction**	**22–25% reduction**	**27–35% reduction**
• Targeted audits for high demand landscape customers	0–30% of utilities implement	30–50% of utilities implement	50–80% of utilities implement
• Landscape transformation of some high water requirement turf to low water requirement plantings	<=20% of landscapes	20–40% of landscapes	>50% of landscapes
• Irrigation efficiency improvements	<=10% of landscapes	<=50% of landscapes	50–100% of landscapes
Utility water loss control			
• Improved utility water loss control measures	<=7% real losses	<=6% real losses	<6% real losses

* Colorado Department of Natural Resources, Colorado Water Conservation Board. 2011. "Appendix L: SWSI 2010 Municipal and Industrial Water Conservation Strategies," prepared by Aquacraft, Inc. and Headwaters Corporation, January 2011. In *Colorado's Water Supply Future, Statewide Water Supply Initiative 2010, Final Report*. January.

† Landscape water demand reductions include the anticipated impact of urban densification.

The Better Future Alternative assumes that only 60% of active conservation savings are applied to meet future demands. Active conservation, phased in over time, results in applied (60% of total) savings of 6,401 AF in 2030 and 20,482 AF in 2060 (Table D-3). These savings include decreases in water charges.

TABLE D-3 PASSIVE AND ACTIVE CONSERVATION SAVINGS AND RESULTING DECREASES IN WATER CHARGES.

Year	Better Future Population	Per Capita Use with Passive and Active Conservation[a] (gpcd)	Water Deliveries[b] (AF)	Annual Loss and Water Charges[c]	Water Requirements[d] (AF)	Baseline Water Requirements[e] (AF)	Active Savings[f] (AF)	60% Active Savings Applied[g] (AF)
A	B	C	D	E	F	G	H	I
2010	207,363	185	43,051	13%	48,764	48,764	0	0
2015	227,255	176	44,922	14%	51,254	53,145	1,891	1,134
2020	255,379	168	47,943	14%	54,759	59,013	4,254	2,552
2025	287,958	159	51,198	14%	58,236	65,401	7,165	4,299
2030	320,576	150	53,811	14%	61,395	72,064	10,668	6,401
2035	352,483	141	55,663	14%	63,698	78,404	14,706	8,824
2040	383,648	132	56,772	14%	64,948	84,151	19,202	11,521
2045	408,768	123	56,426	14%	64,592	88,475	23,884	14,330
2050	437,147	114	55,999	15%	64,342	93,642	29,300	17,580
2055	469,727	114	60,173	15%	69,232	100,759	31,527	18,916
2060	507,033	114	64,952	15%	74,962	109,098	34,136	20,482

a Applies SWSI 38.3% savings by 2050 to historical use rate of 185 gpcd for NISP participants.

b Deliveries were calculated by applying per capita use rate (column C) to Better Future population (column B).

c Harvey Report annual percentage loss and water charges were calculated by WRA using data in Harvey Report, Appendices A through O.

d Calculated by applying loss and water charge percentage (column E) to deliveries (column D). These are water requirements with passive and active conservation savings applied.

e From Table B-4, column I. These are water requirements with only passive conservation savings applied.

f Difference between baseline water requirements (column G) and requirements after active conservation savings (column F).

g 60% of savings from active conservation applied to the Better Future Alternative to meet future demands; 40% retained as a buffer (not included in Better Future supplies) for drought protection and to improve system reliability.

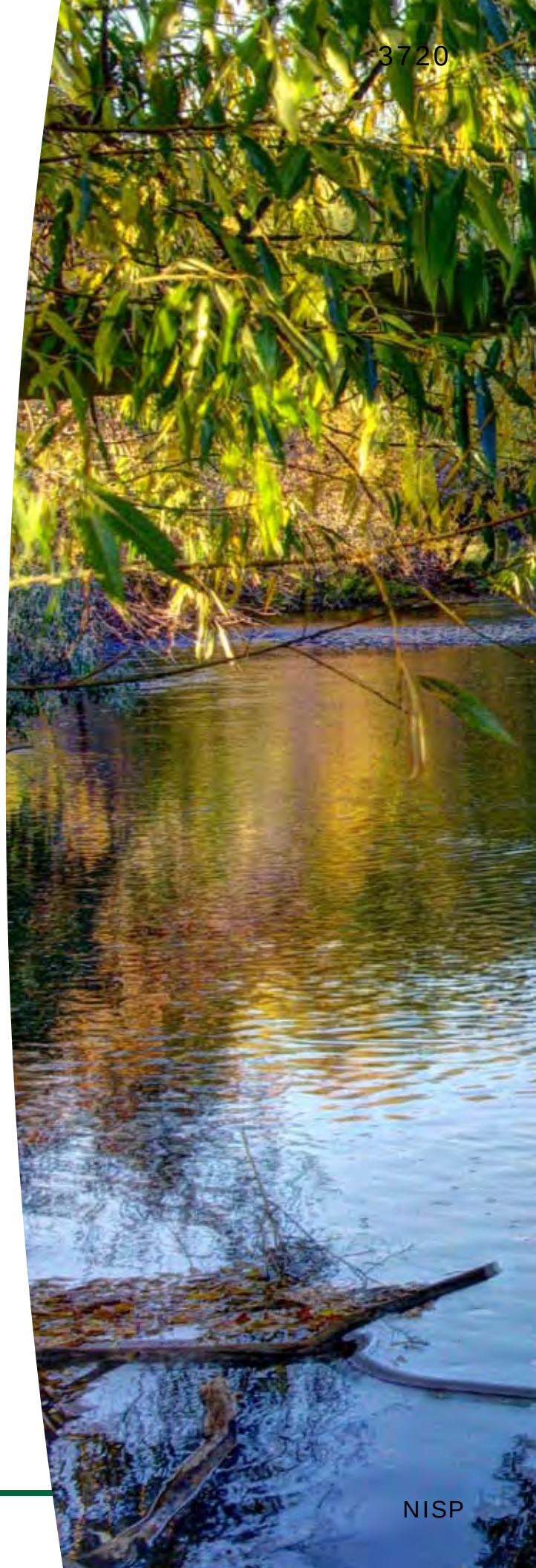
Appendix E: Better Future Alternative Summary of Supplies and Demands

Table E-1 summarizes all Better Future demands and supplies for the 2010 to 2060 planning period. A supply surplus exists in every year, without (column H) and with (column J) the Windy Gap Firming Project.

TABLE E-1 SUMMARY OF BETTER FUTURE SUPPLIES AND DEMANDS.

	Better Future Alternative (AF)									Additional Supplies Not Included in Better Future Yields (AF)	
Year	Total Water Requirements	Existing Supplies	Growth onto Irrigated Lands	Active Conservation (60% applied)	Reuse	Ag-Urban Cooperation	Supply Surplus without WGFP (AF)	Conditional WGFP (Initial Use and Reuse)	Supply Surplus with WGFP (AF)	Average Year Existing Supplies in Excess of Firm Yield[a]	Reserved (40%) Active Conservation Savings
A	B	C	D	E	F	G	H	I	J	K	L
2010	48,764	59,870	195	0	0	0	11,301	0	11,301	22,469	0
2015	53,145	59,870	1,453	1,134	1,479	0	10,792	0	10,792	22,469	756
2020	59,013	59,870	3,232	2,552	2,621	0	9,262	4,390	13,652	22,469	1,702
2025	65,401	60,550	5,293	4,299	3,763	2,500	11,004	4,949	15,953	22,469	2,866
2030	72,064	60,550	7,356	6,401	4,905	5,000	12,148	5,509	17,657	22,469	4,267
2035	78,404	60,550	9,374	8,824	4,905	7,500	12,749	5,509	18,258	22,469	5,882
2040	84,151	60,550	11,345	11,521	4,905	10,000	14,171	5,509	19,680	22,469	7,681
2045	88,475	60,550	12,934	14,330	4,905	10,000	14,244	5,509	19,753	22,469	9,554
2050	93,642	60,550	14,729	17,580	4,905	10,000	14,122	5,509	19,631	22,469	11,720
2055	100,759	60,550	16,790	18,916	4,905	10,000	10,402	5,509	15,911	22,469	12,611
2060	109,098	60,550	19,150	20,482	4,905	10,000	5,988	5,509	11,497	22,469	13,654

a Additional supplies identified in the Harvey Report that are available in average and wet years.



> This report needs to be read by every decision maker interested in Northern Colorado water supply planning. The report examines basic population and water use assumptions and demonstrates how those assumptions affect future projected firm water supply needs. Better Future alternatives are presented and analyzed. The report is a must read.

—Gerry Horak, Fort Collins City Councilmember

WESTERN RESOURCE ADVOCATES

ADDENDUM FOR 6/24, 7/08 AND 7/15

LARIMER COUNTY | Community Development

P.O. Box 1190, Fort Collins, Colorado 80522-1190, Planning (970) 498-7683 Building (970) 498-7700, Larimer.org

MEMO

To: Larimer County Planning Commission

From: Community Development Staff

Date: June 24, 2020

RE: Addendum to Staff Report for NISP 1041
File #20-ZONE2657

Attached to this memo please find the following information received by staff after June 9, 2020 and since the packet for the June 24th meeting was published and posted.

1. Public comments: Comments in the form of email strings, letters including Sierra Club, and correspondence to the ACOE from Save the Poudre

2. Applicant information: Supplemental information received from the applicant with respect to traffic and construction responding to initial staff comments

3. Referral Agency response: Comments from the Wellington Fire District – Access to 287 and water supply concerns

Public Comments

Meyer Glitzenstein & Eubanks LLP

4115 Wisconsin Avenue, N.W., Suite 210
Washington, D.C. 20016
Telephone (202) 588-5206
Fax (202) 588-5049
lmink@meyerglitz.com

2601 S. Lemay Ave.
Unit 7-240
Fort Collins, CO 80525
Telephone (970) 703-6060
Fax (202) 588-5049
beubanks@meyerglitz.com

March 12, 2019

Via E-Mail
John Urbanic, NISP EIS Project Manager
U.S. Army Corps of Engineers, Omaha District
Denver Regulatory Office
9307 S. Wadsworth Blvd.
Littleton, CO 80128
nisp.eis@usace.army.mil

Re: Request For Supplemental NEPA Review By The Corps For The Northern Integrated Supply Project In Light Of Significant New Information Bearing On The Proposed Action

On behalf of the nonprofit organization Save The Poudre, I hereby request that the U.S. Army Copy of Engineers ("Corps") conduct supplemental environmental analysis pursuant to the National Environmental Policy Act ("NEPA"), 42 U.S.C. §§ 4321-4370m, by preparing a supplemental environmental impact statement ("SEIS") or, at bare minimum, a supplemental environmental assessment ("EA") to address and evaluate new circumstances and significant information relevant to this project and its environmental impacts. As explained below, **we request a response from the Corps by no later than March 29, 2019** informing Save The Poudre whether the Corps intends to conduct any supplemental NEPA review, and, if not, explaining the reasons why the Corps has declined to take this action.

BACKGROUND

I. STATUTORY AND REGULATORY FRAMEWORK

Congress created NEPA more than four decades ago "[t]o declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment . . . ." 42 U.S.C. § 4321. In light of this mandate, the Supreme Court has reasoned that NEPA is "intended to reduce or eliminate environmental damage and to promote 'the understanding of the ecological systems and natural resources important to' the United States." *Dep't of Transp. v. Pub. Citizen*, 541 U.S. 752, 756 (2004) (quoting 42 U.S.C. § 4321).

In achieving NEPA's substantive goals, Congress created two specific mechanisms through which federal agencies must evaluate the environmental and related impacts of a

particular federal action—an EIS and an EA. *See* 42 U.S.C. § 4332(c). These procedural mechanisms are designed to inject environmental considerations "in the agency decisionmaking process itself," and to "'help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment.'" *Pub. Citizen*, 541 U.S. at 768-69 (emphasis added) (quoting 40 C.F.R. § 1500.1(c)). Therefore, "NEPA's core focus [is] on improving agency decisionmaking," *Pub. Citizen*, 541 U.S. at 769 n.2, and specifically on ensuring that agencies take a "hard look" at potential environmental impacts and environmentally enhancing alternatives "as part of the agency's process of deciding whether to pursue a particular federal action." *Balt. Gas & Elec. Co. v. Nat. Res. Def. Council*, 462 U.S. 87, 100 (1983). The alternatives analysis "is the heart" of an EIS or EA. 40 C.F.R. § 1502.14. NEPA's implementing regulations require that the agency "present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public." *Id.*

An EIS must be prepared by an agency for every "major Federal action significantly affecting the quality of the human environment." 42 U.S.C. § 4332(c). Under the Council on Environmental Quality's ("CEQ") regulations that implement NEPA, "significance" requires consideration of both context and intensity. Where a significant environmental impact is not expected, the agency must still prepare an EA and a Finding of No Significant Impact ("FONSI"). *Id.* §§ 1508.9, 1501.3. Where an EA or EIS has been previously prepared, NEPA's regulations require an agency to supplement its prior NEPA review when "[t]he agency makes substantial changes in the proposed action that are relevant to environmental concerns," or "[t]here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." 40 C.F.R. § 1502.9(c).

II. FACTUAL BACKGROUND

The Corps commenced its decisionmaking and NEPA review process for the Northern Integrated Supply Project ("NISP") in August 2004. *See* Corps, *Environmental Impact Statement – Northern Integrated Supply Project*, https://www.nwo.usace.army.mil/Missions/Regulatory-Program/Colorado/EIS-NISP/. The Corps issued its Draft EIS in April 2008, its Supplemental Draft EIS in June 2015, and its Final EIS in July 2018. *Id.* According to the Corps' project website, the agency intends to issue a Record of Decision ("ROD") authorizing this project later this year (i.e., in 2019). *Id.*

It would be a major understatement to say that this project has engendered substantial controversy. Save the Poudre, affected municipalities such as the City of Fort Collins, and many other interested parties have submitted extensive comments criticizing myriad aspects of the Corps' decisionmaking process including the agency's impermissibly narrow purpose and need statement, the artificially constrained analysis of practicable alternatives, the use of inappropriate screening criteria in examining project alternatives, and major project impacts that have not been adequately analyzed. Those comments are all part of the public decisionmaking record.

DISCUSSION

Although the Corps evidently intends to issue its ROD later this year, the Northern Colorado Water Conservancy District ("Northern Water")—i.e., the project proponent—recently made a major change in project operations that alters many of the basic assumptions underlying the NISP project and the ability of Northern Water to fill the proposed Glade Reservoir. On February 28, 2019, Northern Water revealed—*for the first time ever*—that, in order for NISP to be viable, Northern Water may have to purchase at least "25,000 acre-feet of water" from northern Colorado farmers, which Northern Water representatives estimate "would take about a decade and 100 or more farms, depending on their size." Loveland Reporter, *Northern Water Buys First Farm for NISP Water* (Feb. 28, 2019), *available at* http://www.reporterherald.com /news/larimer-county/ci_32483944/northern-water-buys-first-farm-nisp-supply. Indeed, in purchasing its first water from a northern Colorado farm in furtherance of NISP, Northern Water spent $330,000 to purchase a mere 30 acre-feet of water—i.e., $11,000 per acre-foot. Even assuming other farms will sell to Northern Water at no more than this rate (a proposition that is far from certain), purchasing all of the required water would add an additional $275 million in total project costs. *See id.* On the same day that local newspapers revealed this approach, Northern Water separately unveiled its new regime—called the WaterSecure program—and launched a website providing information about it. *See* Northern Water, *WaterSecure*, *available at* https://www.northernwater.org/sf/nisp/watersecure. For several reasons, these purchases would represent a wholesale change to the approach Northern Water will take to acquire the water for NISP, and is a fundamentally different and highly significant modification to the project that bears directly on the proposed action, its impacts, and its alternatives.

First, Northern Water's new approach of purchasing some or all of the required 25,000 acre-feet of water from northern Colorado farms—i.e., more than 60% of the 40,000 annual acre-feet of water that Northern Water alleges is a necessary project component of NISP—has *never* been analyzed as part of the Corps' Draft EIS, Supplemental Draft EIS, or Final EIS. To the contrary, the Final EIS makes clear that under Northern Water's preferred alternative—as well all other action alternatives—"$0" would be spent on "water rights acquisition." Final EIS at 2-103. In contrast, the Corps estimated that under the *no-action* alternative, Northern Water would have to spend $700 million on water rights acquisition by buying water rights from farms at approximately $15,500 per acre-foot. *See* Final EIS at 2-102. Accordingly, because Northern Water's new approach fundamentally transforms the preferred action and its underlying assumptions and operational mechanics, at minimum the Corps must prepare supplemental NEPA review disclosing to the public this new approach and soliciting public input on this substantial change.[1]

[1] The Final EIS states that Northern Water already owns the water rights necessary to implement the preferred alternative. *See* Final EIS at 2-77 ("With the exception of Upper Galeton Reservoir as a point of storage for the SPWCP water right, *Northern Water owns the water rights with the necessary points of diversion and storage for Alternative 2M*." (emphasis added)). Thus, the fact that Northern Water actually does *not* own some of these water rights—to the tune of 25,000 of annual acre-feet of water (more than half the water Northern Water claims to need from this project)—is a colossal change in the preferred alternative that alters the entire landscape of this project is a significant way.

Second, supplemental NEPA review is necessary because Northern Water's new approach completely alters the baseline against which practicable alternatives are measured, especially in light of the significantly increased project costs. Even if Northern Water is able to buy 25,000 acre-feet at approximately $11,000 per acre-foot—which is not certain given the fair market price for such water rights, *see* Final EIS at 2-102—this would add at least $275 million to overall project costs, which means that certain alternatives previously dismissed due to higher costs might now be "practicable" when compared to the much higher costs of the preferred alternative in light of Northern Water's new farm purchasing scheme. Given the new cost baseline for the project, the Corps must re-examine all practicable alternatives as judged against the new projected costs of Northern Water's preferred alternative.[2]

Third, the Corps and Northern Water previously rejected alternatives that included as a component alternative agricultural transfer methods (including agricultural leasing), and did so by implementing faulty screening criteria for proven technology—i.e., rejecting the leasing of agricultural water on the purported grounds that such methods are technologically unproven. *See* Final EIS at A-115 (EPA comments advocating the consideration of alternative agricultural transfer methods). Now that Northern Water has dramatically changed course and *is* purchasing and/or leasing water from northern Colorado farms, the Corps must revisit the concept of alternative agricultural transfers and analyze other alternatives involving this concept that is, in fact, feasible as demonstrated by Northern Water's selection of this new approach to acquire more than half of the water needed for this project to be viable.

Fourth, Northern Water's significant change in operations for the preferred alternative necessarily modifies many of the key factors under NEPA related to this project, such as the purpose and need and whether the preferred alternative can even achieve the purported need for this project. In particular, since there is much uncertainty as to whether and when Northern Water would be able to achieve its goal of purchasing 25,000 acre-feet of water from northern Colorado farms, it is highly speculative as to whether the preferred alternative can provide 40,000 acre-feet of water (which is a requirement to satisfy the project's stated need).[3] The Corps

[2] The costs associated with NISP have grown exponentially since the beginning of this project. In 2008, the Corps estimated that the project would cost $350 million. By the 2018 Final EIS, the Corps estimated that the project would cost $1.1 billion—i.e., three times what the Corps estimated only ten years earlier. With Northern Water's new approach, the estimated costs will increase at least another $275 million and likely much more than that as farms sell their water rights at higher per-unit rates.

[3] Northern Water has indicated that it intends to resell the purchased land, conditioned to allow the exchange to operate in perpetuity, and may claim that such transactions will allow them to make these purchases at zero cost. *See* Loveland Reporter, *supra* ("Eventually, the district plans to sell the farms to private owners, he said, with the stipulation that the water would stay with the property."). Until such a time as Northern Water can provide signed contracts for resale of all of the purchased land, this approach remains speculative at best. Even if Northern Water was able to eventually resell all of the properties at favorable prices—which is far from certain—the project would incur substantial carrying costs associated with land ownership in the interim.

must analyze the likelihood that Northern Water will be able to acquire the rights to 25,000 acre-feet of water, the estimated costs of doing so, the anticipated time frame before such acquisition is completed, and what happens in the event that Northern Water is not able to acquire 25,000 acre-feet of water through this new approach.[4]

Fifth, the modeling conducted to date by the Corps and/or Northern Water is no longer accurate since the modeling assumptions previously used in assessing mass-balance water quality and return flow obligations fail to include any analysis of this new approach and how those projections change if Northern Water is (or is not) able to purchase 25,000 acre-feet of water from farms.

Sixth, there will be highly significant environmental impacts under Northern Water's new approach, in which the project proponent will separate Poudre river water from the land and replace it with South Platte water (then reselling and/or leasing the land to an irrigated agricultural user). Because of the multi-river issues inherent in this approach, there are myriad adverse effects to water quality, wildlife, and other aspects of the ecosystem that the Corps has not yet examined. The need for a "hard look" at these new impacts counsels in favor of supplemental NEPA review.[5]

Seventh, now that Northern Water's preferred alternative and the no-action alternative *both* involve as a key component the purchase of many acre-feet of water from farms, there is not an alternative that is genuinely distinct from the action alternatives. Because the Corps must include an analysis of a true no-action alternative—which must be conceptually distinct in terms of its components from the action alternatives—supplemental NEPA review is necessary to ensure that the agency explores a genuine no-action alternative as a proper baseline for assessing the action alternatives against that no-action standard.

None of these costs have been disclosed in any of the NEPA documents to date, nor compared to alternatives in determining the practicability of other approaches.

[4] Not only will Northern Water's new approach dramatically increase overall project costs and the amount of time before the project is viable due to water rights acquisition, but there will be additional costs and time expended addressing water rights issues associated with this new approach in water court. These costs and delays must also be examined as part of a supplemental NEPA analysis.

[5] Under this new approach, every purchase/exchange allows Northern Water to displace clean Poudre River water with more contaminated and more polluted water from the South Platte River. The mixing of water from these two sources will very likely adversely impact water quality for all ditch customers, including landowners who have *not* sold or leased their water rights to Northern Water. The Corps must analysis these water quality impacts, which require landowners who refuse to sell to Northern Water to nevertheless accept more polluted and lesser-quality water from the South Platte that otherwise would flow from the much cleaner Poudre River, and would require this outcome presumably without any compensation for those landowners from Northern Water or the Corps.

Eighth, in conjunction with this new approach, Northern Water expects to exchange 25,000 acre-feet of water between several ditch companies and the NISP participants. However, there is nothing in the Final EIS or elsewhere quantifying the costs of any contracts or other agreements with these ditch companies, nor any evaluation of what happens if the ditch companies are unwilling to partner with Northern Water on this project. This, too, must be addressed through supplemental NEPA analysis.

Ninth, supplemental NEPA review is necessary because Northern Water's new approach to the preferred alternative changes the assessment of impacts to the irrigated agriculture-related economy of northern Colorado. Whereas the Final EIS stated that the no-action alternative "would likely result in a moderate to major effect on irrigated agricultural economy in the study" due to widescale purchase of water rights under the no action alternative, Final EIS at 4-541, the Corps stated that "[u]nlike the No Action Alternative, Alternative 2M would not relay on transfers of agricultural water rights as a source of supply"; "[c]onsequently, there would not be effects on the irrigated agriculture-related economy due to water transfers." *Id.* at 4-545. Clearly, the Corps' earlier assumption that the preferred alternative would not involve transfers of agricultural water rights is no longer accurate, nor is the conclusion accurate that the local agricultural economy will not be impacted by implementation of the preferred alternative. This aspect of the Final EIS needs to be revised to account for current information on the preferred alternative and to accurately identify economic and other effects that will reasonably flow from Northern Water's new approach.

Given the many areas of the Final EIS that are now outdated, inaccurate, or flawed, it is imperative that the Corps update its analysis of project impacts, alternatives, and purpose and need. This critically important information requires supplemental NEPA review addressing these concerns both because Northern Water has made "substantial changes in the proposed action that are relevant to environmental concerns," and the new approach constitutes "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts," 40 C.F.R. § 1502.9(c)(1). Thus, because agencies "shall prepare supplements" to final EISs where either criterion is satisfied, *id.*, the Corps must conduct supplemental NEPA review and issue an SEIS (or at least a supplemental EA) addressing this vitally important issue that is central to the Corps' purpose and need analysis, evaluation of reasonable alternatives that could satisfy the need for this project, and the ultimate decision as to whether the Corps should authorize this project under Section 404 of the Clean Water Act. In conducting supplemental NEPA review, Save The Poudre strongly urges the Corps to subject that document to public comment and input, in light of the controversial nature of this project and the immense public interest in this project shown to date by Colorado residents. In our view, absent a supplemental NEPA analysis incorporating the new elements of the preferred alternative and public comment on that evaluation, the Corps' action would not satisfy NEPA's "hard look" standard and would, instead, be sweeping vital aspects of this project and its effects under the rug,

CONCLUSION

For the reasons explained above, Save The Poudre believes that the Corps must conduct supplemental NEPA review as directed by the CEQ's NEPA regulations to analyze various aspects of Northern Water's new WaterSecure program and how it impacts this project, its purpose and need, its impacts, and feasible alternatives. Please let me know by **no later than March 29, 2019** if the Corps intends to prepare a Supplemental EIS or EA in response to this letter and the significant new information identified herein. If the Corps decides not to conduct any further NEPA review despite the new information set forth in this letter, please provide a written response by March 29 explaining the reasons why the Corps has declined this request. I look forward to hearing from the Corps about this matter. Please let me know if you would like to schedule a conference call to discuss this matter in person.

Respectfully submitted,

William S. Eubanks II

William S. Eubanks II

Memo to: Larimer County Commissioners

From: Dr. Yvonne M. Wittreich

Date: June 7, 2020

Regarding: No Pipe Dream and placement of Thornton and Northern Pipelines

I am writing an urgent memo to each of you, as we are still very concerned about the location of the Thornton and Northern Pipelines. The residents of Douglas Road, east and west, as well as residents of County Road 56 have been under so much pressure for nearly three years with the threat of cramming pipelines down our roads. Previously, in the past, we were threatened by a Truck Bypass rambling trucks down our roads. When will be have peace, harmony, and tranquility in our neighborhoods, instead of threat and intimidation?

In the meantime, we are pleased for our neighbors on Country Club Road who have enjoyed peace of mind with improvements such as the following:

- Signs restricting semi-trucks to use County Club Road (Unfortunately, now we get the trucks on Douglas Road)
- A new traffic light at the corner of Turn berry and Country Club Road
- A cross walk for residents and children on Country Club Road
- Road work and improvements at the corner of Colorado 1 and Country Club Road

For many years, we have written letters and appealed to you to put a traffic light at the corner of Colorado I and Douglas Road. We have described to you so often, how dangerous and treacherous this crossing is. Wellington has doubled in size, and traffic is very heavy on Colorado 1 and Douglas Roads. Increased Semi trucks have made this crossing even more horrific and dangerous!! We are hopeful that the traffic light can still be put in this summer, as we were recently told.

Now, we have a large number of semi-trucks speeding down Douglas Road as if it were a designated Truck Bypass. Could signs be put at the entries of Douglas Road asking the truck drivers to stay on Highway 287, a designated Truck by Pass? Signs such as "Residential Neighborhoods, Larimer County Encourages Truck Drivers to stay on Highway 287, a designated Truck Route", would be helpful. We are a residential neighborhood, too, and now we have many multi ton trucks rambling down our road from early am to late evening. What is a recent count per day of semi-trucks on Douglas Road, has one been completed?

The residents of Thornton and Northern Cities do not deserve your support and allegiance, as they do not care about you or us. Thornton can keep their water in the Poudre River as they originally bought farm water, not the pristine waters of the Poudre River!! Northern is too big of a project for Larimer County and it should be discontinued because of the danger it proposes to the water system as well as destruction in neighborhoods from a huge dam and monstrous water pipes!!

Have you seen the "disarray" on Remington and Parker Streets? This is a signal to all of us what our roads and neighborhoods could soon look like.

I have felt that you were our colleagues and friends as many of us attended your monthly public meetings. I hope that we can continue to feel this way about our elected officials, our commissioners.

Thank you for your time in reading this message, and I hope it will make you think what you are doing to the beautiful, rural northern areas of Larimer County. I write this memo in support of No Pipe Dream, Save the Poudre and Save Rural Northern Colorado neighborhood groups.

Most Sincerely,

Yvonne M. Wittreich

Dr. Yvonne M. Wittreich

Resident of Douglas Road

Copies: Rob Helmick

Mark Peterson

3734

Rob Helmick <helmicrp@co.larimer.co.us>

NISP Comment

3 messages

Daniel Teska <dt2885@gmail.com> Mon, Jun 8, 2020 at 7:59 PM
To: "bocc@larimer.org" <bocc@larimer.org>, "ccsl@fcgov.com" <ccsl@fcgov.com>, "pcboard@larimer.org" <pcboard@larimer.org>

Dear Commisioners Donnelly, Johnson, and Kefalas,

I am writing you today to urge you to oppose NISP. The Cache la Poudre River is the heart and soul of Larimer County and Fort Collins, and allowing NISP to move forward would result in the destruction of the very river that provides irrigation for farmers, recreation, wildlife habitat, and aesthetics and beauty for our community.

You have the opportunity to provide a legacy for our children and grandchildren. If NISP is allowed to be built, the chance for them to enjoy the river as it now exists would disappear. Imagine if the National Park system was not created. We would have lost the public lands that we now enjoy, the incredible beauty of the country that we see every day. Without the Endangered Species Act, we would have lost many of the flora and fauna that are an essential part of a functioning ecosystem, and a chance to enjoy the plants and animals that Would have otherwise been lost. We would have lost our national symbol, the Bald Eagle, as well as many plant and animal species that have been saved because of the ESA.

You have heard the arguments for opposing NISP, but they are worth repeating here. Water from the reservoirs created by NISP would go outside of Larimer County, to Weld and Boulder County towns. It would reduce Poudre River flows to a trickle through Fort Collins and beyond, after the city spent millions building a new whitewater park. There would be massive dam construction impacts for local residents and massive pipeline construction impacts, destroying or damaging many Larimer County and Fort Collins natural areas. It would be necessary for NISP to buy 20,000 acres of farms for their water rights, taking farmland out of production that is needed for our future.

The impact on our rural communities would be huge. The noise, traffic, and air pollution caused by dam construction would negatively impact their way of life. Irreparable harm of the land, air, water and rural character would result from this project.

Pipeline construction impacts would be massive. Private property would need to be seized by eminent domain, road construction and environmental impacts would have a detrimental effects on day to day life. Natural areas would be lost, resulting in degraded ecosystems and recreational opportunities, not to mention the effects on wildlife and habitat.

NISP would result in the degradation of flows and water quality of the Poudre. It would mean the destruction of the river as we know it.

Is that the legacy you want to leave, or do you want to leave a legacy where the Poudre River would be protected and preserved for future generations? There are alternatives to provide water for future residents of Larimer County. But if you allow NISP to go forward, the loss of the river as we know it would be unimaginable.

Thank you for the opportunity to share my thoughts on this important subject. Please oppose NISP. Our children and grandchildren will thank you for the vision to make a very difficult decision.

Sincerely,

Dan and Val Teska
410 Buckeye St.
Fort Collins, CO 80524
970-218-1286

Matthew Lafferty <laffermn@co.larimer.co.us> Tue, Jun 9, 2020 at 8:18 AM
To: Rob Helmick <helmicrp@larimer.org>

fyi
[Quoted text hidden]
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Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

Linda Hoffmann <hoffmalc@co.larimer.co.us> Thu, Jun 18, 2020 at 10:49 AM
To: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Please add this to the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Daniel Teska** <dt2885@gmail.com>
Date: Mon, Jun 8, 2020 at 7:59 PM
Subject: NISP Comment
To: bocc@larimer.org <bocc@larimer.org>, ccsl@fcgov.com <ccsl@fcgov.com>, pcboard@larimer.org <pcboard@larimer.org>

[Quoted text hidden]

3736

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 is incomplete

2 messages

normanranch <normanranch@earthlink.net> Mon, Jun 8, 2020 at 10:20 AM
To: bocc@larimer.org, pcboard@larimer.org, rhelmick@larimer.org

Dear Commissioners,

NISP has its 1041 Glade Reservoir and Pipeline application deemed complete by the Planning Department. There are numerous deficiencies and the completeness determination should be reversed.

The issues below need to be addressed more thoroughly by NISP before ever going before the Planning Commissioners.

Here are just a few of the many concerns we have over NISP's 1041 application:

1. The relocation of 7 miles of Highway 287, a major federal highway, would not occur but for the NISP project. NISP is treating the 7 miles of highway 287 relocation as "not our problem" and is claiming the relocation and all of its impacts is a separate "CDOT" project, to be funded by taxpayers! The relocation of 287 started out in the NISP proposal, "NISP includes the following facilities located in Larimer County**: the Glade Unit**; the Glade Pump Station; raw water distribution piping; and the **relocation of U.S. Highway 287**." NISP then changed its mind and excluded the 287 relocation from the proposal. The relocation will have major impacts to Larimer County and its taxpayers, public safety, visual impacts, historic structures,etc.. The relocation of U.S. Highway 287 is part and parcel of NISP, please insist it is addressed in the 1041.

2. Not adequately addressing 1041 Criteria 6, "The proposal will not negatively impact public health and safety".

a. The proposal will push a missile site carcinogenic chlorinated solvent plume into domestic drinking water wells. As stated by geological expert, Tom Sales, "Historical operations at a DoD Nuclear Missile Site at the base of the Glade Dam created a large plume of carcinogenic chlorinated solvents in groundwater that currently passes out beneath the proposed forebay for Glade. Plumes of this nature last many lifetimes and it is implausible that site specific efforts to clean up the plume have been effective. Northern installed more than 20 monitoring wells in 2019 located through the plume, but no public records are available regarding data from the Northern 2019 monitoring well network." The forebay is a below dam small reservoir of the Poudre water which will be pumping water 375 feet up into Glade Reservoir. This groundwater carcinogenic contamination must be addressed thoroughly in the 1041. Why wasn't the NISP monitoring well information made public? Please insist this information is included in the 1041.

b. The relocation will take a benign straight highway alignment along a valley bottom and turn it into a dangerous road up and over a high hogback. This rocky terrain, and curvy reroute will be a longer and more dangerous road, causing higher accident rates. Blind corners will undoubtedly cause an increase in vehicle/vehicle and vehicle/wildlife accidents. I concur with attorney, John Barth's statement, "The new alignment will increase emergency response times by at least 5 minutes, critical minutes in a life-threatening emergency." This reroute is only for the benefit of NISP, and unnecessarily endangers Larimer County residents and visitors. Please insist these safety issues are addressed in the 1041 application.

c. Two large faults, the North Fork Fault and the Bellvue Fault, pass under the proposed Glade Dam site. Tom Sale, geological expert, states, " 1) the faults represent vertical intervals of broken rock and 2) that they pass directly under the proposed dam site (that will have up to 400 feet of differential water level) it seems highly likely that leakage under the dam along the faults will be severe. NISP's "Oh, by the way" inclusion in the application is**,** "There are two earthquake faults mapped within the Glade unit. The Bellvue Fault and North Fork Fault have been intercepted at depth by test holes advanced during the project's geotechnical investigations."…. "Both faults are inactive and do not present a seismic risk to the project." **All faults are inactive until they aren't**. NISP's remark of "Do not present a seismic risk to the project" has no reference to a government agency verifying there is no seismic risk. Any seismic risk, no matter how small, is unacceptable when it involves a dam holding back 170,000 acre feet of water!. Please demand a more thorough analysis from a federal authority and insist on a qualified government agency's certification that the two faults will never present a seismic risk to the project. Larimer County citizens lives depend on it!

3. Inadequate Criterion #5, "The proposal will not adversely affect any sites and structures listed on the State or National Registers of Historic Places." The Final EIS states there are 82 eligible or potentially eligible cultural sites present in the disturbed area. Eight of the sites are officially eligible and 74 require additional data and formal evaluation. These are dismissed by NISP as minor to moderate impacts. There are numerous additional sites in the APEs of the 287 reroute that are not even mentioned. The FEIS states mitigation will be decided at a future time. This is unacceptable. Please assure that historical sites are individually addressed, by appropriate historical societies as to impact.

4. Proposal has not addressed Criterion #4, "The proposal will not have a significant adverse affect on or will adequately mitigate significant adverse affects on the land or its natural resources, on which the proposal is situated and on lands adjacent to the proposal." To get the Poudre River water into Glade reservoir will take 80MW of power supplied by huge transmission towers similar to those used at Glen Canyon Dam (see below image).The forebay is the holding reservoir for water from the Poudre River, and from where the Poudre water will be pumped 400 feet up into the Glade Reservoir. "The proposed peak pumping rate in Northern's application to Larimer County, from the forebay, is 1,200 cubic feet per second and will require 81 MW (megawatt) of power. To put 81 MW in context, it is equivalent to the power required by Fort Collins' approximately 62,000 residences and 90% of the reported generation capacity of Glen Canyon Dam," states Tom Sale, civil and environmental engineering expert. We also want answers in the 1041 to Tom Sales questions of:

- How will NISP get the required electrical power to the pumps,
- Where is the approval for an 80 MW power line, and
- What is the visual impact of these enormous power lines?

We would like to add to that list:

- What is the carbon footprint in the producon, ins tallaon, and main tenance of the transmission towers and power lines, and

- What is the on going carbon footprint from the producon the electricity r equired to run those huge pumps?
- Where is the assessment assuring there are no protected and endangered species along the hogback that would be impacted by the towers and lines?

Below is the 90 MW power source illustration, from Tom Sales' comment letter, showing the transmission towers of 90 MW necessary for the Glen Canyon Dam. NISP has stated it will need 80 MW for the proposed Glade Reservoir. The towers needed will be unsightly in this beautiful valley and may have a huge impact of wildlife and human safety. Where is the assessment documentation that there are no protected and endangered species along the hogback?
Glen Canyon Electric Power Source

Some things just don't make sense, and Glade Reservoir is one of them.

Thank you,

Roberta and John Norman

719-339-1751

normanranch@earthlink.net

Matthew Lafferty <laffermn@co.larimer.co.us> Thu, Jun 11, 2020 at 8:52 AM
To: "Helmick, Rob" <rhelmick@larimer.org>

fyi
[Quoted text hidden]
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Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

3739

Rob Helmick <helmicrp@co.larimer.co.us>

NISP Comments for the Record

2 messages

K Artell <artellme2@gmail.com> Tue, Jun 9, 2020 at 1:21 PM
To: "pcboard@larimer.org" <pcboard@larimer.org>, jkefalas@larimer.org, Steve Johnson <swjohnson@larimer.org>, "tdonnelly@larimer.org" <tdonnelly@larimer.org>

Hello Larimer County Planning Commission and County Commissioners

Please take care regarding Northern Water's proposed pipelines through Larimer County.

I think Poudre River water should be left in the River through Fort Collins to be picked up by a pipeline east of I-25.

The County Commissioners declined to approve Thornton's pipeline which seems to be a similar route through Larimer County as the NISP Pipeline. Is the NISP Pipeline different?

The second additional Poudre Delivery Pipeline is touted by Northern Water as bringing water directly to the Poudre River and through Fort Collins with water being picked up east of Fort Collins. Please note the route of the Poudre Delivery Pipeline (see attached maps and links below). The Pipeline starts in the Homestead Natural Area in Fort Collins and the Pump Station is in the Kingfisher Natural Area in Fort Collins and takes a route through Kingfisher and River Bend Natural Areas as the pipeline heads southeast past I-25. The route is not "east of Fort Collins" as Northern Water claims on its NISPTalk page. The route goes through Fort Collins natural areas within City limits and the City's GMA area.

The Poudre Delivery Pipeline route is detrimental to the Natural Areas on which taxpayers have spent $millions to improve the health of the Poudre River, riparian areas, wildlife and recreation. As you know the health of Larimer County depends in part on the health of the Poudre River. The detriment to the River and Natural Areas includes pipeline construction with accompanying noise and air quality impacts on wildlife and area residents and businesses and includes Northern Water's permanent easement along the pipeline route. How can Northern Water mitigate the damage done to the Poudre River and surrounding area?

How does running a pipeline through Natural Areas and the River's riparian area "provide positive benefits to the river corridor and enhance the aquatic and riparian environment" as Northern Water claims? The proposed pipeline should be changed and ideally the water should run through in the Poudre River to be picked up east of I-25.

City of Fort Collins map of pipeline through Larimer County
https://www.fcgov.com/nispreview/files/nisp-alignment-gma.pdf?1587655316
https://www.fcgov.com/nispreview/files/nisp-pipes-on-nad-properties.pdf?1587410652
Found here https://www.fcgov.com/nispreview/

Thank you for your consideration.

2 attachments

nisp-alignment-gma.pdf
1117K

nisp-pipes-on-nad-properties.pdf
397K

Matthew Lafferty <laffermn@co.larimer.co.us> Thu, Jun 11, 2020 at 8:49 AM
To: "Helmick, Rob" <rhelmick@larimer.org>

fyi
[Quoted text hidden]
--

Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

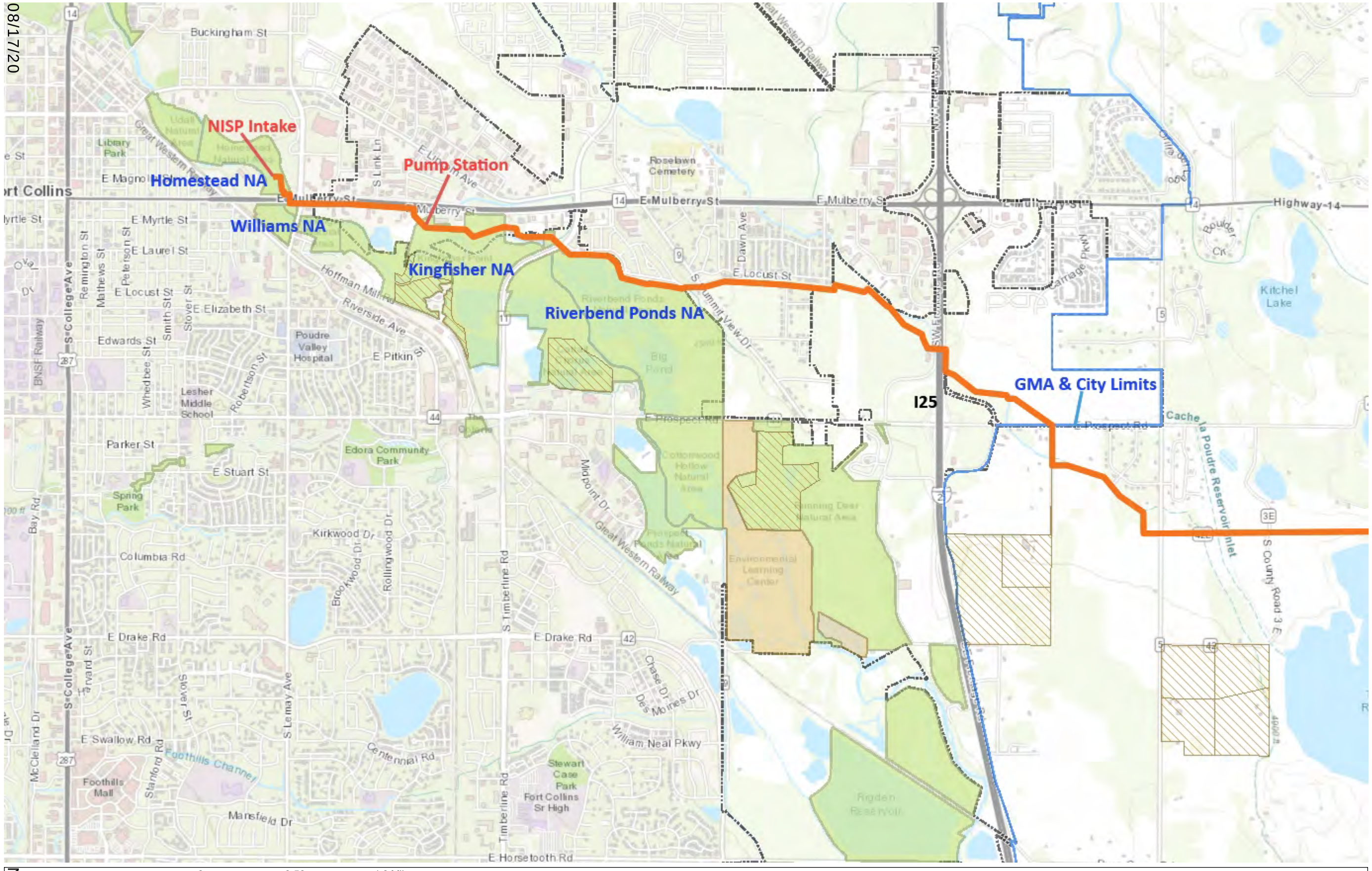
2 attachments

nisp-alignment-gma.pdf
1117K

nisp-pipes-on-nad-properties.pdf
397K

BCC 08/17/20

NISP Alignment



Legend

- Conservation Easements
- Natural Areas
  - Natural Area (City of Fort Collins)
  - State, County or Other Municipal O
- Meadow Springs Ranch (City
- Growth Management Area
- City Limits
- Citations

1: 27,437

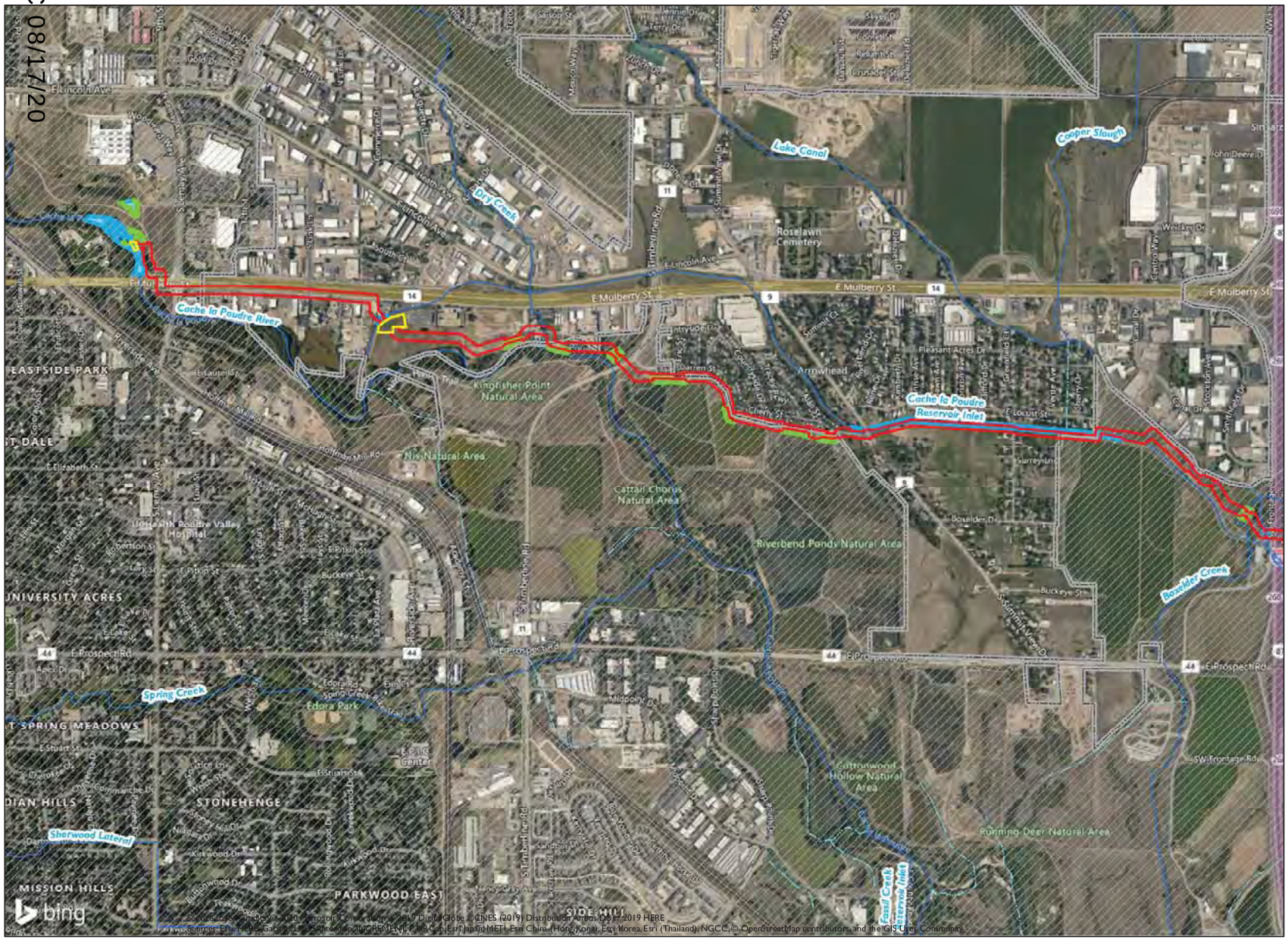
0 0 0.50 1.0 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere
City of Fort Collins - GIS

This map is a user generated static output from the City of Fort Collins FCMaps Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

Notes

Item 4, 3741



Legend

- NISP Conveyance – Poudre Intake Permanent Impact Area
- NISP Conveyance – Poudre Intake Temporary Impact Area
- Incorporated Larimer County and/or Weld County*
- Open Waters
- Wetland
- Major Stream/Ditch
- Minor Stream/Ditch

Note
NISP = Northern Integrated Supply Project
Wetland and Open Water boundaries have been exaggerated for visual purposes.

*All non-hatched areas are Unincorporated Larimer County

Wetland Data Source: Pinyon 2019

1 inch = 0.25 miles
0 0.125 0.25 Miles

Pinyon

NISP CONVEYANCE - POUDRE INTAKE ALIGNMENT WATER RESOURCES
Northern Integrated Supply Project
Larimer and Weld Counties, Colorado

Site Location: Larimer County, Colorado	Drawn By: MJS	Figue 3; Page 2 of 3
Pinyon Project Number: 11881402	Reviewed By: KKM	Date: 1/23/2020

Document Path: G:\PROJECTS\2018\11881402 NISP Environmental Compliance Support\Figures\ArcMap\MXDs\Wetlands\Larimer 1041 Permit\Erosion Control Plan\NISP_Larimer1041_EC - Poudre MapBook.mxd

3743

Rob Helmick <helmicrp@co.larimer.co.us>

NISP 1041 permit

3 messages

Roger Hoffmann <rogerh8808@gmail.com> Tue, Jun 9, 2020 at 2:15 PM
To: pcboard@larimer.org
Cc: bocc@larimer.org

Below, and attached as a PDF, is a letter re. the NISP 1041 review.

~Roger Hoffmann

****

3908 La Mesa Dr.

Fort Collins, CO 80524

June 9, 2020

Larimer County Planning Commission

Larimer County Board of County Commissioners

To all concerned,

I'm writing as a Larimer County resident, property owner and tax payer, with respect to the Northern Integrated Supply Project (NISP), and its pending 1041 Permit request.

For very many reasons, I believe the Planning Commission must reject the 1041 permit request by the project's proponents, Northern Water. Personally speaking, it is certainly not in my best interests. Nor, I believe, is it in the interest of those whom I suspect to be the vast majority of Larimer County residents. In fact, this project proposal represents significant public harms. I will only mention a few here, in partial explanation for why I oppose it and hope you will deny the 1041 permit.

As you likely know, the Poudre River is already stressed and endangered , in large part by diversions. NISP, if completed, will severely cut off the "peak flows" needed to maintain the river's health and habitats. There is no way to avoid this if this project is built as planned, and it is impossible to mitigate these system-wide impacts. One of the direct ones will likely be a reduction of habitat for trout species. While I'm not an angler myself, I have very many friends who are. Yet, even if there wasn't a single person who personally cared about fishing, we have a moral duty to preserve what we have.

Also with respect to the Poudre itself, I'm extremely concerned about the gradually increasing effects of climate change, whose effects may well be exacerbated by diversions from the river. What is the tipping point? Just how far are we willing to go? While I understand water rights, I would urge the Planning Commission and Board of Commissioners not to play a part in further damaging the river.

NISP's plan is also incompatible with Larimer County's Comprehensive Land Use Plan that pertains to the area in question. Larimer County should defend this plan and its visionary objectives, for the benefit of residents, both today's and tomorrow's; and put Larimer County's interests first.

That Northern Water will buy up farms in Weld County for their water rights is another reason for denial. Why does this matter? For one thing, the drying up of farms in Weld will be yet another heavy blow to agriculture in Northern Colorado, which has already been harmed by speculation in water and land. For another, all that "dry" land will then have only one perceived use- development. This will drive up vehicle miles traveled (VMT), a major contributor to both highway congestion and air quality problems that continue to lower quality of life while driving up costs for all. Several failed attempts to win public support for highway expansions illustrate the growing difficulty of ignoring this problem.

Unfortunately, the federal EIS missed the latter impacts, erroneously concluding that the project has no need for additional water rights (it will), and therefore, no farms would be purchased in order to fill the reservoir. This error alone casts significant doubt on the reliability of the federal EIS.

Of course, NISP won't just drive land development and sprawl in Weld County. The communities participating in NISP are faced with every-increasing costs to finance it. There will be even greater pressures on each for expansion for revenue development to cover these costs. This is ill-advised in an area already literally choking on the effects of high growth rates. NISP, in effect, creates a vicious cycle of deb-fueled expansion which leads to yet further costs for local governments and their taxpayers. This is madness. It is unsustainable and counters everything we try to do to keep Larimer County a great place to live.

Besides such harms, I'm also concerned about the potential long-term costs to residents here from trying to accommodate NISP. I marvel that this can even be considered without a prior public discussion and hearing on whether Larimer County should agree to the relocation of US287, along with the consequences of that.

Summing this up, this is a very bad deal for Larimer County and its residents. I hope that we, who will bear many (but not all) of the negative consequences will be your primary concern in this regard.

Respectfully,

Roger Hoffmann

Letter_LCPC-NISP1041_20200609..pdf
232K

Linda Hoffmann <hoffmalc@co.larimer.co.us> Tue, Jun 9, 2020 at 4:04 PM
To: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Please include this message in the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

[Quoted text hidden]

Letter_LCPC-NISP1041_20200609..pdf
232K

Matthew Lafferty <laffermn@co.larimer.co.us> Thu, Jun 11, 2020 at 8:49 AM
To: "Helmick, Rob" <rhelmick@larimer.org>

fyi

---------- Forwarded message ---------
From: **Roger Hoffmann** <rogerh8808@gmail.com>
Date: Tue, Jun 9, 2020 at 2:15 PM
Subject: NISP 1041 permit
To: <pcboard@larimer.org>
Cc: <bocc@larimer.org>

[Quoted text hidden]

--

Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

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Respectfully,
Roger Hoffmann

3748

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project

1 message

Darene Carter -Hiatt (dchiatt@yahoo.com) Sent You a Personal Message Fri, Jun 12, 2020 at 7:32 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

The NISP is an extremely expensive project that would cause great destruction; disrupt and displace residents around the proposed reservoir, residents along Highway 287, and residents along the proposed pipeline route; and it isn?t needed. There are many conservation actions that would provide all the water proposed to be delivered by Glade, including improved water efficiency by municipal districts, industry, and agriculture; public education and awareness programs; repairs to leaking ditches and pipelines, landscape irrigation improvements, and much more.

The NISP is a controversial project that is of great interest to many people in Larimer County who want full opportunity to comment on the permitting process and to appear at public hearings. Because of the scope and controversy surrounding this proposed project, the Commissioners should wait until the coronavirus pandemic has subsided enough to allow for full in-person public participation.

Sincerely,

Darene Carter -Hiatt
4238 Stoneridge Dr.
FORT COLLINS, CO 80525
dchiatt@yahoo.com
(970) 308-2020

Mr. John Urbanic, NISP EIS Project Manager
U.S. Army Corps of Engineers, Omaha District
Denver Regulatory Office
9307 S. Wadsworth Blvd.
Littleton, CO 80128
nisp.eis@usace.army.mil

June 16, 2020

Via Email and Regular Mail

Dear Mr. Urbanic:

No Pipe Dream Corporation, Save Rural NoCo, and Save the Poudre collectively submit this letter specifically to express significant concerns regarding the inadequacy Final Environmental Impact Statement (FEIS dated July 2018) for the Northern Integrated Supply Project (NISP) prepared by the U.S. Army Corps of Engineers (Corps).

Within seven months after the publication of the FEIS, the applicant for the NISP announced a substantive change that renders each of the alternatives analyzed in the FEIS out-of-date and inaccurate, especially alternative 2M, the applicant's preferred alternative. Specifically, the applicant announced publicly in February 2019 that it would undertake a farm-buying program in order to acquire the rights to 22,000 acre-feet of water (Loveland Reporter, Northern Water Buys First Farm for NISP Water [Feb. 28, 2019], available at http://www.reporterherald.com /news/larimer-county/ci_32483944/northern-water-buys-first-farm-nisp-supply). For a project that requires about 40,000 acre-feet of water rights, the project currently lacks more that half of the rights it needs. The proponent has embarked on a farm-buying program, and between February 2019 and May 2019, has purchased just 94 acres of farmland in Weld County (Attachment A). The applicant's current proposed action, therefore, is not analyzed in the FEIS.

The FEIS (Table 2-14) estimates that costs for water rights acquisition under the No Action Alternative would be $700,000,000. Costs for water rights under the preferred alternative 2M is $0. The applicant has already spent almost $1,000,000 to purchase the three farms in Weld County, for a total of about 94 acres. At this rate, project costs for water rights acquisition would be at least $242,000,000 (e.g., 11,000 per acre * 22,000 acres), a cost that is not disclosed as part of any alternative in the FEIS. And, at this rate, water rights acquisition would take over 200 years; therefore, the current project cannot meet the purpose and need described in the FEIS (FEIS pg. 1-5). Even more relevant is, however, that the project is entirely speculative since there are no guarantees that the water rights can ever be obtained.

The FEIS must present a clear and accurate assessment of the proposed costs of the current project. Furthermore, other alternatives may now be less costly. So far, about 94 acres of farmland has cost the project almost $1,000,000, and no headway has been made in over a year. The feasibility of this project is highly questionable and must be independently, thoroughly reevaluated and its impacts disclosed.

Beginning on page 2-8 of the FEIS, Section 2.2.3.2 describes four scenarios for agriculture-to-municipal transfers and clearly discloses the reasons why the Corps determined that all four failed to meet the purpose and need for the project. Specifically:

In 2007, the Corps considered four scenarios of agricultural to municipal transfer concepts (HDR 2007):

- *Partial supply, preserve agriculture – obtain at least 30% (12,000 AF) of firm yield for NISP and preserve agriculture by leasing water back to agricultural users on a rotating basis*
- *Full supply, preserve agriculture – obtain all 40,000 AF* [acre-feet] *of firm yield, but preserve agriculture by leasing the water back to agricultural users through a rotating fallow program*
- *Full supply, permanently remove irrigation from agricultural lands*
- *Partial supply, permanently remove irrigation from agricultural lands*

With regards to the first scenario, the Corps determined the following:
As a result, the rotational fallowing concept has not progressed to the point of being considered a proven technology (Hydros 2012). Therefore, scenarios involving rotational fallowing would fail the NISP proven technology and firm yield screening criteria, if irrigators retained ownership of the water rights.

With regards to the second scenario, the Corp determined:
The full supply, preserve agriculture scenario would fail to meet the NISP firm yield for the same reasons as the partial supply, preserve agriculture scenario discussed above. The amount of agricultural water required to produce 40,000 AF of firm yield for NISP while running a successful rotating fallow program to keep agricultural land in production would be far in excess of the 103,000 AF required for the partial supply option (HDR 2007). It also would be nearly impossible to guarantee that enough water could be purchased to satisfy the full firm yield demand through this full supply, preserve agriculture scenario.

Similarly, the Corps dismissed one of two options for third scenario:
For the full supply, permanently remove irrigation from agricultural lands scenario, there would be two options. The first option would be to purchase C-BT units from ditch companies….. Because the objective of the first option is to produce the full 40,000 AF firm yield for NISP, the scenario failed to meet the NISP purpose and need.

The second option for the third scenario was retained and analyzed at Alternative 4, in the DEIS, but was eliminated and replaced with a different Alternative 4 in the FEIS.
The second option is the extensive transfer of agricultural water rights. It is estimated that about 12,000 AF of new firm yield required for NISP could be obtained. This is the partial supply, permanently remove irrigation from agricultural lands scenario, and was evaluated as Alternative 4 in the DEIS. The basis for eliminating Alternative 4 and the concept of the full supply, permanently remove irrigation from agricultural lands scenario is discussed in Section 2.3.1.1.3.

While this analysis explains that agriculture-to-municipal transfers must be dismissed or relegated to the No Action Alternative because they don't meet the project purpose and need, or are not otherwise feasible, they are currently a *large* part of the applicant's plan. Although they were previously rejected as "unproven", they are apparently now proven-enough for the applicant. Alternatives involving water transfers must now be considered feasible and worthy of analysis.

Throughout the FEIS, the current proposed action, including its agriculture-to-municipal transfers must be described in detail, and the impacts of the loss of over 20,000 acres of farmland must be analyzed before the Corps can prepare a Record of Decision for this project. Clearly, the loss of farmland would not be the only impact associated with this substantive change to the proposed action, and the associated direct, indirect, and cumulative effects must also be evaluated. Mitigation must be developed.

On March 12, 2019, Save the Poudre requested the Corps to prepare a Supplemental EIS or EA. It stated, as we have herein, that significant new information bearing on the proposed action had come to light and requested a response, and we hereby incorporate that letter as Attachment B. To our knowledge, the Corps has not taken any action to prepare a supplemental EIS, despite having been aware of it for over a year. It is contrary to NEPA that the Corps has not evaluated this substantive new information. This project would have significant and far-reaching environmental impacts, on the land, water, and communities across northern Colorado and on the Poudre River, which is a regional treasure. In the absence of a supplemental NEPA document, the Corps must deny the Section 404 permit since the effects of the current project are undisclosed and the NEPA requirements have not been met.

No Pipe Dream Corporation is a Colorado non-profit corporation composed of Larimer County property owners and taxpayers established to protect citizens from the intense adverse impacts of multiple proposed pipeline and reservoir projects in Larimer County, including but not limited to NISP. Save Rural NoCo is a Colorado non-profit organization composed of property owners and taxpayers whose mission is to protect existing land, water, and communities in rural northern Colorado from harmful development through research and public education. Save the Poudre is a Colorado non-profit membership organization primarily composed of residents of Larimer County, including outdoor recreationists, scientists, property owners, and taxpayers that would be adversely impacted by the construction and operation of NISP. Save the Poudre's members live, work, and recreate on and around the Cache la Poudre River in Larimer County. Some members own property or have residences near the Poudre River in the City of Fort Collins.

Sincerely,

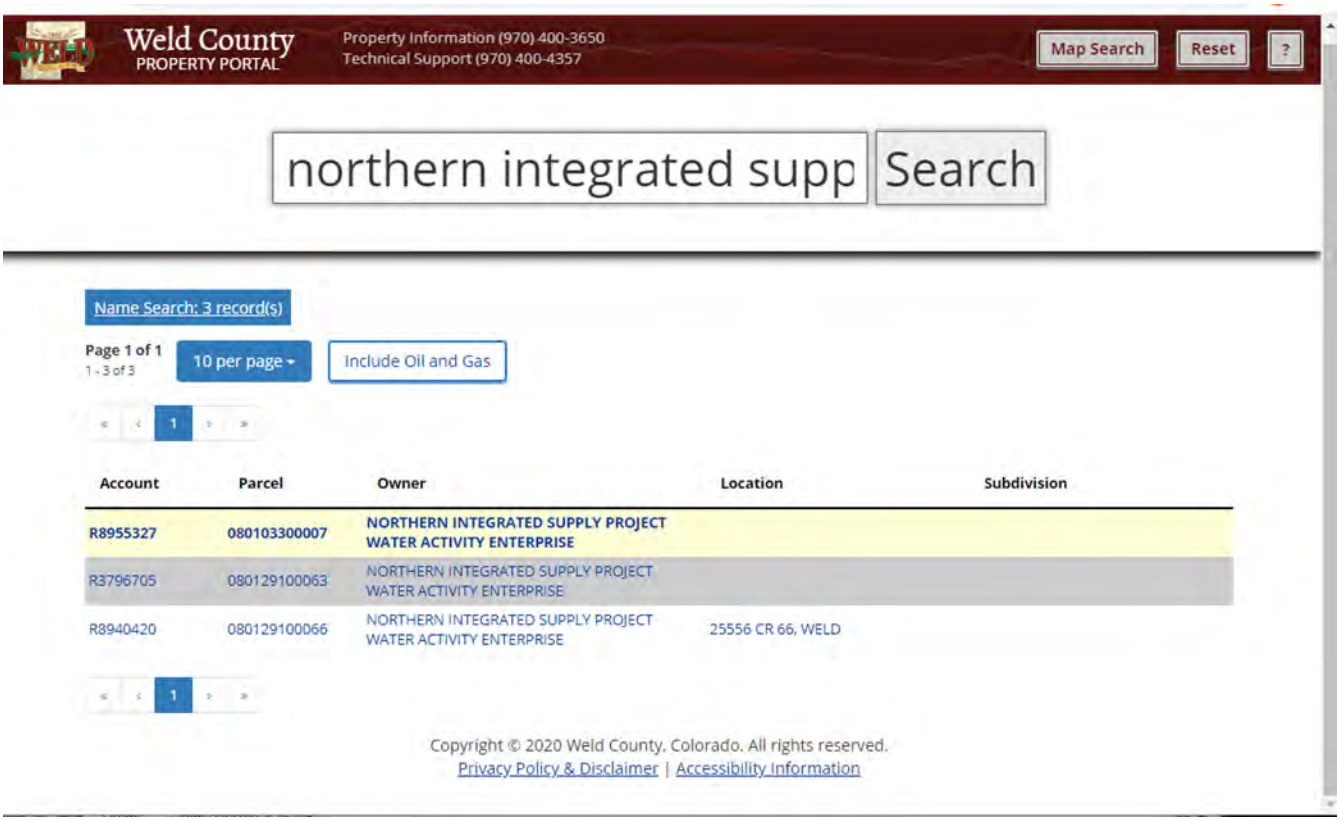
s/ Robert Kitchell, President
No Pipe Dream Corporation

s/John Dettenwanger, Chairman
Save Rural NoCo Corporation

s/ Gary Wockner
Save the Poudre

Xc: Rob Helmick, rhelmick@larimer.org
Larimer County Planning Commission, pcboard@larimer.org
Larimer County Board of County Commissioners, bocc@larimer.org

Attachment A



Attachment A. Screen Shot of Weld County Assessors webpage showing that Northern Integrated Supply Project Water Activity Enterprise has purchased three properties.

Attachment B

Meyer Glitzenstein & Eubanks LLP Letter Dated March 12, 2019 (see attached pdf file).

3754

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: Northern Integrated Supply Project

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Sun, Jun 14, 2020 at 11:07 AM
To: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Please include this message in the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Jan Kleckler (jkleckler@q.com) Sent You a Personal Message** <automail@knowwho.com>
Date: Sun, Jun 14, 2020 at 6:47 AM
Subject: Northern Integrated Supply Project
To: <bocc@larimer.org>

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

The NISP is an extremely expensive project that would cause great destruction; disrupt and displace residents around the proposed reservoir, residents along Highway 287, and residents along the proposed pipeline route; and it isn?t needed. There are many conservation actions that would provide all the water proposed to be delivered by Glade, including improved water efficiency by municipal districts, industry, and agriculture; public education and awareness programs; repairs to leaking ditches and pipelines, landscape irrigation improvements, and much more.

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Sincerely,

Jan Kleckler
309 W. 10th St.
Loveland, CO 80537
jkleckler@q.com
(970) 669-0819

This message was sent by KnowWho, as a service provider, on behalf of an individual associated with Sierra Club. If you need more information, please contact Lillian Miller at Sierra Club at core.help@sierraclub.org or (415) 977-5500.

3756

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project

2 messages

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309 W. 10th St.
Loveland, CO 80537
jkleckler@q.com
(970) 669-0819

Laura Wynkoop (wolfie712@aol.com) Sent You a Personal Message Sun, Jun 14, 2020 at 11:45 AM
<automail@knowwho.com>
To: pcboard@larimer.org

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enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

The NISP is an extremely expensive project that would cause great destruction; disrupt and displace residents around the proposed reservoir, residents along Highway 287, and residents along the proposed pipeline route; and it isn?t needed. There are many conservation actions that would provide all the water proposed to be delivered by Glade, including improved water efficiency by municipal districts, industry, and agriculture; public education and awareness programs; repairs to leaking ditches and pipelines, landscape irrigation improvements, and much more.

The NISP is a controversial project that is of great interest to many people in Larimer County who want full opportunity to comment on the permitting process and to appear at public hearings. Because of the scope and controversy surrounding this proposed project, the Commissioners should wait until the coronavirus pandemic has subsided enough to allow for full in-person public participation.

Sincerely,

Laura Wynkoop
4585 Levi Ct.
Loveland, CO 80537
wolfie712@aol.com
(970) 776-8276
[Quoted text hidden]

3758

Rob Helmick <helmicrp@co.larimer.co.us>

Multiple groups' significant concerns about NISP FEIS

2 messages

Karyn Coppinger <kcoppinger31@gmail.com> Tue, Jun 16, 2020 at 2:58 PM
To: nisp.eis@usace.army.mil, rhelmick@larimer.org, pcboard@larimer.org, bocc@larimer.org

Dear Mr. Urbanic:

Attached please find a letter from Save Rural NoCo, No Pipe Dream, and Save the Poudre expressing significant concerns about the NISP FEIS requiring Corps action.

Thank you for your consideration,
Karyn Coppinger
Save Rural NoCo

2 attachments

Corps of Engineers Letter 6_16_20.pdf
328K

Formal Request for Supplemental NEPA Review 3.12.19.pdf
207K

Rob Helmick <helmicrp@co.larimer.co.us> Wed, Jun 17, 2020 at 10:51 AM
To: Carl Brouwer <cbrouwer@northernwater.org>, Stephanie Cecil <scecil@northernwater.org>, Christie Coleman <ccoleman@northernwater.org>, Brad Wind <bwind@ncwcd.org>, "Haag, Jeannine" <haagjs@co.larimer.co.us>, "Ressue, William" <ressuewg@co.larimer.co.us>, Frank Haug <haugfn@co.larimer.co.us>, Lesli Ellis <ellislk@larimer.org>, Laurie Kadrich <kadriclm@co.larimer.co.us>, Daylan Figgs <figgsdw@co.larimer.co.us>, Mark Peterson <mpeterson@larimer.org>

[Quoted text hidden]
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Robert Helmick
Senior Planner

Community Development Department
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521
970-498-7682
rhelmick@larimer.org
https://www.larimer.org/planning

2 attachments

Corps of Engineers Letter 6_16_20.pdf
328K

Formal Request for Supplemental NEPA Review 3.12.19.pdf
207K

3759

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project 1041

2 messages

Michael Lindsay <mlindsay767@gmail.com> Fri, Jun 19, 2020 at 8:57 AM
To: rhelmick@larimer.org

Rob,
I realize I am sending this comment later than requested but I would like to make you aware of my concern about the noise this project will generate. I live in the city limits of Windsor and in Larimer county next to Weld county Rd 13. My property is impacted by construction traffic noise on a daily basis. Currently the noise almost exclusively is generated by construction truck traffic from 6;00am until 6;00 daily. This truck traffic noise for the most part is caused by large diesel engine trucks hauling construction materials that have no or inadequate muffled exhaust systems. Many of these trucks fail to comply with the traffic signage that requires engine brake mufflers. I have no problem with the water pipeline itself but I am really concerned about noise levels that this project will generate with truck traffic not only while construction is taking place next to my property but as the project continues to the south.

I would ask that Larimer county and the project manager provide monitoring and strict compliance of all contractors with the noise level restrictions as described in the project description Pipeline Noise Analysis. Also, please insure compliance with the Colorado state traffic signage CR 42.4.225 that requires the use of engine brake mufflers for trucks.

Respectfully,
Mike Lindsay
1185 Ridge West Dr.
Windsor, Colorado 80550
PH# 970 978 6594

Rob Helmick <helmicrp@co.larimer.co.us> Fri, Jun 19, 2020 at 8:58 AM
To: Don Threewitt <threewdl@co.larimer.co.us>, Lesli Ellis <ellislk@larimer.org>, Katie Beilby <beilbykm@co.larimer.co.us>, Steven Rothwell <rothwesc@co.larimer.co.us>, Lea Schneider <schneils@co.larimer.co.us>

[Quoted text hidden]
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Robert Helmick
Senior Planner

Community Development Department
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521
970-498-7682
rhelmick@larimer.org
https://www.larimer.org/planning

WEAVER CATTLE CO., INC.
260 Boattail Drive
Fort Collins, CO 80524
Cell: 970-222-2161

June 22, 2020

Rob Helmick
Larimer County Planner
P.O. Box 1190
Fort Collins, CO 80522-1190

RE: Northern Integrated Supply Project (NISP) 1041

Dear Mr. Helmick,

Weaver Cattle Co., Inc. owns the property where NISP project Highway 287 realignment diverts from Highway 287 south of Owl Canyon. When the current highway was built, our predecessor in interest, the Ripple family, reserved a highway access at what is now 11700 North Highway 287. The Ripple family reserved this access when they granted the easement to the State of Colorado's predecessor in interest, Larimer County. While my family has ranched in Larimer County since 1886, we purchased the Ripple Ranch at Owl Canyon in 1969.

This access has been our main ranch access off of Highway 287 and on the west side of the mountain on our property. We access at this location to check the well that is the only water source in that pasture and is our only water source on the west side of the mountain south of County Road 72. We access at this location to check our cattle, pastures, salt, mineral, perform weed control and other issues related to our ranching operation. We also access our property at this location to get to our property on top of the mountain, again to perform our normal and usual ranching operation activities. At this time, this is our only access to the top of the mountain as we can not access with a vehicle from the east side of the mountain. As you can see, this access is important and vital to our ranching operation.

We have been supportive of the Northern Integrated Supply Project (NISP) and have been working with Northern Colorado Water Conservancy District (Northern) for many years. We have had numerous discussions but we have not started final discussions on the Highway 287 realignment right-of way that will be necessary for the NISP. Throughout these discussions, we have been clear the importance of this reserved access and that we will need a like access with the new alignment. The last time I met with Northern a couple of months ago, this access was not included on the current plans. I have been told the engineers are looking at it – but I have not seen anything in writing. I did note to Northern and their engineers, they are allowing an access almost across the road for the frontage road called Big Ridge Way. I told Northern, that it would make sense to put my access

across the road from the access for Big Ridge Way. While this would not be on the exact location as our reserved access, it would be close and would make sense for highway access control.

We believe this NISP will be very beneficial to agriculture and Larimer County and have been supportive of the project. However, to date, while Northern has been cooperative in other areas, they have not been willing to honor our reserved access. I am asking Larimer County to require Northern to honor this reserved access in the Highway 287 realignment in order for us to maintain our ranching operation. It would seem to be defeating the purpose of the reservoir to protect agriculture, if in the process we put agriculture producers out of business.

Thank you for the opportunity to present this issue to Larimer County. I will not be able to make the June 24, 2020 meeting, but I will plan on attending the July 8, 2020 meeting.

Sincerely yours,

Maxine Weaver

Maxine Weaver, President
Weaver Cattle Co., Inc.

CC: Carl Brouwer, Northern Integrated Supply Project

BEEF – IT'S WHAT'S FOR DINNER!!!

Charlotte Parman

A few questions from a resident, transcribed by Katie Beilby.

How much of the Poudre River flow will be diminished, how will it be affected or decreased by siphoning that water off? How big is the pipeline? Will there be clean up of the river and the ponds that will be decreased after this pipeline is put in?

Does the residents have any say about this, does our opinion really matter? Why does it have to be so close to the residents?

Our property taxes just went up, does this have anything to do with this project?

3763

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project

1 message

Sarah rahm (pinkookami@gmail.com) Sent You a Personal Message Sun, Jun 21, 2020 at 4:42 AM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

The NISP is an extremely expensive project that would cause great destruction; disrupt and displace residents around the proposed reservoir, residents along Highway 287, and residents along the proposed pipeline route; and it isn?t needed. There are many conservation actions that would provide all the water proposed to be delivered by Glade, including improved water efficiency by municipal districts, industry, and agriculture; public education and awareness programs; repairs to leaking ditches and pipelines, landscape irrigation improvements, and much more.

The NISP is a controversial project that is of great interest to many people in Larimer County who want full opportunity to comment on the permitting process and to appear at public hearings. Because of the scope and controversy surrounding this proposed project, the Commissioners should wait until the coronavirus pandemic has subsided enough to allow for full in-person public participation.

Sincerely,

Sarah rahm
610 Darlene Ct
Grand Junction, CO 81504
pinkookami@gmail.com
(720) 692-0407

3764

Rob Helmick <helmicrp@co.larimer.co.us>

Weaver Access for New 287

1 message

Maxine Weaver <maxine.weaver@yahoo.com> Mon, Jun 22, 2020 at 7:17 PM
Reply-To: maxine.weaver@yahoo.com
To: rhelmick@larimer.org
Cc: cbrouwer@northernwater.org

Rob,

Attached is my letter for your records on the NISP. I will not be able to attend the meeting Wednesday night as my mom is in the hospital. I will plan on attending the July 8 meeting.

If you have any questions, feel free to contact me.

Thank you,
Maxine

Letter - Helmick - NISP - 6-22-2020.pdf
1389K

3765

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: NISP

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Tue, Jun 23, 2020 at 9:12 PM
To: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Please add this message to the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Megan Thorburn** <meganthor@yahoo.com>
Date: Tue, Jun 23, 2020 at 6:47 PM
Subject: NISP
To: bocc@larimer.org <bocc@larimer.org>
Cc: Sierra Club Poudre Canyon Group Excom List <rmc-pcg-excom@lists.sierraclub.org>, Sierra Club PCG Core <rmc-pcg-core@lists.sierraclub.org>, Carol Jones <cjones@cowisp.net>, Doug Henderson <dhender@gmail.com>, Will Walters <will@walters-consulting.com>, Ted Manahan <ted_manahan@hotmail.com>, Katie Repsis <repskati@isu.edu>, Dr Cory Carroll MD <cdc@drcorycarroll.com>

Attention Board of County Commissioners,

Please see attached letter regarding NISP in preparation for your discussion tomorrow.

Thank you,
Megan Thorburn
Acting Chair
Sierra Club, Poudre Canyon Group

Comments to Commissioners on NISP from PCG Sierra Club.docx
47K

June 23, 2020
Larimer County Commissioners:

The Poudre Canyon Group (PCG) of the Sierra Club respectfully asks the Larimer County Commissioners to deny the 1041 permit for the proposed Northern Colorado Integrated Supply Project (NISP) based on scientific studies that show serious degradation to the Poudre River will occur if it is built, lack of adequate mitigation measures to address problems, and strong citizen opposition to the project.

Currently, almost 60% of the Poudre's water is diverted for agricultural, municipal, and industrial uses. Further diversion will cause major negative impacts to the river's ecology and function, damage the river's utility and use by tens of thousands of people and downstream communities, and harm the area's economy which depends on the river's health and continuing flows.

The State of the Poudre River 2017 study conducted by the City of Fort Collins, found that existing dam and diversion structures "cause unnatural fluctuations in flow volume, which likely affects critical habitat and the reproductive needs of fish and insects in the river." The report also states that "populations of native fish are in sharp decline…most likely due to fragmented habitat and extended periods of extremely low base flows. Other stresses likely influencing fishery health includes rapid fluctuation of flows…and altered water temperatures." If the Halligan and Seaman Reservoirs are expanded, even more water will be diverted from the Poudre, increasing flow and fluctuation disruptions. The massive amounts of water required for NISP can only increase the negative impacts.

Adding to the uncertainty of flows and fluctuations are the anticipated changes to the river due to climate change. The Final Environmental Impact Statement for NISP found extensive negative impacts to the river based on climate change predictions, including to the hydrology, temperature increases that adversely affect fish and other species, flows, changes in runoff timing that greatly affects agriculture, recreational uses, and much more.

Three groups–Save the Poudre, No Pipe Dream, and Save Rural NoCo–have clearly demonstrated the many issues that have been downplayed or ignored in the NISP application, and that are required by Larimer County's land use regulations. The issues include a broad range of serious violations of regulations, including the evaluation of:

- the lack of a permit for the "realignment" of Highway 287,
- the lack of water rights to operate the project,
- inconsistency with the County Master Plan,
- the complete lack of an alternatives analysis,
- the impact on public health and safety,
- the inability of the County to fund the project,

- the impact on the Cache la Poudre River of draining vast amounts of its water,
- the project relies on a huge farm-buying scheme that the Army Corps said was not feasible and too expensive,
- noise caused by power boats and recreation at the proposed Glade Reservoir; and
- the lack of mitigation.

These issues must be fully investigated and results considered in the application process *prior to approval of the 1041 permit*. Approval of the 1041 application while lacking adequate analysis and without meeting associated regulatory requirements would pose a significant vulnerability to litigation, with potential for substantial cost to County taxpayers.

It is ironic that the proposed pipeline route for NISP would follow closely or exactly the same route that was proposed for the Thornton pipeline. The County Commissioners have not forgotten that they unanimously denied the Thornton pipeline route last year. It does not follow that the same affected Larimer County residents would favor a NISP pipeline along the same route—and it would be quite contradictory for the Commissioners to approve it.

NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the proposed Glade Reservoir. Northern Water plans to buy "dozens and dozens" of Larimer and Weld County farms and obtain exchange agreements with water users to obtain the 22,000 acre-feet needed to supply NISP—which is about one-half the water required for Glade Reservoir. According to an April 2020 article in the Coloradoan, Northern Water only purchased its first farm under their new scenario in February—to the cost of $330,000, which netted Northern Water 30 acre-feet.

Of the 15 communities and water districts that hold shares in NISP, most are outside the Poudre's watershed, giving them little stake in the overall health of the river. In fact, Larimer County residents will be left with a degraded river and with little to no benefit from the project.

In addition to its importance to agriculture, municipal, and industrial use, the Poudre is an important recreation source. Not only do boaters, anglers, picnickers, and hikers enjoy the upper stretches of the river, they also treasure its opportunity and beauty as it winds through Fort Collins and beyond. If NISP is permitted, the predicted drops in flows and fluctuations will negatively impact the riparian habitat, the fishery, and the aesthetics of the river as it flows through Fort Collins and beyond. The newly finished White Water Park near downtown Fort Collins is already so popular that it is hard to find parking near the access points. If NISP is allowed, the park may need to change its name to the "Puddle Park." Although NISP would bring a new reservoir that would attract similar recreation attention as Horsetooth Reservoir, flatwater recreation is not a substitute for the loss of river recreation options and negative riparian health impacts in the Poudre River corridor. In addition, NISP is strongly opposed by many of the people who would be displaced by the new Hwy. 287 road alignment and by the reservoir itself.

Earlier this month (June 2020), the City of Fort Collins' Land Conservation and Stewardship Board urged the Fort Collins City Council to strongly oppose NISP for myriad of reasons, including those discussed above. Their letter made worthy arguments: "Fort Collins taxpayers have invested tens of millions of dollars to conserve unmatched ecological resources running through the heart of the City. There are 18 Natural Areas that either border on the Poudre River or are connected to it by riverside forests and wetlands; they encompass 1800 acres…Riverside forests and wetlands do not drink primarily from rainfall; they drink from the river. NISP's removal of water from the river will, quite simply, dehydrate our Natural Areas' ecological resources and degrade them; hundred-year-old trees will die, understory

plants will shift to more drought tolerant species, biodiversity will decrease, and forest- and wetland-dependent animals will disappear.

“The citizens of Fort Collins, as they have invested in Natural Areas, have believed that those areas and their ecological resources and recreational opportunities would be protected in perpetuity. In the opinion of this Board, perpetuity ends on the day that NISP bulldozers arrive to divert water from the Poudre River.

“NISP brings no benefits to the City of Fort Collins, and City Staff previously identified dozens of risks to the physical river, its biota, and its surrounding ecosystems. We have watched, over many years, as Northern Water has proposed mitigations and how these mitigations have then required further mitigations. Continuing this pattern, the recent 1041 application to Larimer County proposes heretofore unseen details for which Staff and this Board have identified numerous unaddressed mitigation requirements. By now it is clear that the cascade of mitigations is unending. The impacts of NISP on the river and adjacent Natural Areas cannot be mitigated. Our Natural Area assets, assembled with decades of effort and tens of millions of dollars investment, will, under NISP, suffer devastating permanent harm.”

There are alternatives to NISP. Although some of the efforts to lower water consumption have been addressed or considered, much more could, and should be, done. Save the Poudre provides a plan forward that includes:

- Tiered water rates that reward conservation with lower costs to customers who conserve.
- Comprehensive public education and awareness programs about quick-payback water conservation measures.
- Rebate/retrofit programs for low-water use landscaping, low-water-use toilets, shower heads, washing machines, and dishwashers.
- Water fallowing contracts between municipal, industrial, and agricultural users, with investments in agricultural water conservation and water use efficiency in return for use of agricultural water.
- Use Growth-Displaced Water Transfers, i.e., transfer water rights from lands developed by growing communities to the communities needing water.
- Landscape irrigation monitoring and improvement programs to reduce water wasted in excessive irrigation.
- Reduce consumptive use on irrigated acreages and improve the efficiency of agricultural return flows to provide transferable water for other uses.
- Use of gray-water systems and interfacing gray-water systems with water recycling systems wherever possible.

Save The Poudre, in partnership with Western Resource Advocates, has developed an alternative to the destructive NISP/Glade Reservoir proposal that would supply the same amount of water for the growing municipalities at a fraction of the cost and environmental damage.

Northern Water has been proposing various projects to siphon the Poudre River since the 1980s. Those projects have not succeeded because they have all been destructive, expensive, unnecessary projects. It is time to put NISP and Glade Reservoir to rest.

We urge the Larimer County Commissioners to deny the 1041 permit.
Sincerely,
Sierra Club Poudre Canyon Group

Applicant Information

3770

Katie Beilby <beilbykm@co.larimer.co.us>

Fwd: NISP 1041 Conditions

Rob Helmick <helmicrp@co.larimer.co.us> Wed, Jun 24, 2020 at 2:03 PM
To: Katie Beilby <beilbykm@co.larimer.co.us>

conditions from northern

---------- Forwarded message ---------
From: **Stephanie Cecil** <scecil@northernwater.org>
Date: Tue, Jun 23, 2020 at 12:20 PM
Subject: NISP 1041 Conditions
To: Lesli Ellis <ellislk@co.larimer.co.us>
Cc: Christie Coleman <ccoleman@northernwater.org>, Rob Helmick <helmicrp@co.larimer.co.us>

Lesli,

As discussed last week, we do plan on touching on a few condions with some r ecommended minor wording changes. This is from our presentaon and includes the tw o condions:

Condition: Prior to construction, secure written confirmation from all affected irrigation companies that are impacted by this project by reservoir or pipelines.
There is no guarantee that each irrigation company will provide a written response.
Recommended condition: The applicant shall demonstrate that it has contacted all affected irrigation companies.

Condition: Pipeline alignment alterations greater than 50 feet must be evaluated by Larimer County and may be subject to reconsideration by the BOCC. All alignment changes on private property shall include approval of the landowner.
The Larimer County Land Use Code 14.13 has requirements for technical revisions or 1041 amendments that would need to go back in front of the BOCC.
Recommended condition: Alterations greater than 100 feet or that move within 100 feet of an existing structure must be evaluated by Larimer County staff. Alignment changes on private property shall be coordinated with the landowner in addition to staff review.

Thanks!

Stephanie Cecil, P.E., PMP | Water Resources Project Engineer
220 Water Ave | Berthoud, CO 80513
Direct 970-622-2231 | Cell 970-685-0061

Main 800-369-RAIN (7246)
www.northernwater.org | Find us on Facebook

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Robert Helmick
Senior Planner

Community Development Department
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521
970-498-7682
rhelmick@larimer.org
https://www.larimer.org/planning

Dewberry HDR

MEMORANDUM

Date: June 12, 2020

To: Larimer County Planning Department

From: Randy Parks – Dewberry, Michael Gossett and Madeleine Harris - HDR

Subject: Northern Integrated Supply Project – Construction Approach in Residential Areas – Revised June 2020

Overview

Due to the proximity of the Northern Tier alignment to Eagle Lake Subdivision, County Road 52 and Bold Venture Way/Grey Rock Drive, the design team developed a preliminary approach to construction access and estimated construction duration so that the impacts to the residents in these areas and the traveling public could be better understood. The alignment was broken into several segments in each area in order to optimize analysis and construction traffic routing.

Construction Phasing

Construction phases throughout the different segments will be overlapping, not additive nor independent of each other. There are three major phases of construction, defined as follows:

Clearing/Site Prep/SWMP- This is a relatively light construction phase. This phase mainly involves preparing the area for installation. This includes removing vegetation/roots that are in the pipeline easement and stockpiling/protecting topsoil. It also includes other site prep work, including setting up signage, assembling equipment, and materials. Finally, this phase includes preparing the site for stormwater management, which could include installation of silt fences, or other best management practices to prevent erosion caused by stormwater drainage. This phase of construction requires small to medium-duty construction vehicles. There may also be larger delivery trucks who occasionally arrive to drop off pipe in preparation for construction.

Pipe Installation- This is the most significant phase of construction and includes digging the trench for the pipeline, laying the pipeline in the trench, welding joints as needed, backfilling the trench and compacting the area as needed. This construction phase will require larger tracked excavators, front-end loaders, dump trucks and stock-piling of materials to complete the work. Speed limits will be set for the delivery and construction vehicles of 10-15 mph to ensure safety of the site.

Restoration and Reclamation- This is also a relatively light construction phase. This phase mainly includes restoring the construction area to conditions prior to construction. This includes re-seeding as needed, and other restoration efforts. It will consist of small agricultural tractors and pick-up trucks. This phase is typically not consecutive like the other phases as the contractor will usually coordinate restoration/reclamation as needed as pipe installation progresses.

Dewberry HDR

MEMORANDUM

Individual Homeowner Impacts

A homeowner whose property is along the construction path will not experience construction on their property for the entire overall construction duration for that area. For example, a homeowner with a 500' stretch of their property abutting the alignment might expect about one week of clearing/site prep/SWMP, about one week of pipeline installation, and about one week of restoration/reclamation. In total, the 500' stretch will likely only see heavy activity for around 3 weeks. This work may be spaced out depending on weather, soil conditions, detailed reclamation plans and appurtenance requirements.

See Figure 1 below for a timeline and intensity of work diagram with photos of each construction phase activity a typical homeowner might experience.

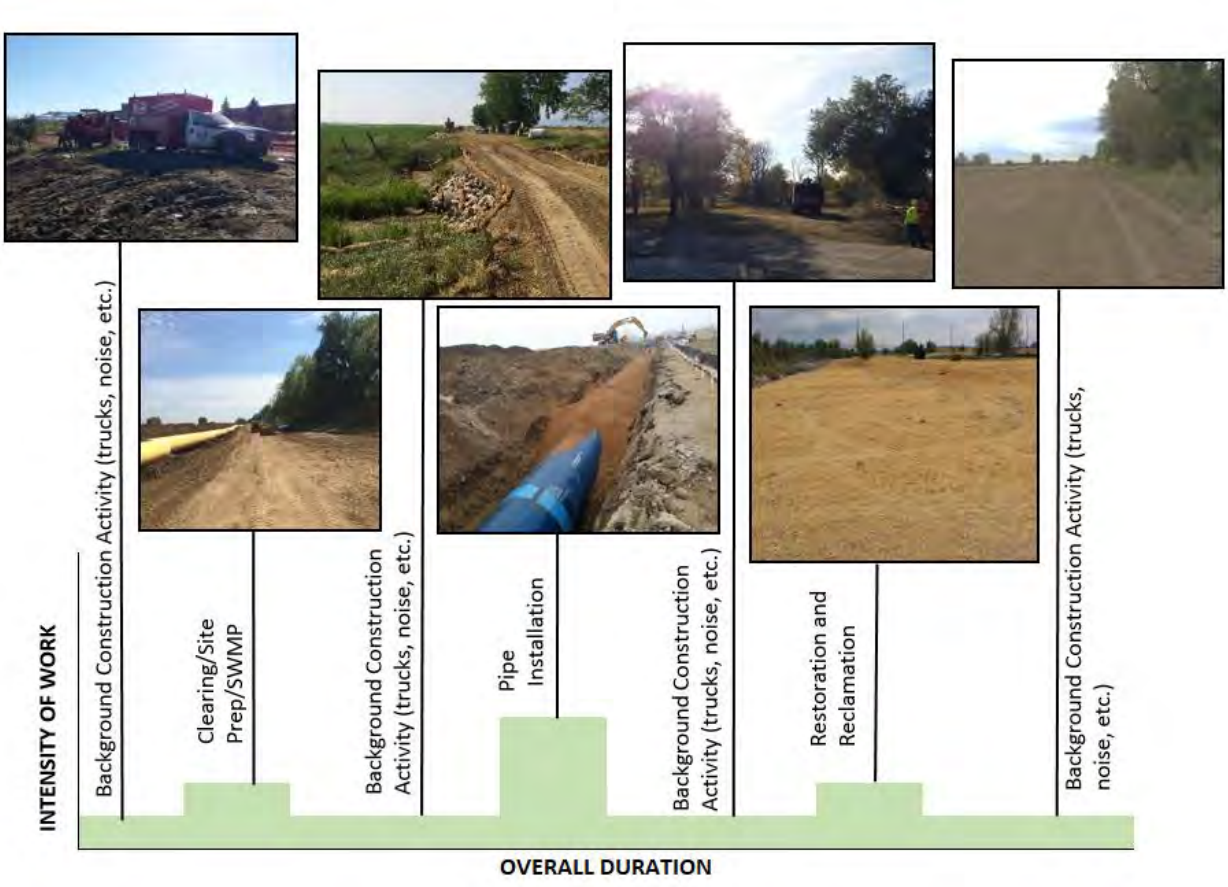

Figure 1: Typical Levels of Activity throughout Construction Duration

Dewberry HDR

MEMORANDUM

Eagle Lake Subdivision

The scope of analysis and segments through Eagle Lake Subdivision are shown in Figure 2 below. The alignment through this area was broken into five segments.

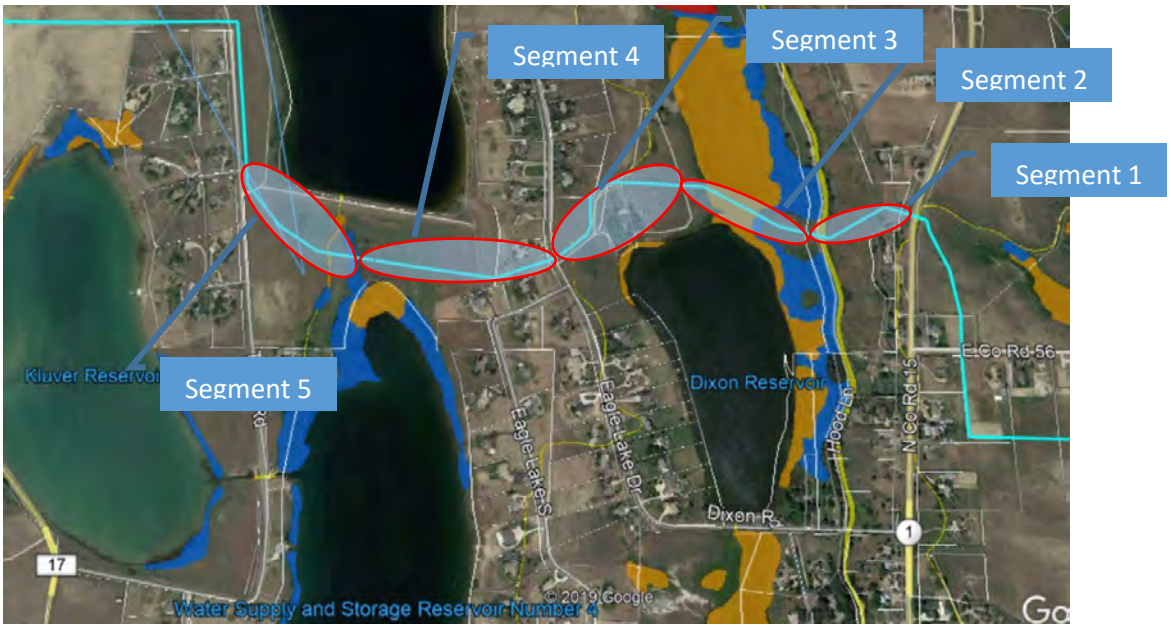

Figure 2: Scope of analysis and segments through Eagle Lake Subdivision

Overall Construction Duration

Construction through the five segments will be overlapping, not additive nor independent of each other. In total, estimated duration of construction through this area is around 14 weeks.

A proposed comprehensive timeline for construction throughout all five segments (approx. 6,000' in total) is displayed in Figure 3. The three major phases of construction are also indicated in the figure.

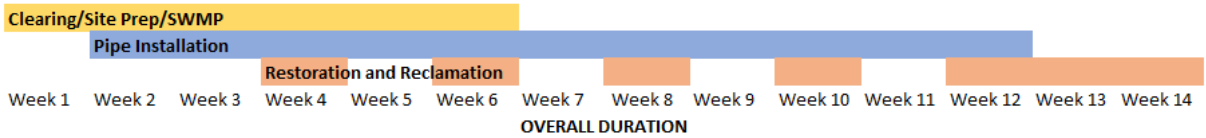

Figure 3: Overlapping construction timeline and phases

As illustrated in Figure 3 above, the estimated durations for each construction phase through the entire Eagle Lake area are as follows:

1. Clearing/Site Prep/SWMP – 6 weeks

2. Pipe Installation for All Segments – 7-11 weeks
3. Restoration and Reclamation – 7 weeks

Construction Duration and Access by Segment

Construction access will be specified by individual segments indicated in Figure 2. Specifying construction access points for each segment will ensure that the least amount of disruption to homeowners and private roadways is maintained. Construction access will be coordinated with individual landowners and the pipeline contractor. Access is subject to change.

Construction activities throughout all segments will occur concurrently to expedite the overall process. Approximate durations of impact provided below for each segment will are overlapping, and should not be summed for a total duration of impact.

Segment 1 – Highway 1 to Hood Lane. Construction and material delivery vehicles will access the alignment via the alignment as it connects to Highway 1. In most cases entering via Highway 1 and exiting via Hood Lane. This segment is approximately 800 feet in length. In total it is anticipated that this area will be impacted for approximately 4 weeks. Since Highway 1 is a paved and highly-trafficked road, construction across Highway 1 will consist of trenchless methods so traffic on that roadway will not be restricted by construction activity. Since Hood Lane is a semi-private gravel road, the pipeline across Hood Lane will be installed with an open cut method. However, homeowner access will be maintained at all times with temporary detours. The road will be returned to current conditions, so only temporary impacts to the roadway are expected.

Segment 2 – Wetlands North of Dixon Reservoir. Construction and material delivery vehicles will access the alignment via the alignment, Hood Lane and Eagle Lake Drive. In most cases entering via Hood Lane and Exiting via Eagle Lake Drive. This will require access to the Eagle Lake Subdivision via the gated entrance at Eagle Lake Drive and Highway 1. This segment is approximately 1,100 feet in length. In total it is anticipated that this area will be impacted for approximately 4 weeks. Because of the presence of wetlands in this segment, construction traffic will not access the alignment via Hood Lane once construction and restoration of this segment is completed. Unless otherwise requested by the County, it is proposed that the Contractor not be allowed to use Eagle Lake Court for construction access.

Segment 3 – Private Property East of Eagle Lake Drive (TIPS COREY ALLEN/KAREN KRISTIN). Construction and material delivery vehicles will access the alignment via Eagle Lake Drive and will use Eagle Lake Drive to both enter and exit the site. This will require access to the Eagle Lake Subdivision via the gated entrance at Eagle Lake Drive and Highway 1. It is anticipated that sufficient temporary easement will be obtained from TIPS COREY ALLEN/KAREN KRISTIN to allow construction vehicles to turn around at the eastern end of this segment and exit the same way they came in. This segment is approximately 1,500 feet in length. In total it is anticipated that this area will be impacted for approximately 5 weeks. Unless otherwise requested by the County, it is proposed that the Contractor not be allowed to use Eagle Lake Court for construction access. The pipeline across Eagle Lake Drive will be crossed using trenchless methods so residential traffic using Eagle Lake Drive will not be restricted.

Segment 4 – Private Property west of Eagle Lake Drive to drainage between Water Supply and Storage Reservoirs 3 and 4. Construction and material delivery vehicles will access the alignment via the Eagle Lake Drive both for construction traffic entering and exiting the site. This will require access to the Eagle Lake Subdivision via the gated entrance at Eagle Lake Drive and Highway 1. It is anticipated that sufficient temporary easement will be obtained from the Water Supply and Storage Company to allow construction vehicles to turn around at the eastern end of the wetland that connects the two reservoirs. This segment is approximately 1,500 feet in length. In total it is anticipated that this area will be impacted for approximately 5 weeks. Unless otherwise requested by the County, it is proposed that the Contractor not be allowed to use Eagle Lake Court for construction access. Because of the presence of wetlands in this segment, construction traffic will not access the alignment via Eagle Lake Drive once construction and restoration of this segment is completed.

Segment 5 – Private Property east of Travis Road to drainage between Water Supply and Storage Reservoirs 3 and 4. Construction and material delivery vehicles will access the alignment via Travis Road and will use Travis Road to both enter and exit the site. It is anticipated that sufficient temporary easement will be obtained from the Water Supply and Storage Company to allow construction vehicles to turn around at the western end of the wetland that connects the two reservoirs. This segment is approximately 1,100 feet in length. In total it is anticipated that this area will be impacted for approximately 4 weeks.

County Road 52

The scope of analysis and segments near County Road 52 are shown in Figure 4 on the next page. The alignment through this area was broken into seven segments.

Overall Construction Duration

Construction throughout the seven segments will be overlapping, not additive nor independent of each other. In total, estimated duration of construction through this area is around 20 weeks.

A proposed comprehensive timeline for construction throughout all seven segments (approx. 12,500' in total) is displayed in Figure 5 on the next page. The three major phases of construction are indicated in the figure.

As illustrated in Figure 5 on the following page, the estimated durations for each construction phase through the County Road 52 area are as follows:

1. Clearing/Site Prep/SWMP – 9 weeks
2. Pipe Installation for All Segments – 15-17 weeks
3. Restoration and Reclamation – 10 weeks

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MEMORANDUM

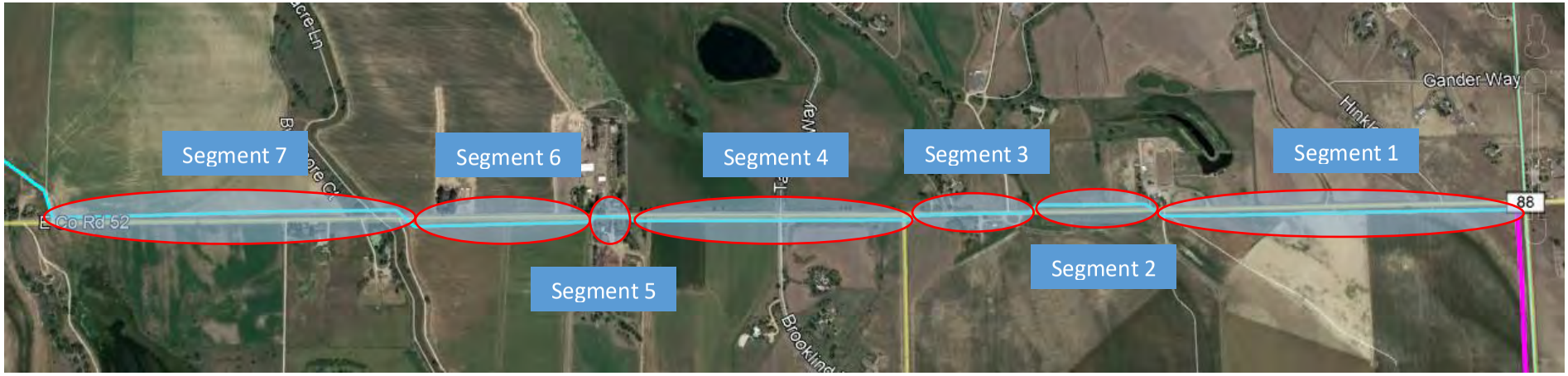

Figure 4: Scope of analysis and segments near CR 52

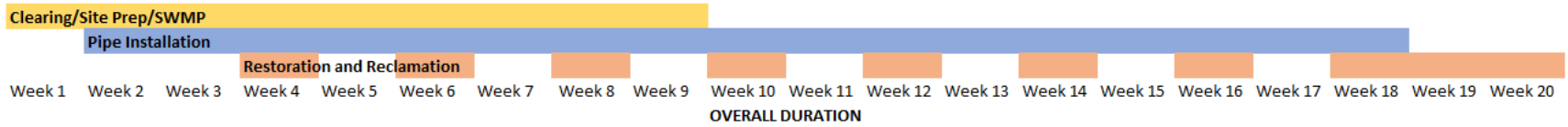

Figure 5: Overlapping construction timeline and phases for entire duration

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MEMORANDUM

Construction Duration and Access by Segment

Construction access will be specified by individual segments, as identified in Figure 4. Specifying construction access points for each segment will ensure that the least amount of disruption to homeowners and private roadways is maintained. Construction access will be coordinated with individual landowners and the pipeline contractor. Access is subject to change.

Construction activities throughout all segments will occur concurrently to expedite the overall process. Approximate durations of impact provided below for each segment will are overlapping, and should not be summed for a total duration of impact.

Segment 1 – From intersection with the County Line Pipeline on the west side of County Road 1 to the point where the alignment crosses CR 52 from the south of the road to the north. Construction and materials delivery vehicles will access the alignment via CR 52. In most cases, the vehicles will enter along CR 1 from the north, and exit along CR 3 to the south. This segment is approximately 3,100 feet in length. In total, it is anticipated that this area will be impacted for approximately 6 weeks. The alignment is south of CR 52 for the majority of the segment. The pipeline does cross CR 52 from the south side of the road to the north side of the road at the end of the segment. Since CR 52 is a gravel road in this area, the pipeline across County Road 52 will be installed with an open cut method. However, only one lane at a time will be closed and flaggers will be on site so traffic will not be restricted. The road will be restored to current conditions, so only temporary impacts to the roadway are expected.

Segment 2 – From the end of Segment 1, where the pipeline crossed to the north side of CR 52, through to the point where the alignment enters the CR 52 ROW. Construction and materials delivery vehicles will access the alignment via CR 52. In most cases, the vehicles will enter along CR 1 from the north, and exit along CR 3 to the south. This segment is approximately 1,000 feet in length. In total, it is anticipated that this area will be impacted for approximately 4 weeks. The alignment is north of CR 52 for the majority of the segment. The pipeline does cross into CR 52 ROW from the north side of the road at the end of the segment. The pipeline is shown in the ROW in this section to avoid impacts to residences in the area and avoid drainage ponds to the south. Since CR 52 is a gravel road in this area, the pipeline within County Road 52 will be installed with an open cut method. However, homeowner access will be maintained at all times with temporary detours.

Segment 3 – Includes the portion where the alignment is within the CR 52 until it crosses back to the south of CR 52, right before crossing CR 3. Construction and materials delivery vehicles will access the alignment via CR 52. In most cases, the vehicles will enter along CR 1 from the north, and exit along CR 3 to the south. This segment is approximately 950 feet in length. In total, it is anticipated that this area will be impacted for approximately 4 weeks. The alignment is within CR 52 ROW for most of the segment. The alignment is in the ROW in this area in order to minimize impacts to landowners and trees on either side of the road in this constricted area. Since CR 52 is a gravel road in this area, the pipeline within County Road 52 will be installed with an open cut method. However, homeowner access will be maintained at all times with temporary detours. The road will be restored to current conditions, so only temporary impacts to the roadway are expected.

Segment 4 – Includes the stretch that crosses CR 3, and Brooklind Estates/Barry Lane and continues to parallel the south side of CR 52 until the point where the alignment pinches in closer to the road near residences along CR 52. Construction and materials delivery vehicles will access the alignment via CR 52. In most cases, the vehicles will enter along N Frontage Road from the north, and exit along CR 3 to the south. This segment is approximately 2,400 feet in length. In total, it is anticipated that this area will be impacted for approximately 5 weeks. The alignment is south of CR 52 for the majority of the segment. The pipeline does cross CR 3 at the east end of the segment. Since CR 3 is a gravel road in this area, the pipeline across County Road 52 will be installed with an open cut method. However, only one lane at a time will be closed and flaggers will be on site so traffic will not be restricted. The road will be restored to current conditions, so only temporary impacts to the roadway are expected. The segment also crosses Barry Lane/Brooklind Estates. This crossing will be a trenchless crossing at the road is paved in this location. Since the crossing will be trenchless, no roadway or traffic impacts are expected.

Segment 5 – Includes the stretch that is very close to CR 52 ROW before it jogs back further to the south of CR 52. Construction and materials delivery vehicles will access the alignment via CR 52. In most cases, the vehicles will enter along N Frontage Road from the north, and exit along CR 3 to the south. This segment is approximately 400 feet in length. In total, it is anticipated that this area will be impacted for approximately 5 weeks. The alignment will be constructed closer to the CR 52 roadway than other segments. This was done to minimize impacts to landowners and trees on either side of the road in this constricted area. Due to the close proximity of the alignment to the road for this small segment, construction staging will likely occur in one lane, but there will be no excavation in the roadway. Only one lane at a time will be closed for staging and flaggers will be on site so traffic will not be restricted. Access to residences in the area will be maintained at all times.

Segment 6 – Includes the stretch that is south of CR 52 through the point where the alignment crosses CR 52 to be on the north side again. Construction and materials delivery vehicles will access the alignment via CR 52. In most cases, the vehicles will enter along N Frontage Road from the north, and exit along CR 3 to the south. This segment is approximately 1,750' feet in total length including the crossing of CR 52. In total, it is anticipated that this area will be impacted for approximately 5 weeks. The alignment is south of CR 52 for the majority of the segment. The pipeline does cross CR 52 from the south side of the road to the north side of the road at the end of the segment. This crossing was included in other to avoid impacts to residences on the south side of the road and avoid a pond. Since CR 52 is a paved road in this area, the pipeline across County Road 52 will be installed with a trenchless method. Since the crossing will be trenchless, no roadway or traffic impacts are expected.

Segment 7 – Includes the portion that parallels the north side of CR 52 before the alignment heads north east of the golf course and includes the crossing of Broadacre Lane. Construction and materials delivery vehicles will access the alignment via CR 52. In most cases, the vehicles will enter along N Frontage Road from the north, and exit along CR 3 to the south. This segment is approximately 2,900 feet in length, including the crossing of Broadacre Lane. In total, it is anticipated that this area will be impacted for approximately 6 weeks. The alignment is north of CR 52 for the entire length of the segment. The pipeline does cross Broadacre Lane at the east end of the segment. Since Broadacre Lane appears to be a gravel residential drive, the pipeline across Broadacre Lane will be installed with an open cut method.

However, homeowner access will be maintained at all times with temporary detours. The road will be restored to current conditions, so only temporary permanent impacts to the roadway are expected.

Bold Venture Way/Grey Rock Drive

The scope of analysis and segments near Bold Venture Way/Grey Rock Drive are shown in Figure 6 below. The alignment was broken into two segments.

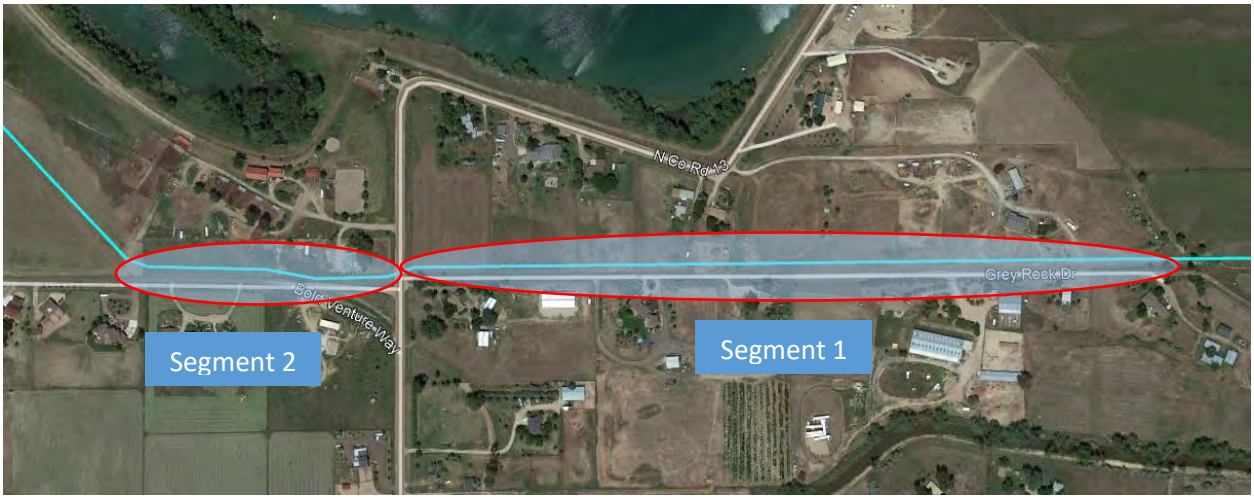

Figure 6: Scope of analysis and segments near Bold Venture Way and Grey Rock Drive

Overall Construction Duration

Construction throughout the two segments will be overlapping, not additive nor independent of each other. In total, estimated duration of construction through this area is around 10 weeks.

A proposed comprehensive timeline for construction throughout both segments (approx. 3,500' in total) is displayed in Figure 7. The three major phases of construction are indicated in the figure.

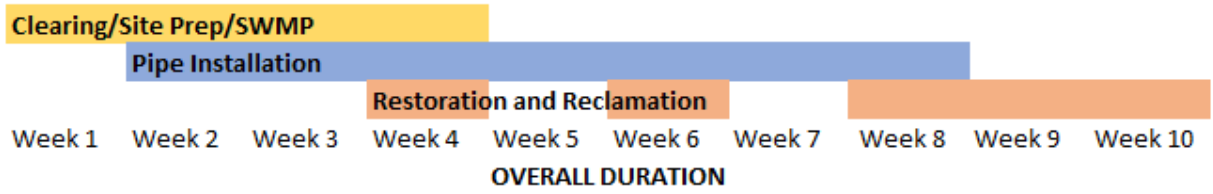

Figure 7: Overlapping construction timeline and phases

As illustrated in Figure 7 above, the estimated durations for each construction phase through Bold Venture Way/Grey Rock Drive area are as follows:

1. Clearing/Site Prep/SWMP – 4 weeks
2. Pipe Installation for All Segments – 5-7 weeks

3. Restoration and Reclamation – 5 weeks

Construction Duration/Access by Segment

Construction access will be specified by individual segments, as identified in Figure 6. Specifying construction access points for each segment will ensure that the least amount of disruption to homeowners and private roadways is maintained. Construction access will be coordinated with individual landowners and the pipeline contractor. Access is subject to change.

Construction activities throughout all segments will occur concurrently to expedite the overall process. Approximate durations of impact provided below for each segment will are overlapping, and should not be summed for a total duration of impact.

Segment 1 – Following the north side of Grey Rock Drive from the dead end to the east up to the crossing of County Road 13 to the west. Construction and materials delivery vehicles will access the alignment via the alignment as it connects to CR 54, to the southeast. In most cases, the vehicles will enter the site from CR 54 to the south, where they will follow the alignment until they reach Grey Rock Drive, and will exit along CR 13 headed south. This segment is approximately 2,500 feet in length. In total, it is anticipated that this area will be impacted for approximately 6 weeks. The alignment is north of Grey Rock Drive for the entire stretch, so no permanent impacts are expected to the roadway.

Segment 2 – Crossing of County Road 13 and paralleling of Bold Venture Way to the north. Construction and material delivery vehicles will access the alignment via the alignment as it connects to Highway 1 to the west. In most cases, the vehicles will enter the site from Highway 1, where they will follow the alignment until they reach Bold Venture Way, and will exit along CR 13 headed south. This segment is approximately 1,000 feet in length, including the crossing of CR 13. In total, it is anticipated that this area will be impacted for approximately 4 weeks. The pipeline across County Road 13 will be installed with an open cut method. However, only one lane at a time will be closed and flaggers will be on site so traffic will not be restricted. The road will be restored to current conditions, so only temporary impacts to the roadway are expected. Otherwise, the alignment is north of Bold Venture Way for the entire stretch, so no permanent impacts are expected to the roadway.

Availability of Space for Other Pipeline in Preferred Corridor

Northern Water has not identified a need for an additional pipe in this corridor for its conveyance needs. Should another entity petition the County for a permit to construct a pipeline in parallel to Northern Water's pipeline, adequate space generally exists to accommodate that pipeline. Northern Water will typically acquire 40 feet of permanent easement plus an additional 60 feet of temporary easement for this project. If another pipeline were to be approved by the County, its permanent easement could abut or overlap Northern Water's permanent easement and they could use Northern Water's permanent easement as their temporary easement.

MEMORANDUM

Northern Integrated Supply Project
Glade Reservoir
Construction Staging

B&V Project Number 403758
B&V File 188754/34.3000
June 10, 2020

To: Larimer County Planning Department

From: Tim Engemoen and Arlene Little, Black & Veatch

Introduction

This technical memorandum identifies probable construction staging areas and construction material sourcing associated with construction of the Glade Unit. This has been done in support of the Larimer County 1041 Permit for the Glade Unit construction. For purposes of this memorandum, construction staging areas are defined as locations used for the storage of construction related equipment and materials, such as office trailers, vehicles and stockpiles.

Project Background

The Northern Integrated Supply Project (NISP) will provide a new raw water supply to several municipal water providers in Northern Colorado. NISP includes the following facilities located in Larimer County: the Glade Unit; the Glade Pump Station; raw water distribution piping; and the relocation of U.S. Hwy. 287. The Glade Unit features the Glade Reservoir Dam, which is an earthen embankment that impounds an off-channel reservoir complete with hydraulic structures required by the State Engineer's Office: the High Level Outlet Works (HLOW); Low Level Outlet Works (LLOW); and spillway.

The Glade Unit also includes expansion of the existing Poudre Valley Canal (PVC) and a new forebay downstream of the dam. A Control Gate structure will be constructed to control flow to the existing portion of the PVC downstream of the forebay. The existing PVC Diversion Structure will be demolished and rebuilt to allow increased diversion of flow from the Poudre River. A portion of the existing Munroe Gravity Canal alignment will be inundated by Glade Reservoir, this open canal will be replaced by the Munroe Canal Bypass (MCB), a conduit and several control structures that will convey flow beneath the reservoir.

The Glade Unit also includes: the Glade Pump Station, which will pump water from the forebay into Glade Reservoir; the Electrical/Control building that will distribute power throughout the site and provide control of the various hydraulic features; the Surge Building that will house surge tanks to protect the pump station discharge conduit; and numerous buried conduits with control valve vaults that connect these facilities. Raw water will be conveyed off site via several buried conduits that are discussed in separate reports. The Glade Unit will include recreational amenities for the general public, including a Visitor Center, campgrounds, a boat ramp, trails and restroom facilities.

Glade Reservoir will submerge a portion of the existing U.S. Hwy. 287 alignment which will be relocated to the east of the reservoir. An existing power transmission line and several power distribution lines will be inundated by the reservoir which will be relocated as part of the Glade Unit construction. A general location map of the Glade Unit facilities is presented on Figure 1.

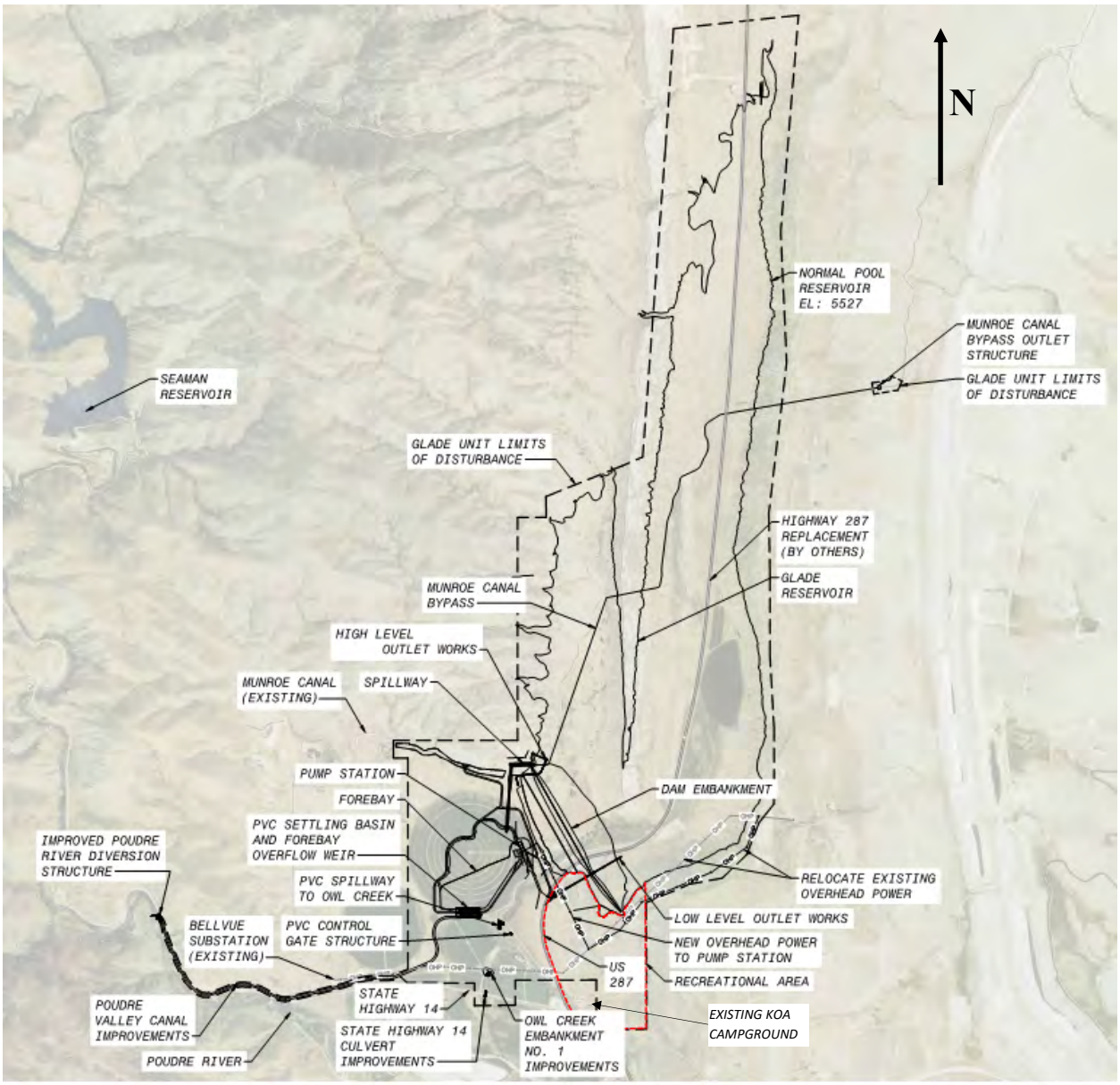

Figure 1 - Glade Unit Overview

Construction Staging Locations

The Glade Unit will be constructed under multiple construction contracts spread out over the project area depicted in Figure 1. The different contracts will likely be executed at different times. Therefore, construction associated with the Glade Unit will not occur concurrently. However, detailed scheduling of

the work will occur in discussion with the with the Construction Manager/General Contractor (CMGC) in 2021.

Without benefit of CMGC input at this time, the design engineer developed a construction contract breakdown and their associated estimated construction schedules.

- Contract 1 – Main Dam Embankment, Forebay, MCB – Construction early 2023 through 2027.
- Contract 2 – Poudre Valley Canal and Owl Creek Improvements – Construction during winters of 2022-2023, 2023-2024, 2024-2025, and 2025-2026. The work within the canal can only be completed when the canal is empty and not conveying irrigation water.
- Contract 3 – Glade Pump Station – Construction late 2024 through 2027.
- Contract 4 – 115 kV Overhead Powerline Relocation – Construction 2023.
- Contract 5 – Electrical Substation – Construction mid-2025 to mid-2027.

The following sections describe likely construction staging locations and strategies for the different components of the Glade Unit project.

Glade Reservoir, Forebay, and Wetlands

It is anticipated the construction of the reservoir, forebay, and wetlands will be completed in two phases to allow for continual presence of wetlands during construction. For both phases, the former KOA campground (east of Ted's Place at the intersection of U.S. Hwy. 287 and State Hwy. 14) will likely be used by the contractor as a temporary construction camp to include trailers, bathrooms, and laydown areas for equipment and materials.

Northern owns, or will own by the time of construction, all the land for the embankment, reservoir pool, and forebay; thus, the contractor will be able to use all this land for construction staging. Borrow material to construct the dam embankment will be taken from several locations across the project site (forebay location, east and west reservoir pool locations) so there will likely be heavy equipment and material stockpiles at various locations at any given time. It is anticipated that there will be routine construction traffic between the former KOA campground and the active construction site(s).

During Phase One, U.S. Hwy. 287 will still be in service through the project site. Phase One construction activities include the following:

- Excavation and foundation preparation for the embankment across the main valley to the west of the existing U.S. Hwy. 287 alignment.
- Tunneling of the LLOW, including upstream and downstream portal excavation which are located to the east of the existing U.S. Hwy. 287 alignment.
- Construction of new wetlands and habitat area on the east and west side of Owl Creek north of the PVC.

At the beginning of Phase Two construction, U.S. Hwy. 287 will be re-routed to its new alignment and the contractor will advance the construction of the embankment across the existing U.S. Hwy. 287 right-of-way. The tunnel for the LLOW will have been completed as part of the Phase One construction and this tunnel will now be used to bypass surface flows from Owl Creek around the construction site.

Glade Pump Station

The Glade Pump Station is located adjacent to the Forebay, just to the south of the dam embankment as shown in Figure 1. The exact staging area for the pump station will likely be adjacent to the forebay in the area between the forebay and the dam embankment.

Poudre Valley Canal

The PVC is being expanded from the Poudre River Diversion Structure to just east of the proposed forebay location. Temporary construction easement will be acquired along this stretch of the canal to provide the contractor adequate room for construction activities and for staging materials and equipment. Construction along the PVC will start at one end of the canal and progress either upstream or downstream so the entire area of the upgraded PVC will not all be impacted at the same time. Part of the PVC expansion will be widening the canal, and due to the proximity to State Hwy. 14, traffic will likely be temporarily reduced to a single lane during construction activities. As previously stated, construction of the canal will only take place during non-irrigating months when the canal is not flowing water.

One of the improvements to the PVC is the upgrade and expansion of the Poudre River Diversion Structure located at the west end of the Glade Unit (shown on Figure 1). The site of the Diversion Structure will likely be used by the Contractor as a main staging area for the PVC improvements for equipment and material storage.

Owl Creek

Improvements to Owl Creek include upgrading an embankment situated between the PVC and State Hwy. 14 and expanding the culvert crossing at State Hwy. 14. Access will come from State Highway 14. Temporary Construction easement will be acquired adjacent to Owl Creek to accommodate construction activities and materials staging.

Munroe Canal Bypass and 115 kV Overhead Powerline

The Munroe Canal is an existing irrigation canal that extends across the proposed Glade Reservoir pool. One of the components of construction Contract 1 is to convert a portion of the canal into a closed conduit system (steel pipe encased in concrete) through the reservoir pool. The MCB Inlet Structure is located on the right abutment of the main dam near the spillway and will likely share construction staging areas with the dam embankment work. The MCB Outlet Structure, located near the northeast portion of the reservoir (shown in Figure 1) is remote from other construction activities and will likely need temporary construction easement to provide adequate space for construction materials and equipment.

A portion of an existing 115 kV overhead powerline will be relocated since the existing alignment is partially contained within the reservoir pool. New permanent and temporary easement will be acquired as needed for material and equipment staging during the construction of the new overhead powerline. Like the work along the PVC, this work will progress in a linear fashion and the areas of disturbance will be limited at any given time.

Construction Material Sourcing

Construction of the dam embankment will require a vast amount of material including both soil and rock. The intent is to source most of the dam material on site from identified borrow areas located at the forebay location and the east and west reservoir pool locations. Analysis is still ongoing to determine the estimated amount of soil and rock available onsite for construction purposes. If adequate material cannot be produced from the borrow locations on site, some material may need to be imported from local quarries. It is anticipated that imported material will be brought to site using the I-25 and State Hwy. 14 haul route.

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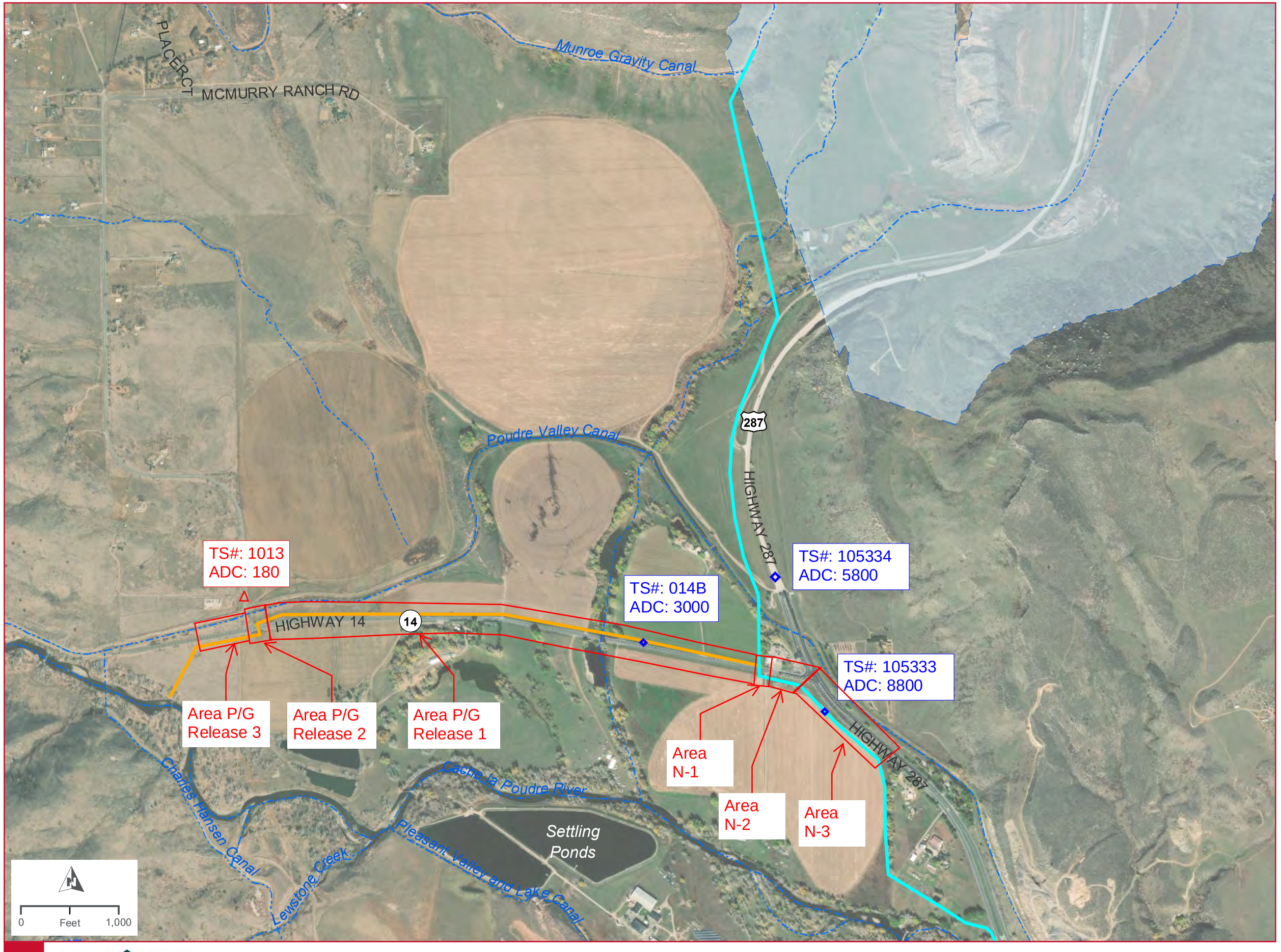
NORTHERN TIER
SHEET 1 OF 7
MAP SERIES 6: TRAFFIC STUDY



Legend

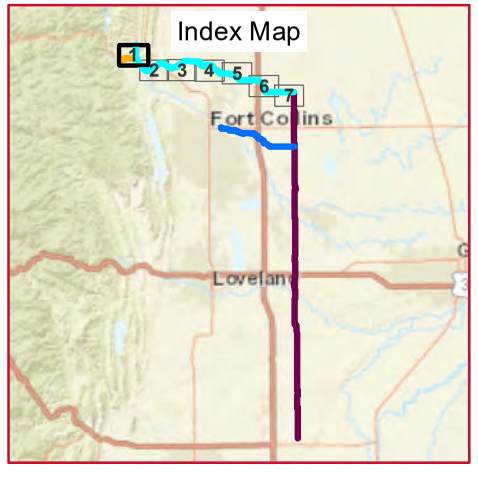
- Glade Release/Poudre Release Pipeline
- Northern Tier Pipeline
- Poudre Intake Pipeline
- County Line Pipeline
- County Boundary
- Railroad
- Stream/Ditch
- Glade Reservoir (future)

TS#: Traffic Station Number

ADC: Average Daily Count

△ Larimer County Traffic Count Station

◇ CDOT Traffic Count Station



Imagery Date: 10/2017, 03/2018

DATA SOURCES: Northern Water, Larimer County, HDR

NISP

NISP Northern Water Northern Integrated Supply Project

HDR Dewberry

NORTHERN INTEGRATED SUPPLY PROJECT

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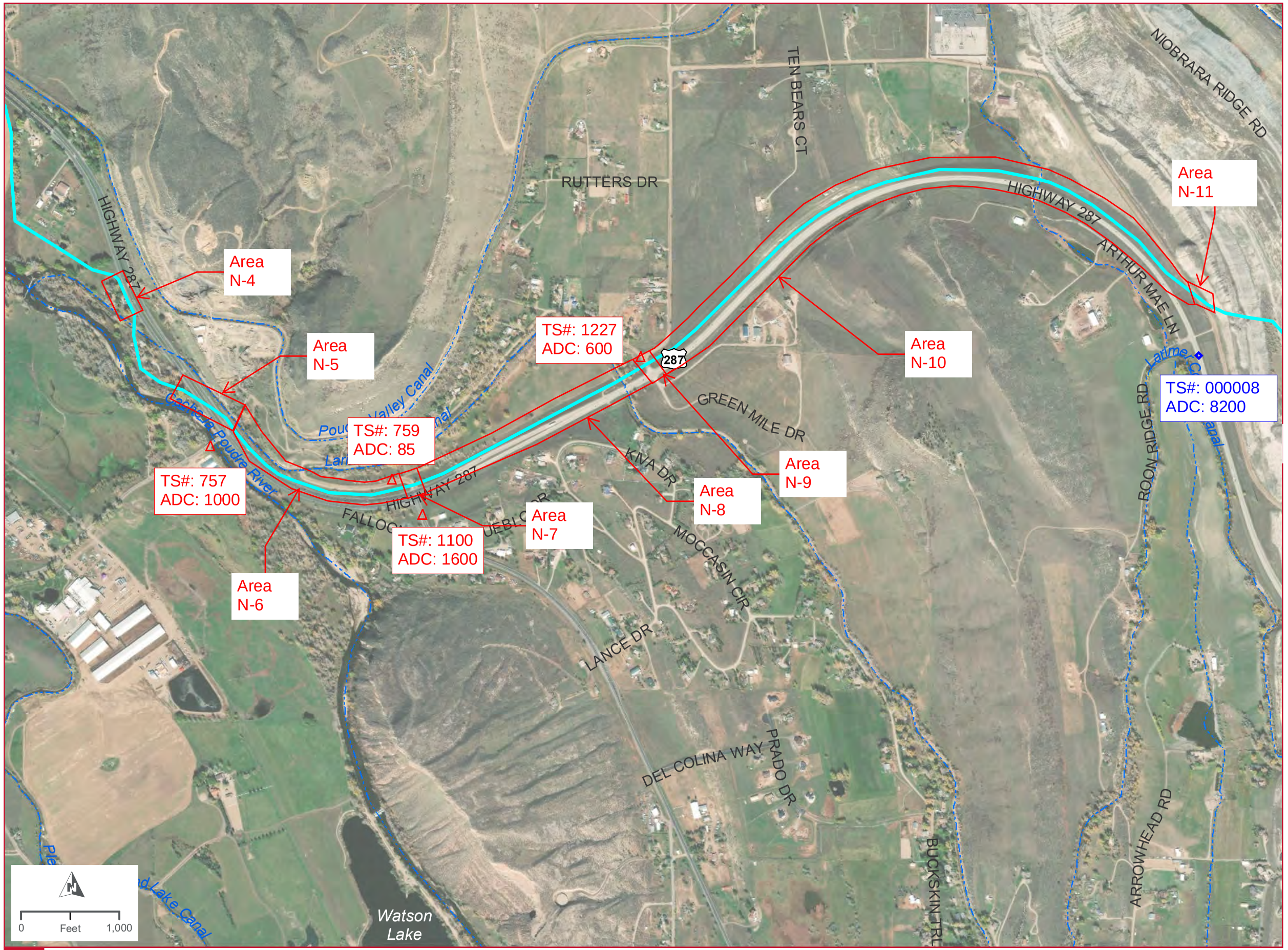
NORTHERN TIER
SHEET 2 OF 7
MAP SERIES 6: TRAFFIC STUDY



Legend

- Glade Release/Poudre Release Pipeline
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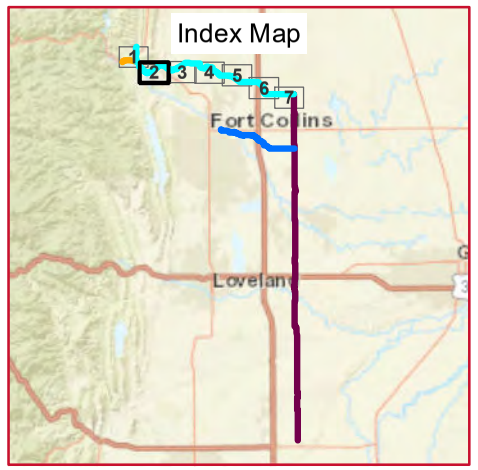

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DATA SOURCES: Northern Water, Larimer County, HDR

NISP Northern Water Northern Integrated Supply Project

HDR

Dewberry

NORTHERN INTEGRATED SUPPLY PROJECT

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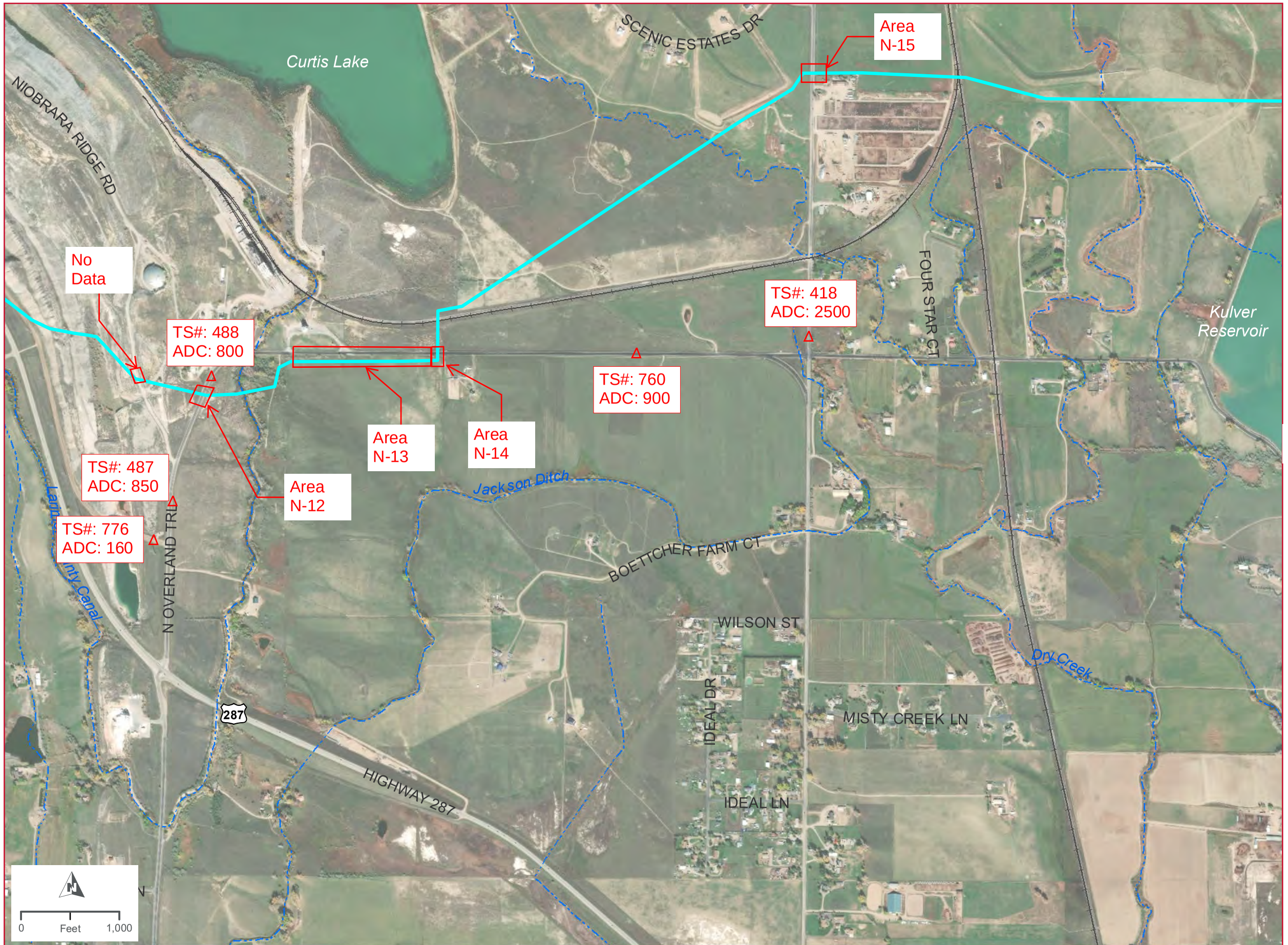

NORTHERN TIER
SHEET 3 OF 7

MAP SERIES 6: TRAFFIC STUDY

Legend

- Glade Release/Poudre Release Pipeline
- Northern Tier Pipeline
- Poudre Intake Pipeline
- County Line Pipeline
- County Boundary
- Railroad
- Stream/Ditch
- Glade Reservoir (future)

TS#: Traffic Station Number
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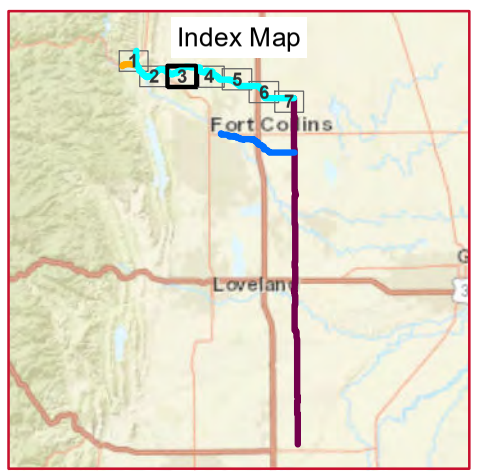
Larimer County Traffic Count Station
CDOT Traffic Count Station



Imagery Date: 10/2017

DATA SOURCES: Northern Water, Larimer County, HDR

NISP Northern Water Northern Integrated Supply Project

HDR Dewberry

NORTHERN INTEGRATED SUPPLY PROJECT

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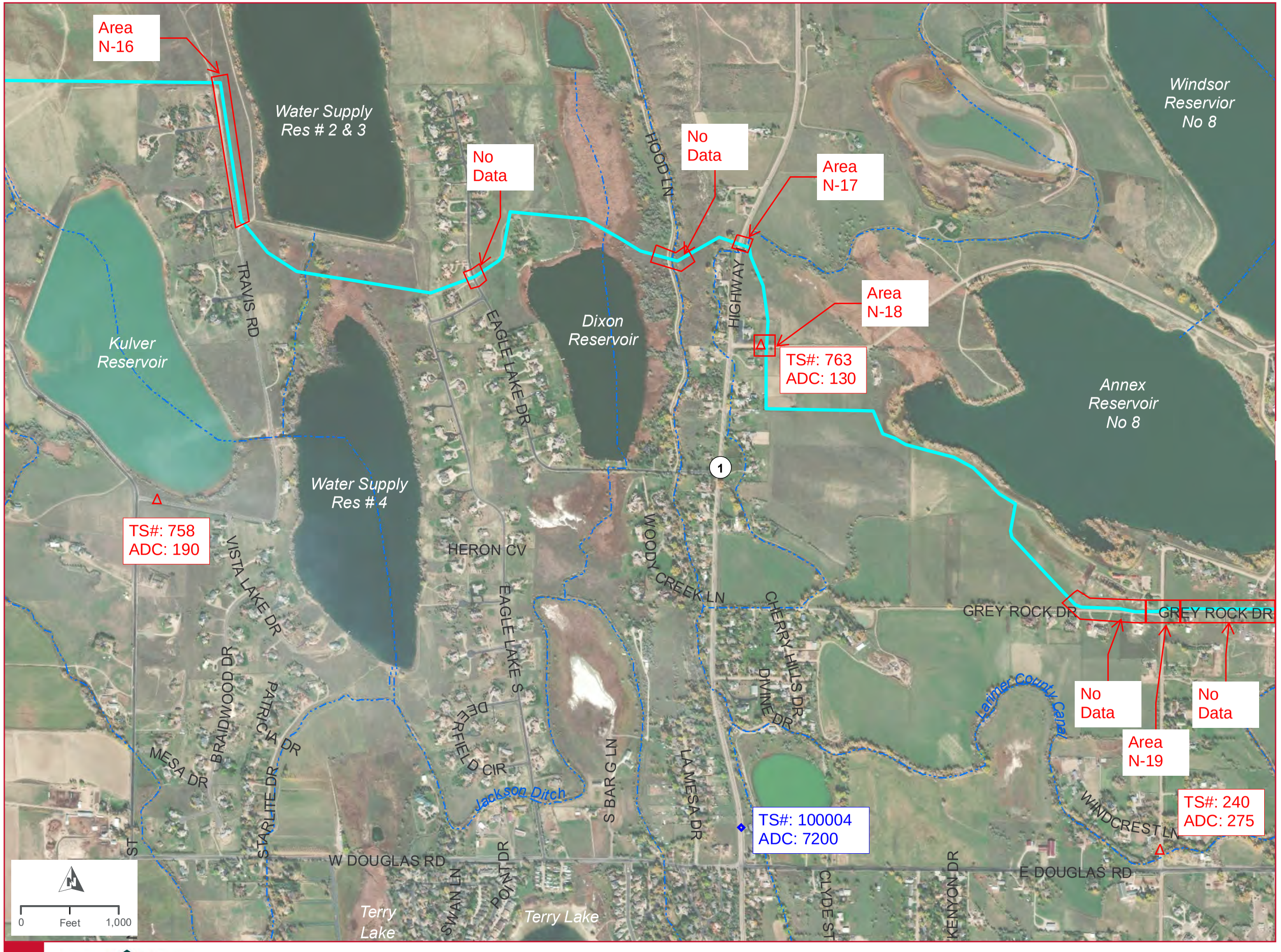


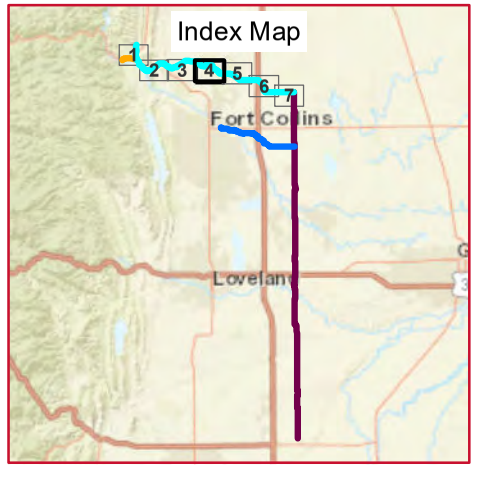
NORTHERN TIER
SHEET 4 OF 7

MAP SERIES 6: TRAFFIC STUDY

Legend

- Glade Release/Poudre Release Pipeline
- Northern Tier Pipeline
- Poudre Intake Pipeline
- County Line Pipeline
- County Boundary
- Railroad
- Stream/Ditch
- Glade Reservoir (future)

TS#: Traffic Station Number
ADC: Average Daily Count
Δ Larimer County Traffic Count Station
◆ CDOT Traffic Count Station



Imagery Date: 10/2017

DATA SOURCES: Northern Water, Larimer County, HDR

NISP Northern Water Northern Integrated Supply Project | HDR | Dewberry

NORTHERN INTEGRATED SUPPLY PROJECT

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NISP

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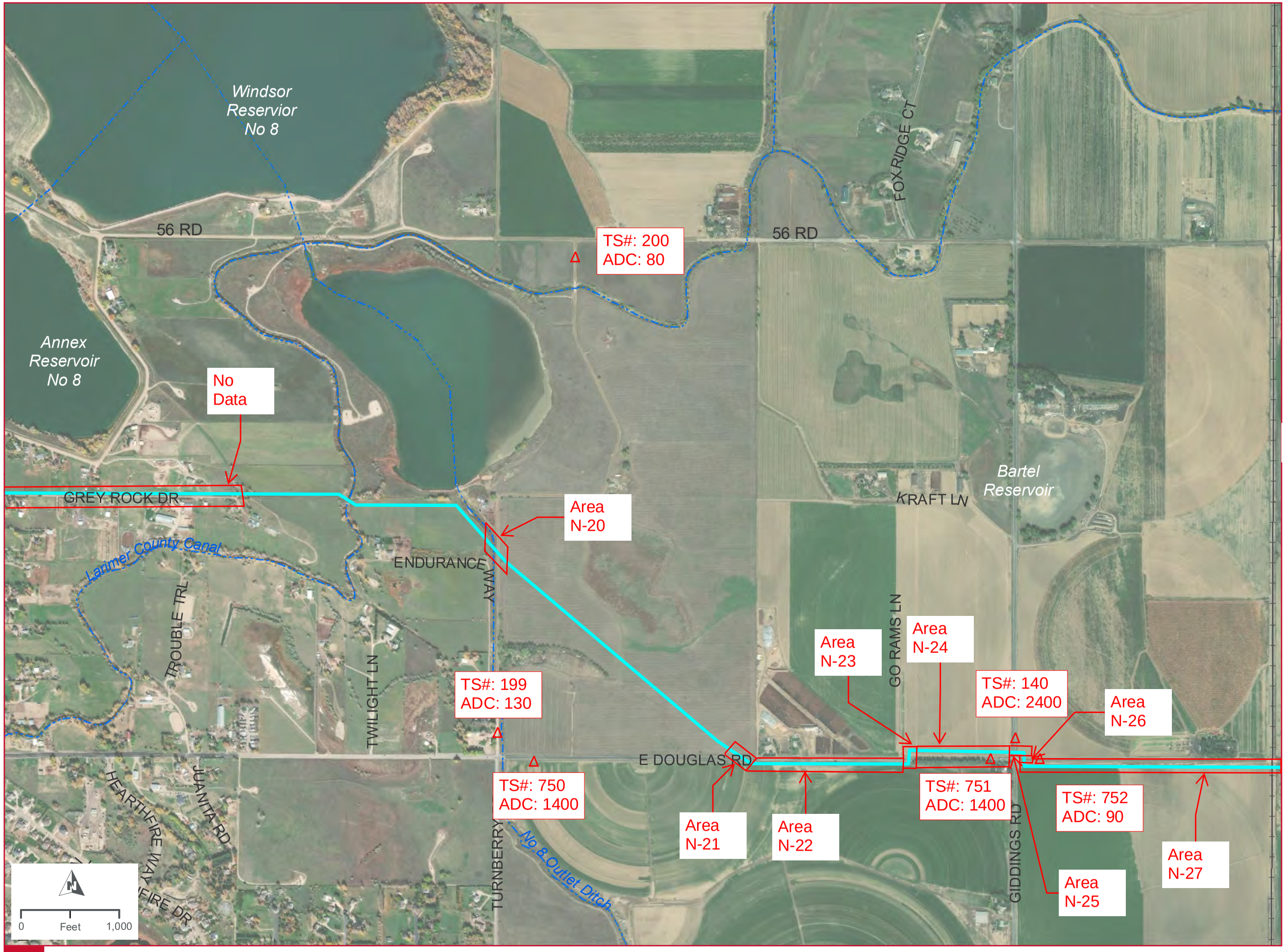


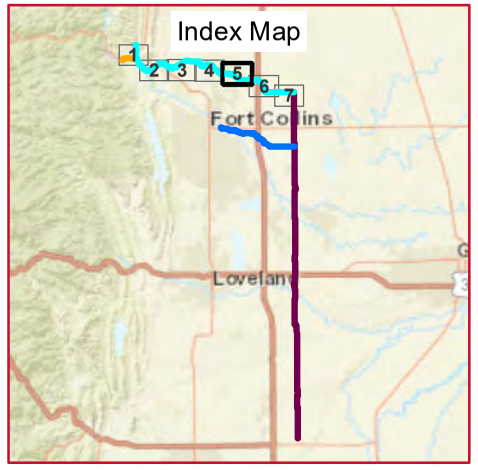
NORTHERN TIER
SHEET 5 OF 7

MAP SERIES 6: TRAFFIC STUDY

Legend

- Glade Release/Poudre Release Pipeline
- Northern Tier Pipeline
- Poudre Intake Pipeline
- County Line Pipeline
- County Boundary
- Railroad
- Stream/Ditch
- Glade Reservoir (future)

TS#: Traffic Station Number
ADC: Average Daily Count
Larimer County Traffic Count Station
CDOT Traffic Count Station



Imagery Date: 10/2017, 10/2018

DATA SOURCES: Northern Water, Larimer County, HDR

NISP Northern Water Northern Integrated Supply Project

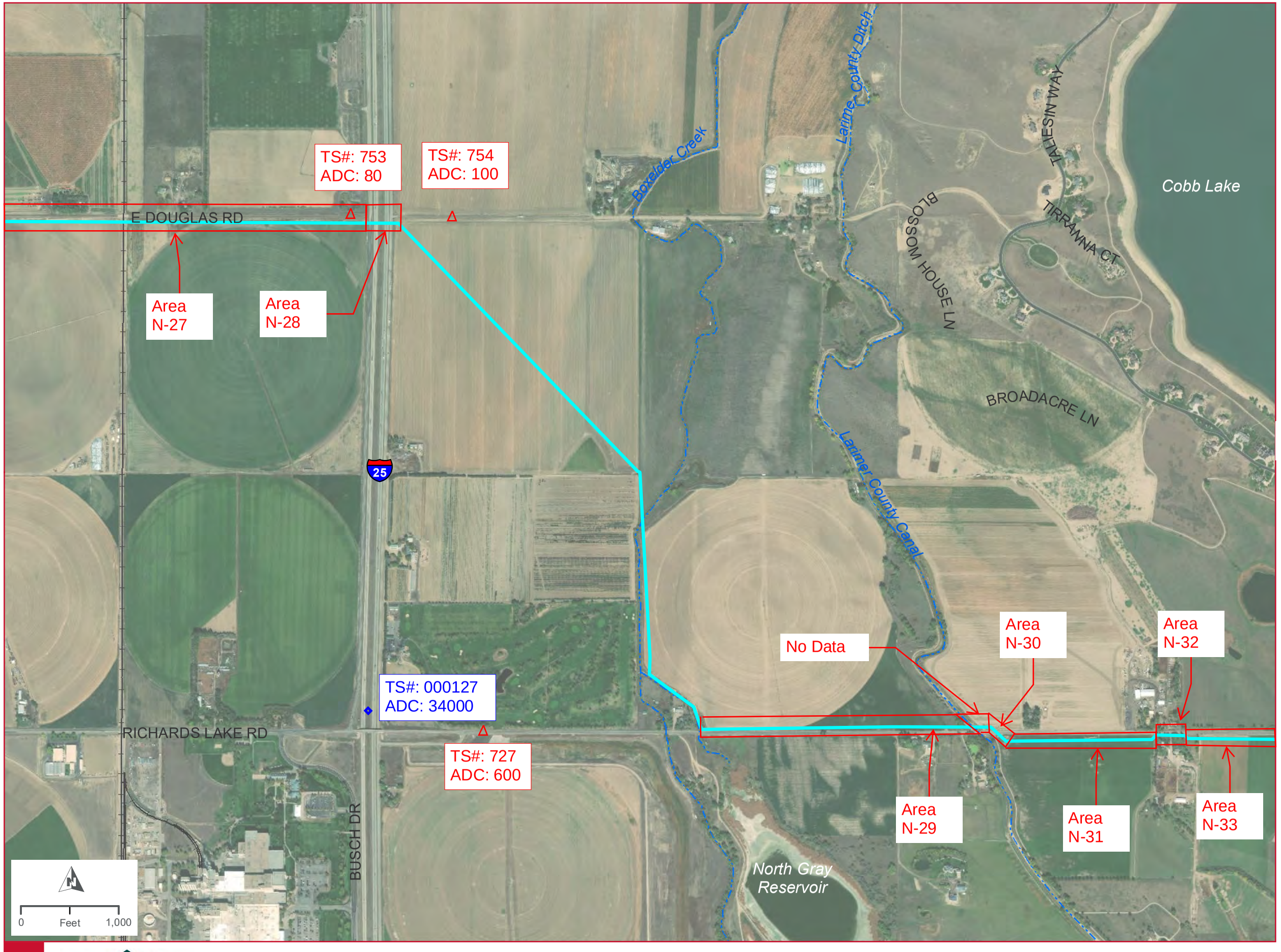
HDR Dewberry

NORTHERN INTEGRATED SUPPLY PROJECT

NISP

PATH: \\DEN-GISSRV1\GISDATA\PROJECTS\10151633_NORTHERN_WATER_NISP\MAP_DOCS\LARIMER COUNTY 1041 PERMIT NORTHERN TIER\NISP_N_TIER_MAP6_TRAFFICSTUDY.MXD - USER: MHARRIS - DATE: 2/5/2020

BCC 08/17/20



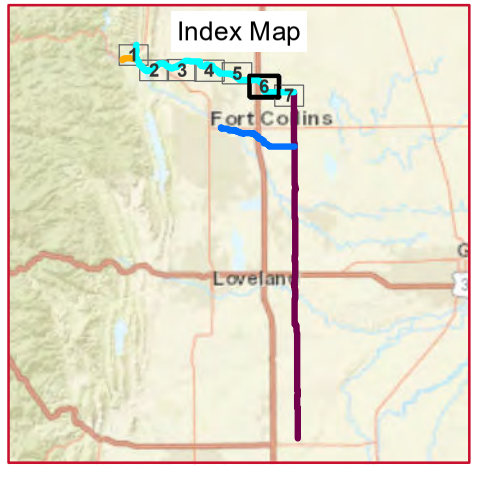
NORTHERN TIER
SHEET 6 OF 7

MAP SERIES 6: TRAFFIC STUDY

Legend

- Glade Release/Poudre Release Pipeline
- Northern Tier Pipeline
- Poudre Intake Pipeline
- County Line Pipeline
- County Boundary
- Railroad
- Stream/Ditch
- Glade Reservoir (future)

TS#: Traffic Station Number
ADC: Average Daily Count
Larimer County Traffic Count Station
CDOT Traffic Count Station



Imagery Date: 10/2018

DATA SOURCES: Northern Water, Larimer County, HDR

NISP

NISP Northern Water Northern Integrated Supply Project

HDR Dewberry

NORTHERN INTEGRATED SUPPLY PROJECT

PATH: \\DEN-GISSRV1\GISDATA\PROJECTS\10151633_NORTHERN_WATER_NISP\MAP_DOCS\LARIMER COUNTY 1041 PERMIT NORTHERN TIER\NISP_N_TIER_MAP6_TRAFFICSTUDY.MXD - USER: MHARRIS - DATE: 2/5/2020

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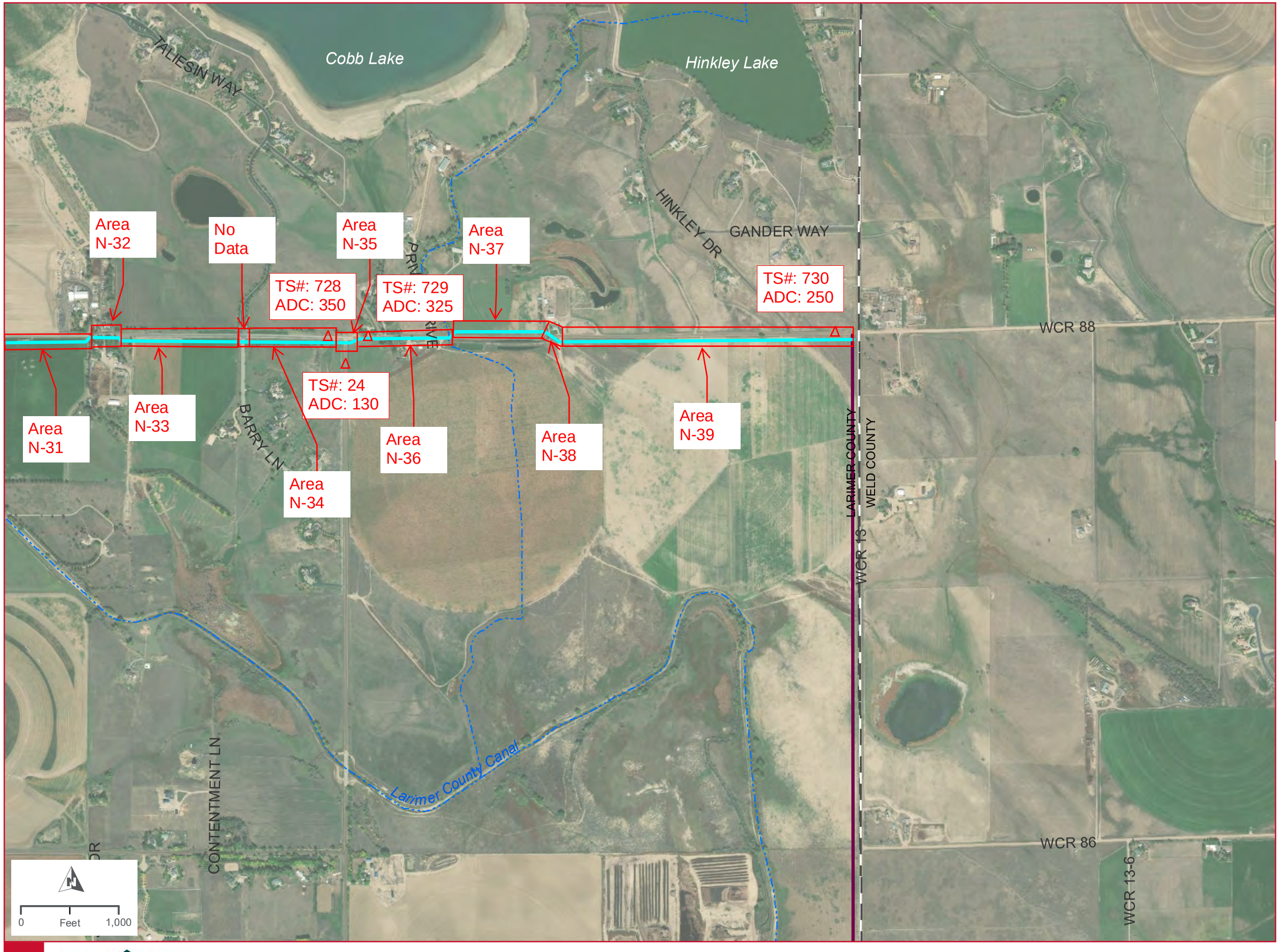
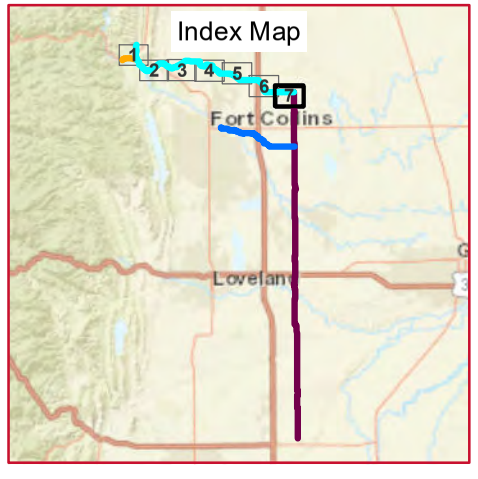


NORTHERN TIER
SHEET 7 OF 7
MAP SERIES 6: TRAFFIC STUDY

Legend

- Glade Release/Poudre Release Pipeline
- Northern Tier Pipeline
- Poudre Intake Pipeline
- County Line Pipeline
- County Boundary
- Railroad
- Stream/Ditch
- Glade Reservoir (future)

TS#: Traffic Station Number
ADC: Average Daily Count
Traffic Count Station Location
Larimer County Traffic Count Station
CDOT Traffic Count Station



Imagery Date: 10/2018

DATA SOURCES: Northern Water, Larimer County, HDR

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NORTHERN INTEGRATED SUPPLY PROJECT

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POUDRE INTAKE PIPELINE
SHEET 1 OF 3
MAP SERIES 6: TRAFFIC STUDY

Legend

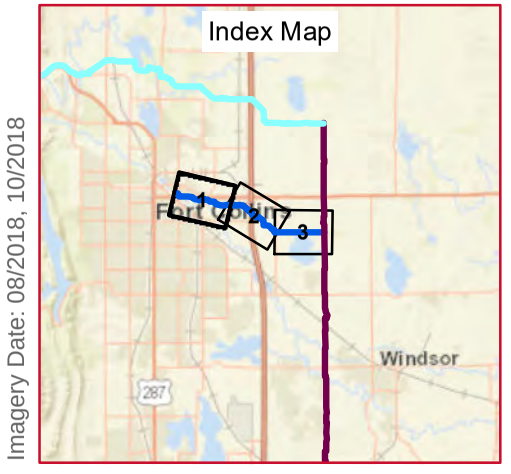
- Poudre Intake Pipeline
- County Line Pipeline
- Northern Tier Pipeline
- County Boundary
- Railroad
- Stream/Ditch

TS#: Traffic Station Number

ADC: Average Daily Count

Larimer County Traffic Count Station

CDOT Traffic Count Station



Imagery Date: 08/2018, 10/2018

DATA SOURCES: Northern Water, Larimer County, HDR

NISP

NISP Northern Water Northern Integrated Supply Project | HDR | Dewberry

NORTHERN INTEGRATED SUPPLY PROJECT

PATH: \\DEN-GISSRV1\GISDATA\PROJECTS\10151633_NORTHERN_WATER_NISP\MAP_DOCS\LARIMER COUNTY 1041 PERMIT POUDRE WEST_DELIVERY\NISP_MAPBOOK_POUDRE_MAP6_TRAFFICSTUDY.MXD - USER: MHARRIS - DATE: 2/5/2020

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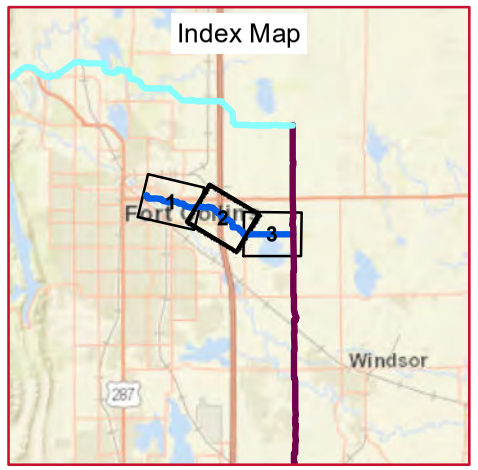
POUDRE INTAKE PIPELINE
SHEET 2 OF 3
MAP SERIES 6: TRAFFIC STUDY

Legend

- Poudre Intake Pipeline
- County Line Pipeline
- Northern Tier Pipeline
- County Boundary
- Railroad
- Stream/Ditch
- TS#: Traffic Station Number
- ADC: Average Daily Count
- Larimer County Traffic Count Station
- CDOT Traffic Count Station



Imagery Date: 10/2018

DATA SOURCES: Northern Water, Larimer County, HDR

NISP Northern Water Northern Integrated Supply Project

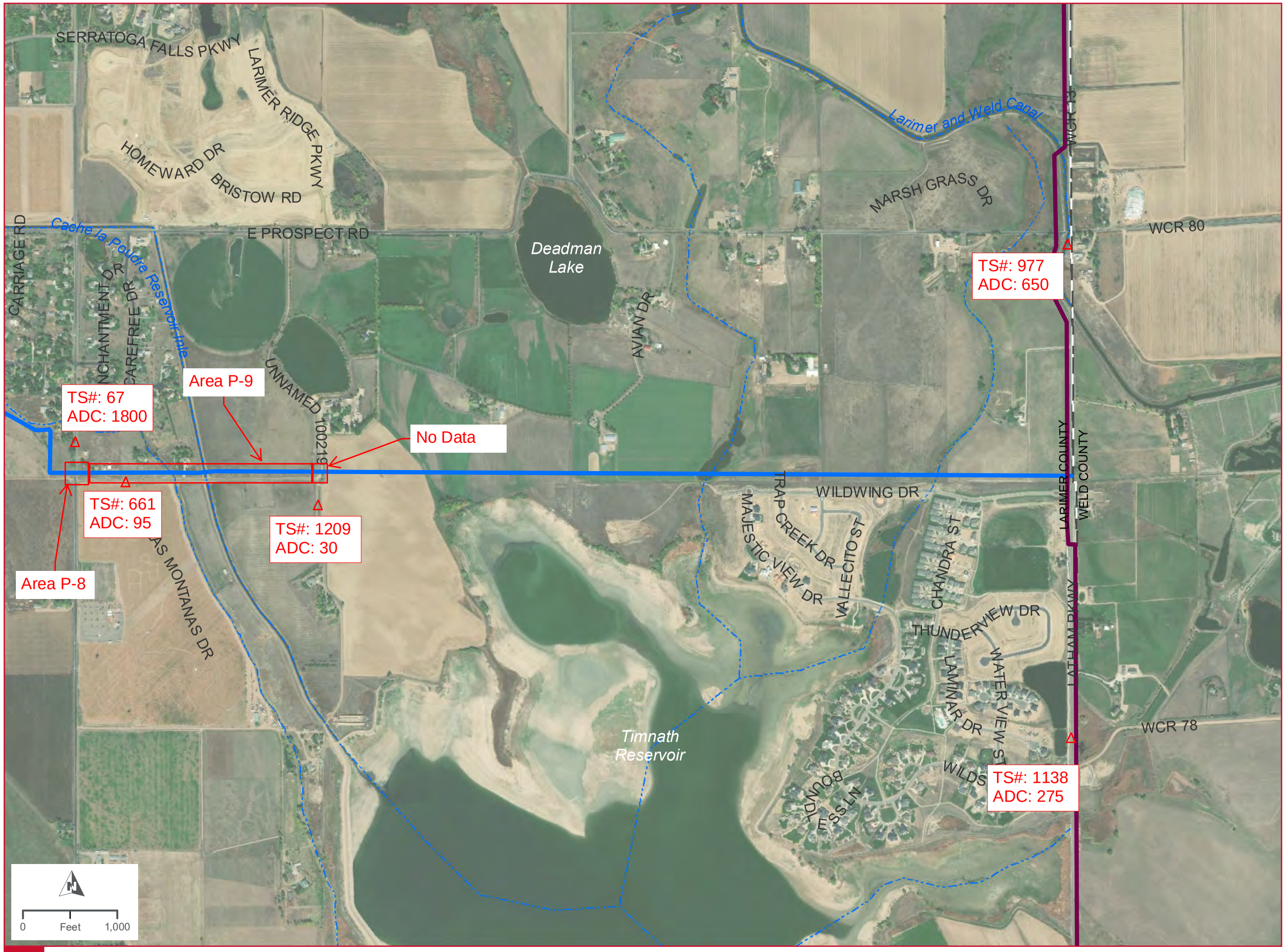
HDR Dewberry

NORTHERN INTEGRATED SUPPLY PROJECT

PATH: \\DEN-GISSRV1\GISDATA\PROJECTS\10151633_NORTHERN_WATER_NISP\MAP_DOCS\LARIMER COUNTY 1041 PERMIT POUDRE WEST_DELIVERY\NISP_MAPBOOK_POUDRE_MAP6_TRAFFICSTUDY.MXD - USER: MHARRIS - DATE: 2/5/2020

BCC 08/17/20

POUDRE INTAKE PIPELINE
SHEET 3 OF 3
MAP SERIES 6: TRAFFIC STUDY



Legend

- Poudre Intake Pipeline
- County Line Pipeline
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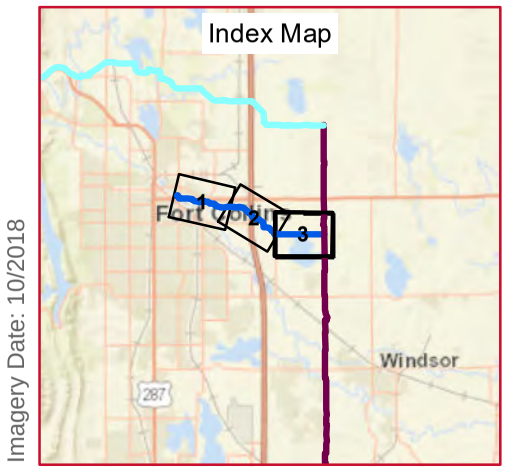


Imagery Date: 10/2018

DATA SOURCES: Northern Water, Larimer County, HDR

NISP Northern Water Northern Integrated Supply Project

HDR Dewberry

NORTHERN INTEGRATED SUPPLY PROJECT

PATH: \\DEN-GISSRV1\GISDATA\PROJECTS\10151633_NORTHERN_WATER_NISP\MAP_DOCS\LARIMER COUNTY 1041 PERMIT POUDRE WEST_DELIVERY\NISP_MAPBOOK_POUDRE_MAP6_TRAFFICSTUDY.MXD - USER: MHARRIS - DATE: 2/5/2020

NISP

Dewberry HDR

MEMORANDUM

Date: June 10, 2020

To: Larimer County Planning Department

From: Randy Parks and Derek Nelson - Dewberry Engineers Inc.

Subject: Northern Integrated Supply Project – Traffic Impact Study – Revised June 2020

Northern Water
Northern Integrated Supply Project

This section addresses requirements of the 1041 Permit item 8.d for Traffic Impact Study. It describes the effects of the NISP conveyance facilities that are within unincorporated parts of Larimer County. Such facilities include:

- Northern Tier Pipeline
- Poudre Release/Glade Release Pipeline
- Poudre Intake Pipeline
- County Line Pipeline
- Glade Reservoir Pump Station
- Poudre Diversion Pump Station

Methods

Effects on traffic and transportation were assessed based on existing roadway information from the Larimer County Road Information Locator webpage and, when needed, from CDOT Road Traffic Count data. The most recent available data from Larimer County was used, which came from the years 2000, 2009, 2015, 2017, and 2018; depending upon the node. Traffic volumes obtained from CDOT were conducted in 2014. The road classification and Annual Average Daily Traffic (ADT) count from nodes that were available along the alignments can be seen in Map Series 6 in Attachment D to the Project Description.

Since the County Line Pipeline is parallel and adjacent to the roadway, good traffic data existed along the entire alignment. The tabulated data was taken from the ADT found after one another and averaged. The reach between nodes were then designated as a work area. This data is presented in table 4.

Since the Northern Tier Pipeline, Poudre Intake Pipeline, and Poudre Release/Glade Release Pipeline do not parallel roadways consistently, data was tabulated through an alternative method by creating “Traffic Study Areas” which can be seen in map series 6 in Attachment D to the Project Description. Additionally, the density of traffic station locations was significantly less than along the County Line Pipeline, which necessitated a modified approach. Tables 1-3 in this memo list all areas, relevant traffic stations, traffic counts, approximate length of crossing, street impact, closure requirements and estimated duration for the Northern Tier, Poudre Intake, and Poudre Release/Glade Release Pipelines. The Traffic Study Areas were broken up as portions of the pipeline that parallel roadways within 100 feet, cross roadways with trenchless crossings, or cross gravel roads.

Dewberry HDR

MEMORANDUM

General NISP Conveyance Information

An alternatives alignment study was performed and the preferred alignment for NISP conveyance can be found as part of the Conveyance Routing Assessment (Technical Memorandum 3). Although the final design of the pipeline will be developed at a later date, the NISP conveyance lines are expected to have a 60-foot permanent easement and a 40-foot temporary construction easement. The NISP pipelines are planned to be routed as much as possible in private easement rather than public right-of-way. By routing most of the pipeline in private easements traffic impacts will be lessened.

Crossings

Water pipeline road crossings in Larimer County will be constructed using trenchless methods on all paved roadways and open-cut construction on unpaved roadways. A list of all anticipated trenchless and open-cut crossings is presented in Tables 1-4. Trenchless construction methods would cause only minor disruption to traffic and would have negligible short-term effects. Any roadway that is unpaved (e.g. gravel) would use open-cut construction. Open-cut construction of pipelines would require a trench to be dug along the length of the pipeline, affecting the segment of the road that requires the trench. The pipeline would then be laid in the trench, and the trench would be backfilled to pre-existing conditions. Roadways that would be open-cut would either have temporary lane closures or would be closed to traffic, and a detour route would be provided during construction. The NISP conveyance will likely cross the Great Western and Union Pacific Railroads in several places. Trenchless construction methods would be used at the railroad crossings.

General Compliance

For all pipeline alignments adjacent to or crossing the road ROW, Northern Water and/or construction contractors would be required to develop traffic control plans. Traffic control plans would be subject to approval by the transportation agency responsible for the impacted roadway. As such, short-term effects on local roadways during construction are expected to be minor for construction areas. If the level of construction activity impacted traffic to a greater magnitude than anticipated, the construction contractor would work with the responsible transportation agency to reduce the traffic effect to an acceptable level based on their policies and standards.

Further, it is understood that during final design, Northern Water will be required to represent anticipated haul/delivery routes and coordinate same with Larimer County.

All activities in or adjacent to, access to and from, and including hauling/delivery on Larimer County roads/ROW must abide by the Larimer County Access Policy and Larimer County Land Use Code.

Mitigation

Mitigation of traffic impacts will be addressed on a road-by-road basis and for local community/residences/businesses during final design. General mitigation measures that may be implemented include:

- Utilization of major roads and bridges for haul routes whenever feasible.

Dewberry HDR

MEMORANDUM

- Minimization of hauling/deliveries during peak driving hours.
- Coordination with the County and other entities to avoid planned concurrent road construction.
- Coordination with local schools on bus routes and pickup or drop-off times.
- Maintenance of access to residents and businesses to include emergency vehicles, trash pickup, and postal/delivery services.
- Stabilized construction access in accordance with erosion control and streets ordinances.
- Dust control during construction.

Durations

Construction durations per work area were estimated with production rates using factors including pipe diameter, route complexity, route length, available construction corridor area and access, utility density, and terrain challenges. Estimated construction durations per work area can be found in Tables 1-4.

Revisions

Updates were made to the memo after receiving comments from the Larimer County Planning Department in May 2020. Public and private gravel road crossings were added to the ROW impact tables for Northern Tier, Poudre Intake and Glade/Poudre Release alignments, as well as other roadway impacts that were not included in the original memo. Lengths and duration of impact were updated as needed to account for additional crossings or other reasons.

Dewberry HDR

MEMORANDUM

Table 1- Northern Tier Annual Average Daily Traffic (ADT)

	Traffic Station 1 Type	Traffic Station 1	Traffic Count 1	Traffic Station 2 Type	Traffic Station 2	Traffic Count 2	Traffic Count Used	Approx. Length (ft)	Street Impacted	Type of Impact	Closure Required?	Estimated Duration (Days)
Area N-1	CDOT	014B	3000	-	-	-	3000	150	HW 14	Trenchless Crossing	No	5
Area N-2	CDOT	014B	3000	-	-	-	3000	400	HW 14	Parallel	No	2
Area N-3	CDOT	105333	8800	-	-	-	8800	1200	HW 287	Parallel	No	6
Area N-4	CDOT	105333	8800	CDOT	000008	8200	8500	500	HW 287	Parallel	No	5
Area N-5	CDOT	105333	8800	CDOT	000008	8200	8500	500	HW 287	Trenchless Crossing	No	17
Area N-6	CDOT	105333	8800	CDOT	000008	8200	8500	2,100	HW 287/CR 56	Parallel	No	21
Area N-7	LC	759	85	LC	1227	600	343	100	CR 56	Gravel Crossing	No- single lane flagged	3
Area N-8		105333	8800	CDOT	000008	8200	8500	2,500	HW 287	Parallel	No	13
Area N-9	LC	759	85	LC	1227	600	343	100	CR 56	Gravel Crossing	No- single lane flagged	3
Area N-10		105333	8800	CDOT	000008	8200	8500	6,600	HW 287	Parallel	No	33
Area N-11	LC	776	160	-	-	-	160	100	CR 56 E	Gravel Crossing	No- single lane flagged	3
No Data	-	-	-	-	-	-	-	100	CR 21C/ Niobrara Rodge	Gravel Crossing	No- single lane flagged	3

Area N-12	LC	488	800	LC	487	850	825	100	CR56/ CR 21-C/ Overland Trail	Trenchless Crossing	No	3
Area N-13	LC	488	800	LC	760	900	850	1500	CR56/ CR 21-C/ Overland Trail	Parallel	No	8
Area N-14	LC	488	800	LC	760	900	850	100	CR56/ CR 21-C/ Overland Trail	Trenchless Crossing	No	3
Area N-15	LC	418	2500	-	-	-	2500	100	Taft Hill Rd	Trenchless Crossing	No	3
Area N-16	LC	758	190	-	-	-	190	1500	Travis	Parallel	No	8
No Data	-	-	-	-	-	-	-	100	Eagle Lake Dr	Trenchless Crossing	No	3
No Data	-	-	-	-	-	-	-	100	Hood Lane	Gravel Crossing	Homeowner access maintained with temporary detours	1
Area N-17	CDOT	100004	7200	-	-	-	7200	250	HW 1	Trenchless Crossing	No	8
Area N-18	LC	763	130	-	-	-	130	100	E CR 56	Gravel Crossing	No- single lane flagged	3
No Data	-	-	-	-	-	-	-	900	Grey Rock	Parallel	No	5
Area N-19	LC	240	275	-	-	-	275	100	N CR 13	Gravel Crossing	No- single lane flagged	3
No Data	-	-	-	-	-	-	-	2500	Grey Rock	Parallel	No	13

Area N-20	LC	199	130	LC	200	80	105	100	Turnberry	Gravel Crossing	No- single lane flagged	3
Area N-21	LC	750	1400	LC	751	1400	1400	100	CR 54/ Douglas	Trenchless Crossing	No	3
Area N-22	LC	750	1400	LC	751	1400	1400	1600	CR 54/ Douglas	Parallel	No	8
Area N-23	LC	750	1400	LC	751	1400	1400	100	CR 54/ Douglas	Trenchless Crossing	No	3
Area N-24	LC	750	1400	LC	751	1400	1400	1100	CR 54/ Douglas	Parallel	No	6
Area N-25	LC	140	2400	-	-	-	2400	100	Giddings	Trenchless Crossing	No	3
Area N-26	LC	752	90	LC	753	80	85	100	CR 54/ Douglas	Gravel Crossing	No- single lane flagged	3
Area N-27	LC	752	90	LC	753	80	85	5000	CR 54/ Douglas	Parallel	No	25
Area N-28	CDOT	000127	34000	-	-	-	34000	350	I-25	Trenchless Crossing	No	12
Area N-29	LC	727	600	LC	728	350	475	2800	CR 52/ Richards Lake	Parallel	No	14
No Data	-	-	-	-	-	-	-	100	Broadacre Lane	Gravel Crossing	Homeowner access maintained with temporary detours	1
Area N-30	LC	727	600	LC	728	350	475	250	CR 52/ Richards Lake	Trenchless Crossing	No	8
Area N-31	LC	727	600	LC	728	350	475	1500	CR 52/ Richards Lake	Parallel	No	8

Area N-32	LC	727	600	LC	728	350	475	400	CR 52/ Richards Lake	Parallel	No- single lane flagged. Construction staging in lane, but no excavation in road.	10
Area N-33	LC	727	600	LC	728	350	475	1200	CR 52/ Richards Lake	Parallel	No	6
No Data	-	-	-	-	-	-	-	100	Barry Lane/ Brooklind Estates	Trenchless Crossing	No	3
Area N-34	LC	727	600	LC	728	350	475	1000	CR 52 /Richards Lake	Parallel	No	5
Area N-35	LC	24	130	-	-	-	130	100	CR 3	Gravel Crossing	No- single lane flagged	3
Area N-36	LC	729	325	LC	730	250	288	950	CR 52/ Richards Lake	Construction in Gravel road	Homeowner access maintained with temporary detours	10
Area N-37	LC	729	325	LC	730	250	288	1000	CR 52/ Richards Lake	Parallel	No	5
Area N-38	LC	729	325	LC	730	250	288	100	CR 52/ Richards Lake	Gravel Crossing	No- single lane flagged	3
Area N-39	LC	729	325	LC	730	250	288	3000	CR 52/ Richards Lake	Parallel	No	15

Table 2- Poudre Intake Annual Average Daily Traffic (ADT)

	Traffic Station 1 Type	Traffic Station 1	Traffic Count 1	Traffic Station 2 Type	Traffic Station 2	Traffic Count 2	Traffic Count Used	Approx. Length (ft)	Street Impacted	Type of Impact	Closure Required?	Estimated Duration (days)
Area P-1	CDOT	100637	31000	-	-	-	31000	250	Mulberry	Trenchless Crossing	No	8
Area P-2	LC	1142	6000	-	-	-	6000	200	Lemay	Trenchless Crossing	No	7
Area P-3	CDOT	100638	40000	-	-	-	40000	2800	Mulberry	Parallel	No	28
Area P-4	LC	192	4500	-	-	-	4500	200	Timberline	Trenchless Crossing	No	7
No Data	-	-	-	-	-	-	-	400	Cherly	Construction in Paved Roads	Homeowner access maintained with temporary detours	4
Area P-5	LC	134	2200	-	-	-	2200	150	Summit View	Trenchless Crossing	No	5
Area P-6	CDOT	101036	63000	-	-	-	63000	350	I-25	Trenchless Crossing	No	12

Area P-7	LC	671	1600	LC	672	2100	1850	150	Prospect	Trenchless Crossing	No	5
No Data	-	-	-	-	-	-	-	1000	McLaughlin	Parallel	No	7
Area P-8	LC	67	1800	-	-	-	1800	150	CR 5	Trenchless Crossing	No	5
Area P-9	LC	661	95	-	-	-	95	2500	CR 42 E	Parallel	No	17
No Data	-	-	-	-	-	-	-	100	Unnamed 100219/CR 3e	Gravel Crossing	Homeowner access maintained with temporary detours	1

Table 3- Poudre/Glade Release Annual Average Daily Traffic (ADT)

	Traffic Station 1 Type	Traffic Station 1	Traffic Count 1	Traffic Station 2 Type	Traffic Station 2	Traffic Count 2	Traffic Count Used	Approx. Length (ft)	Street Impacted	Type of Impact	Closure Required?	Estimated Duration (days)
Area P/G R-1	CDOT	014B	3000	-	-	-	3000	5200	HW 287	Parallel	No	26
Area P/G R-2	CDOT	014B	3000	-	-	-	3000	150	HW 287	Trenchless Crossing	No	5
Area P/G R-3	CDOT	014B	3000	-	-	-	3000	700	HW 287	Parallel	No	4

Table 4- County Line Annual Average Daily Traffic (ADT)

Work Area	Station 1	ADT 1	Station 2	ADT 2	Average Traffic Count	Trenchless Crossings (paved)	Open-Cut Crossings (gravel)	Duration (days)
C-1	983	210	982	500	355	1. Trenchless crossing 2,640-feet north of CR 48 across CR 1 2. Trenchless crossing 1,780-feet north of CR 48 across CR 1 3. Trenchless crossing across CR 48 at the intersection with CR 1	0	117
C-2	981	500	980	475	488	1. Trenchless crossing across Hwy 14 at the intersection with CR 1	0	39
C-3	979	550	978	325	438	1. Trenchless crossing across CR 44 at the intersection with CR 1	0	39
C-4	977	650	1138	275	463	1. Trenchless crossing across Wildwing Dr. at CR 1 2. Trenchless crossing 2,375-feet north of WCR 78 across CR 1	1. Open-cut crossing across WCR 78	78
C-5	1138	275	1200	2000	1138	1. Trenchless crossing diagonally across the intersection of LCR 40 and CR 1 2. Trenchless crossing diagonally across the intersection of LCR 38 and CR 1 3. Trenchless crossing under railroad 6,500 feet south of LCR 38 4. Trenchless crossing 1,350-feet north of LCR 32E across CR 1 5. Trenchless crossing across LCR 32E at the intersection with CR 1	0	195
C-6	1200	2000	1199	1500	1750	0	0	15

C-7	1199	1500	976	4500	3000	1. Trenchless crossing across Hwy 392	0	39
C-8	976	4500	1203	4700	4600	1. Trenchless crossing 1,900 feet south of Hwy 392 across CR 2. Trenchless crossing across Steeplechase Dr 3. Trenchless crossing across Bounty Dr 4. Trenchless crossing across WCR 62	1. Open-cut crossing across WCR 64	156
C-9	1203	4700	975	4800	4750	1. Trenchless crossing 2,530 feet south of WCR 62 across CR 1 2. Trenchless crossing 4,590 feet south of WCR 62 across CR 1	1. Open-cut crossing beneath WCR 60	78
C-10	975	4800	CDOT traffic count	2200	3500	1. Trenchless crossing across Hwy 34 2. Trenchless crossing 400 feet south of Hwy 34 3. Trenchless crossing 800 feet south of Hwy 34 under railroad 4. Trenchless crossing 2,800 feet south of Hwy 34 under railroad 5. Trenchless crossing under railroad at CR 20C 6. Trenchless crossing 6,000 feet south of Hwy 34 across CR1 7. Trenchless diagonal crossing across LCR 18 8. Trenchless crossing across LCR 16 9. Trenchless crossing north of LCR 14 and CR 1 across CR1	0	351

Referral Agency Response

June 16, 2020

Northern Integrated Supply Project Water Activity Enterprise
Carl Brouwer
220 Water Ave
Berthoud, CO 80513

RE: Review of Larimer County application # 20-ZONE2657

To whom it may concern:

This letter is confirmation that the Wellington Fire Protection District (WFPD) has completed the review of the application and has the following comments.

1.WFPD Western boundary will be the Eastern half of the proposed reservoir. This project will require the relocation of U.S. Hwy 287. The proposed relocation route will be in WFPD response area but will not provide direct access to the new Hwy 287. We have concerns with are ability to respond in an appropriate time due to the lack of access to the new Hwy. We are requesting that there be access provided either by way of W CR 64 and N CR 21 west to intersect with the new Hwy. or W CR66 and N CR 21 West to intersect with the new Hwy.

2. As stated above WFPD will also provide service to the east portion of Glade Reservoir as well as the new rout of Hwy 287. WFPD nearest station is Station 17 located at 108 W CR 66, which is approximately 4 miles east of the eastern edge of Glade Reservoir. WFPD is requesting that NISP provide the same provision that were given to Livermore Fire Protection District (LFPD). In the form of water storage tank (up to 10,000 gallons in size) at a location determined by WFPD for their use in staging water for firefighting and emergency-response capabilities. As stated by LFPD staff WFPD staff also fells that the Glad Reservoir will provide a strategic water source for future aerial firefighting efforts.

3.We also have concerns with the impact that rerouting of U.S. Hwy 287 will have on the intersection of U.S. Hwy 287 and W CR 72 also known as The Owl Canyon intersection. This intersection is also part of the Wellington Fire Protection District. We are requesting information on the estimated traffic flows at the intersection as this may have a direct impact on us as well.

My best,

Capt. Pettit
Deputy Fire Marshall

LARIMER COUNTY | Community Development

P.O. Box 1190, Fort Collins, Colorado 80522-1190, Planning (970) 498-7683 Building (970) 498-7700, Larimer.org

MEMO

To: Larimer County Planning Commission

From: Community Development Staff

Date: July 8, 2020

RE: **2nd Addendum to Staff Report for File #20-ZONE2657; Northern Integrated Supply Project Enterprise 1041 Application**

Attached to this memo please find all public submittals received in the Community Development office between the June 24th meeting and July 8.

- Citizen comments – Over 20 email correspondences, and several letters
- Letters from the Morgan, Weld and Larimer County and Colorado Farm Bureaus.
- Public testimony received via the website from initial posting through July 8.

3813

Rob Helmick <helmicrp@co.larimer.co.us>

COVID-19

1 message

Alan Braslau <braslau@comcast.net> Wed, Jun 24, 2020 at 8:39 PM
To: pcboard@larimer.org

I am watching the Planning Commission Board meeting. Is there no concern about contamination of the COVID-19 virus through the shared use of the microphone, pointer, all with presenters speaking without masks?

Thank you

--
Alan Braslau
816 West Mountain Avenue
Fort Collins, CO 80521 USA
mobile: (970) 237-0957

Conserve energy! ;-)

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: Comments for Planning Commission Meeting July 8, 2020

1 message

Debra Unger <ungerde@co.larimer.co.us> Tue, Jul 7, 2020 at 10:50 AM
To: Rob Helmick <helmicrp@co.larimer.co.us>
Cc: Don Threewitt <threewdl@co.larimer.co.us>, Lesli Ellis <ellislk@larimer.org>, Matthew Lafferty <laffermn@co.larimer.co.us>

Rob, fyi . . .

Debra Unger
Administrative Assistant II

Commissioners' Office
200 W Oak St | 2nd Floor
PO Box 1190, Fort Collins, CO 80522-1190
W: (970) 498-7149
DUnger@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: <dking49326@aol.com>
Date: Tue, Jul 7, 2020 at 10:43 AM
Subject: Comments for Planning Commission Meeting July 8, 2020
To: ungerde@co.larimer.co.us <ungerde@co.larimer.co.us>

Hi, Debra - Please see that our attached Public Comments are provided for the July 8, 2020 Planning Commission meeting regarding the NISP.

If we need to send to someone else, please provide the contact information.

Thank You,
Dan & Evelyn King
6321 W County Road
Loveland, CO 80537
dking49326@aol.com

NISP Comments July 2020.docx
15K

Public Comments Regarding The NISP – File #20-ZONE2657:

Northern Water has worked extremely hard to provide an excellent water project for the 15 supporting members. Even though Northern Water has successfully worked to substantially decrease water consumption, storing water is absolutely critical for our region. We all enjoy the benefits of water projects completed by past visionaries; therefore, we must not allow this excellent project to be declined.

The NISP will provide a reservoir larger than Horsetooth and will include a huge increase in recreational opportunities for the residents of Fort Collins and Loveland. Those entities will receive economic benefit even though they will not be paying for this resource. Fort Collins will also benefit tremendously from the guarantee of the continuous Poudre River water flow through the City for the pleasure and enjoyment of the citizens. Currently, the Poudre is dry in the late summertime and the NISP will provide huge improvement with the continuous flow. This continuous water flow will also benefit and improve the health of the Poudre River, itself, as well as the environment along the waterway.

The City of Fort Collins is also asking to enlarge the Halligan Reservoir, which is a source for their water. Why would Fort Collins' residents oppose the NISP when the City understands the critical need for additional water storage?

Rivers, lakes, reservoirs and waterways define our outdoor experiences, and those experiences are enhanced with all the connecting trails and open spaces in Larimer County. More is better, but only if we complete the NISP.

Larimer County has proven its capabilities in managing other reservoirs, and have promised to require mitigations as are needed for the NISP. The NISP will provide all types of new recreational opportunities which are desperately needed in Northern Colorado because of overcrowding at the current recreational locations.

The dissent and game played by environment groups is fairly simple. They use every tool to drag the project into the courts, raise the cost as much as they can, they hope for an economic downturn and then they hope the project members will throw in the towel. The Glade Reservoir project has taken far too long and at a huge additional cost to the 15 member districts, cities and towns. Please delay no longer.

The 1041 Permit will allow the siting and development of the water storage project, which includes recreational uses, facilities and other items. It also allows the siting and development of four raw water lines to support the project.

We agree with the Development Services Review Team's Recommendation for Approval.

Please approve the NISP so the Glade Reservoir can be built for many to enjoy!

Dan & Evelyn King
6321 W County Rd 18
Loveland, CO 80537

Rob Helmick <helmicrp@co.larimer.co.us>

The Cache la Poudre River

1 message

DAVID ROY <david.roy@comcast.net> Tue, Jul 7, 2020 at 7:53 AM
To: "pcboard@larimer.org" <pcboard@larimer.org>, "pcboard@larimer.com" <pcboard@larimer.com>

Good morning, Larimer County Planning Commission Board Members;

The Cache la Poudre river is a special natural resource for every person who lives in Colorado, and especially anyone who lives in Fort Collins and Larimer County. It provides water, habitat, recreation, and solace; in short, the magic of nature, right through our backyards here in Northern Colorado.

NISP will destroy it. A flowing Cache la Poudre river and the habitat and wildlife it makes possible is worth protecting and preserving, and will be a legacy that future generations will enjoy.

As the Larimer County Planning Commission, your first responsibility is to the citizens of Larimer Country, and to protect the natural resources of this county. NISP will require 7 miles of new roadway east of the hogbacks, will drain the Cache la Poudre of water, while supporting a purely speculative project for 600,000 people yet to move to the Eastern Plains, largely outside of Larimer County.

The price for the project has risen to astronomical heights, while the science behind the project has not kept up, ignoring the effects of climate change on such a large capital outlay, and that will increase the already profound devastation that this project would cause to our natural environment.

Denying the permit that Northern Water is seeking is the best work you can do as a Board. Exchanging boating for the life of the Cache la Poudre river is a choice that would border on criminal. The high likelihood that Glade Reservoir will take over 30 years to fill, and the added effect of climate change on that number, makes recommending to the BOCC that it go forward an irresponsible choice for the communities downstream, and would still kill the the Cache la Poudre river as it flows through Fort Collins.

When uncertain, the best action is to do no harm. Make the choice that we know preserves the splendor of the Cache la Poudre. Support the investments that local citizens have made to protect and preserve the natural areas along our river. Position Larimer County to be the stewards of this priceless gem of a natural resource. Vote to create a flowing river through an urban setting, a vote that supports habitat and wildlife, and protects and preserves the natural resource for the citizens of Larimer County that is our Cache la Poudre river .

Thank you.

David Roy
2016 Evergreen Court
Fort Collins CO 80521
(970) 493-9201

3818

Rob Helmick <helmicrp@co.larimer.co.us>

NISP

1 message

Gayla Martinez <gmaxwellmartinez@gmail.com> Tue, Jul 7, 2020 at 6:21 AM
To: pcboard@larimer.org

Dear Commissioners,

The NISP project is a short-sighted, ill-conceived plan that has been a concern to Larimer County residents for many, many years. It is time, once and for all, to remove this ominous threat to the well-being of the Poudre River.

Sincerely,
Gayla Maxwell Martinez

3819

Rob Helmick <helmicrp@co.larimer.co.us>

NISP Project

1 message

Jessica Elf <jessicaelf@gmail.com> Fri, Jun 26, 2020 at 2:24 PM
To: rhelmick@larimer.org

Dear Mr. Helmick,

I am writing to voice my strong disapproval for the NISP 1041 permit application. I firmly believe that moving forward with this water project would irrevocably damage the health and wellbeing of the Poudre and will diminish the irreplaceable natural value of our Northern Colorado environment. I strongly urge the County to disapprove this application. I believe firmly that the issues and concerns raised in Preston Brown's OpEd in the Coloradoan (https://www.coloradoan.com/story/opinion/2020/06/07/opinion-reject-nisp-to-keep-the-poudre-river-healthy/5313447002/) highlight some of the value of the Poudre and all we have to lose.

Let's be smarter and more progressive about how we approach these very real water challenges moving forward. Putting in the hard, smart work now will be worth it in the future. Let's not make mistakes or take for granted our precious natural resources.

Sincerely,
Jessica Elf
352-672-1268
107 N Hollywood St
Fort Collins, CO 80521

3820

Rob Helmick <helmicrp@co.larimer.co.us>

NISP project

1 message

Judith Putnam <judy.putnam60@gmail.com> Sat, Jun 27, 2020 at 10:09 AM
To: rhelmick@larimer.org

The fact is we need the water.

As the climate gets hotter and drier, there aren't going to be any trout that can live in the waters here on the plains. Best to do one's trout fishing in the mountains. That is, until they get too hot, too.

I can remember the Cache La Poudre river in the winter here in Fort Collins having a flow so small that I could easily place one dry foot on one side and the other dry foot on the other, spanning the flow. This BS about flow and "preserving" it is a fantasy created by people who haven't been here very long.

Ed Beattie's parents owned the ranch at the mouth of the Poudre. He remembered picking feathers out of his mom's pillows to make flies to fish. There was no road into the canyon at that time. He recalled that he would fish in the pools of the river in the fall. Back then, there wasn't enough flow to fish anywhere else. He recounted this to his fly-tying class, that I attended, back in the 1970s.

The river is and has been for a long time, the way that water gets from the mountains to the thirsty prairie, to farms and ranches and cities. We need the water, therefore the flow is regulated by the river commissioner. Those who propose to regulate it for recreation and esthetics forgot who is paying for the water and what it is really needed for.

All one has to do is watch the river for awhile. See when it rises (during the week) and when it lowers (on weekends). See how the flow can be radically increased for a short time in the winter, and then reduced when there is not a call for the water. This is what the river has been about for over a century: a conduit for water.

Face facts. The river does not access the flood plain that is there, so we can't use the argument that the flow needs to be there for the floodplain ecosystem. It would be a disaster if it was allowed to flood every spring. We try very hard to keep the river in its channel. All the time.

As rainfall gets less predictable, a reliable reservoir is needed. One might suspect that those who oppose NISP, also oppose growth. Once they have settled here, nobody else can, because, gee, we don't have the water. NISP is a well-thought out, responsible and careful way that we can have the water that we desperately need. It supports recreation and would take, just temporarily, some of the recreation pressure off of the river.

I am sure that those who oppose this project have good intentions. They just seem to be ignoring some of the facts. Here in Colorado, water is money and money talks.

Thank you for the opportunity to speak my peace,
Judith D. Putnam, retired

3821

Rob Helmick <helmicrp@co.larimer.co.us>

Letter to County Commissioner's for their upcoming 1041 hearings on NISP

1 message

JDP <jerroldpault@gmail.com> Mon, Jul 6, 2020 at 9:08 AM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Rob,
Could you please forward this email to the County Commissioners or include it in their package when they meet on NISP.
Thank you,
Jerrold Pault

NISP-CCHEARINGS.pdf
52K

July 6, 2020

To: **Larimer County Commissioners** (via email)

From: Jerrold Pault
President - The Hill Community Homeowners Association (HOA)
President – Cobb Lake Preservation & Recreation Association (CLPRA)

Subject: NISP - Commissioners' Hearings

Dear Commissioners,

On behalf of The Hill Community HOA (60 homeowners) and CLPRA (104 members), we strongly oppose the Northern Integrated Supply Project (NISP) and request that you vote against this environmentally devastating project.
The following concerns are cited:

- This project would take additional water from the Poudre River, which is already seriously depleted by agriculture and residential use. The diminished flows would due irreparable harm to the riverbed and its wildlife habitat and the City of Fort Collins beautiful new water park would be rendered virtually useless. We are grateful for the efforts of the **Save The Poudre** organization and support their efforts to protect this precious resource for our children and future generations.
- This project does not own sufficient water rights to be feasible, which will result in NISP purchasing additional water rights, likely from our local farms. While NISP has promised not to "Buy and Dry" farms like Thornton did, we do not believe they will honor this commitment after spending a Billion dollars and then not be able to fill Glade Reservoir. We must protect the rich tradition of family farming in our region before it is lost forever!
- NISP originally planned to run a huge 54" pipeline thru the middle of deeded conservation space owned by The Hill HOA (600 acres of native grasses full of wildlife). Now they are proposing a different route along CR 52, which will impact access and egress to our community along with the many residents who live along this route. Why do we need more massive and disruptive pipelines in Larimer County, when we have nature's solution for moving this water in the Poudre River? We are thankful for the efforts of the **No Pipe Dream** organization in opposition to both NISP and Thornton's Pipeline last year.
- NISP will bring unwanted growth, development and urban sprawl to the areas north west of Fort Collins. These quiet and peaceful rural areas will be forever changed and overrun with traffic, noise and residential and commercial development. We need to preserve the remaining open spaces and rural character of our county. We support **Save Rural NOCO**, another

organization against NISP, and think it is important that we protect the lifestyle of our rural residents.

- Cobb Lake is a pristine recreation and preservation area that is nourished by the clean waters from the Poudre River every year. NISP could be potentially devastating to our lake if they are permitted to utilize water exchanges, which would divert clean Poudre River water from Cobb Lake to Glade Reservoir and replace it with dirty water from the South Platte. **CLPRA is against NISP.**

Why should we agree to all of these environmentally devastating and permanent impacts to Larimer County … just to send water to municipalities and water districts in other counties so that they can develop more housing, water more lawns and grow their tax base? **We feel that it is time to start planning responsible for the future of all of Colorado, live within the constraints of our natural resource and stop enabling developers and unchecked growth to destroy the quality of life that is Northern Colorado.**

3824

Rob Helmick <helmicrp@co.larimer.co.us>

Please oppose the construction of NISP

2 messages

Kevin Cross <jkevin87@comcast.net> Tue, Jul 7, 2020 at 6:24 AM
To: pcboard@larimer.org
Cc: bocc@larimer.org

Dear Members of the Larimer County Planning Commission of Larimer County (with a cc to the Larimer County Board of Commissioners) –

I will not be able to attend your meeting this Wednesday, but wanted to register my strong opposition to the Northern Integrated Supply Project (NISP). A few of the reasons I oppose this project are:

1. It would kill the Cache la Poudre river through Fort Collins, which is already dry in spots at times through the year from being overworked.

2. The models and assumptions of water flows used by Northern Water don't take climate change into account.

3. Fort Collins residents would lose tremendous amounts of the natural resources they have chosen to protect with their sales tax dollars.

4. The destruction of those natural resources would mean the decimation of the riparian edge through Fort Collins, and the wildlife it supports.

Thank you for your consideration.

Sincerely,

Kevin Cross

300 Peterson Street

Fort Collins, CO 80524

Linda Hoffmann <hoffmalc@co.larimer.co.us> Tue, Jul 7, 2020 at 8:07 AM
To: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Rob -- Please include this message in the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

[Quoted text hidden]

Rob Helmick <helmicrp@co.larimer.co.us>

Do Not Approve NISP 1041 Project No. 20-ZONE 2- Save Our Rural Northern Colorado

1 message

Kit Nielsen <kfn5454@gmail.com> Wed, Jul 1, 2020 at 6:24 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

We are landowners residing in the area of the proposed Glade reservoir that have concerns with the proposed Glade Project and the negative impacts that would occur if the project moves forward.

The primary benefits of this proposed reservoir would be enjoyed by the 15 subscriber towns or agencies that receive the proposed Glade water. Most of these towns and agencies are outside Larimer County. The most obvious and intense costs would be borne by local and other surrounding communities.

In general, our concerns are that the scope and scale of this proposed project, if approved, would have significant, detrimental, and permanent impact on our rural community, environment, and lifestyle we enjoy today and desire to have in the future.

Specifically, our rural environment we believe would be negatively impacted in the following ways:

1) Noise - The rerouted highway over the most eastern hogback would have an unobstructed view from residences in the foothills, there would be no middle hogback to block truck and auto noise. The NISP publications suggest that recreation would include motorboats and jet skis. Boats and skis are loud, they would likely be louder than current road traffic.

2) Light Pollution – This rural area enjoys fairly dark skies. The proposed recreational activities would generate significant exterior lighting for boats, facilities, camping, pumping facilities, traffic, etc. and headlights from traffic coming down the hogback on the rerouted 287 would shine into the adjacent private property. This could destroy the enjoyment of our night skies.

3) New development - We do not know what sort of development would occur near and north of proposed Glade. The rerouted highway 287 would invite more residential development on the plains. The reservoir would invite more development in the adjacent foothills and valleys. It's not inconceivable that more commercial development catering to visitors would encroach into currently uncommercialized lands, forever altering the rural nature of the area.

4) Trespass – Plans for proposed Glade project almost 400,000 visitors per year. This would include boaters, campers, fishers and hikers and bikers, among others. There is every reason to believe that not all these visitors would stay within the confines of designated recreational areas. Some visitors are likely to explore the inviting foothills that border the reservoir and trespass, however inadvertently, on our private property.

5) Wildlife – Proposed Glade would become a significant barrier to the permanent and migratory herds of deer and elk that reside in our area and would be disruptive to other wildlife. In a world where wildlife and nature are under stress, and is diminishing generally owing to human activities, should we be contributing to those activities for unnecessary purposes? We encourage the county to find alternatives that don't result in the significant loss of open space and wildlife habitat that this project would cause.

6) Wildfires – In this century three major wildfires burned over 100,000 acres on and around Glade. Two of the three forest fires were caused by careless people. Can we rely on the >1000 daily visitors to proposed Glade to be careful?

7) Emergency response – The recreation on the proposed reservoir is projected to be almost 400,000 visitors per year. Such a large increase in recreationalists would likely increase the number of emergency calls thereby further stretching emergency response agency resources. Costs would be borne by Larimer County taxpayers, and emergency services

that are diverted to Glade would not be readily available to serve the local communities.

8) Air quality – Because Glade would have junior water rights, the water level of the proposed reservoir would be highly variable, unlike Horsetooth. The water level frequently would drop precipitously, often changing proposed Glade Reservoir to Glade Mudflats, and could stay that way for years. The large “bathtub ring” that would materialize around the reservoir would become dry soil that would blow in our strong winds causing air quality and visual concerns. The hundreds or thousands of vehicles that would travel to the area emit gases, particulates, and ozone precursors (i.e., health hazards).

9) Climate change – the pumps, the construction vehicles, the recreational vehicles: the project would result in considerable burning of fossil fuels, forever, and the emission of greenhouse gases. The pumping stations alone would emit the equivalent of adding 7000 GHG emitting cars at a time when Colorado is implementing zero emissions vehicle standards.

10) State Land Usage - The large area of state land west of the proposed reservoir is devoted to hunting and cattle grazing. The state and federal lands in this region of northern Colorado provide abundant and easily accessible opportunities for recreation, which we gratefully utilize. Impacts to use of or access to the state land is a negative impact to our communities.

11) Aesthetic - The drive from Livermore to Laporte would no longer be through the heritage rangeland and the familiar hogbacks. Since the proposed reservoir would likely be only partially filled much of the time, instead of beautiful hogbacks and grassy foothills, our viewshed would be marred by the barren sides (bathtub ring) and murky surface of a partially filled reservoir.

12) Lack of combined Project evaluation/coordination - There is no apparent coordination of the NISP or the proposed Seaman’s expansion or the Halligan expansion. All these projects surround our properties and would leave us on a peninsula of land cut from the rural environment we now enjoy. We met with the City of Greeley in August 2018 and learned that they are not planning to cooperate with other cities due to “challenges” and are proceeding on an expansion of Seamen’s reservoir from 5,000 to 80,000 acre-feet. In the 21st century, surface storage just doesn’t make sense; this is a semi-arid climate that is getting drier. Alternatives are available and should be seriously considered.

13) Social justice - While the benefits of proposed Glade would be enjoyed by people who live and work far from the reservoir site, the costs would be borne by those whose quality of life would be severely lessened.

14) Conservation and Alternatives – Conservation is not begin adequately considered. While the Colorado Front Range is land-rich for development, it is semi-arid and thus water-limited. About 2/3 of the Poudre is already taken out, and Glade would take another 40% of what’s left. Yet another reservoir is nothing but a temporary fix for a small portion of the state’s water needs; but one with permanent, destructive impacts on a large part of rural northern Colorado. The time is way past due for developing long-term solutions based on state-of-the-art technologies and widespread education on the absolute necessity to conserve water, and to stop relying on 19th century solutions for 21st century challenges.

The Larimer County Commissioners must save our rural communities and be good stewards of our natural resources by saying no Glade Reservoir!

Sincerely,

--
Mr Kit Nielsen
kfn5454@gmail.com
312 Granite Ridge
Laporte, CO 80535

Save Rural NoCo Member

3828

Rob Helmick <helmicrp@co.larimer.co.us>

Do Not Approve NISP 1041 Project No. 20-ZONE 2- Save Our Rural Northern Colorado

1 message

Lori Nielsen <lorikitnielsen@msn.com> Wed, Jul 1, 2020 at 7:10 PM
To: rhelmick@larimer.org, tdonnelly@larimer.org, swjohnson@larimer.org, jkefalas@larimer.org

Dear Commissioners and Planning Commission:

Commissioner Johnson
Commissioner Kefalas
Commissioner Donnelly
Rob Helmick

Dear Larimer County Commissioners:

I grew up in conservative Oklahoma and have lived in Larimer County for 34 years. I currently reside in the Bonner Peak subdivision. I am a professional Wildlife Biologist and have over 33 years experience in environmental impact reviews. Although my focus has been on wildlife resources as part of my career, I also am familiar with a number of other environmental resource issues. I am not nor have been a member of any local environmental organization, although I have been monitoring the "water wars" throughout the West and in the County.

I have tried to be succinct, given the number of comment letters I anticipate you will be receiving. However, please do not interpret brevity as a lower level of interest. The following points are key to the rural lifestyle Larimer County has come to represent both locally and globally.

I reference the latter, since Bonner Peak supports a diversity of residents, and my first question to them moving from all walks of life and the globe has been, "Why Bonner Peak? Why Larimer County?" The answers are parallel in that this area is unique in many different ways. Quality of life and opportunities are the nucleus. Northern Colorado is rare in merging interests from the far right to the far left, and Bonner Peak is a good example of this diversity.

Now for the substantive comments.

I have reviewed a number of sources and have found Save Rural NoCo as a pretty impressive, science-based constituent. Having worked on National Environmental Policy Act (NEPA) and local permitting for well over 30 years, they provide substantive points. I am providing my own perspective, based on my 30+years in the County, but I also use some of their talking points, where stated.

#1: Direct adverse effects to local landowners and natural resources resulting in direct benefits to communities exterior to Larimer County is negative to all Larimer County residents, no matter their political bent. I'm surprised even conservative constituents would be in favor of this proposal? Using impact terminology, this project would result in irreversible, irretrievable adverse impacts to local residents, water users within Larimer County, and the myriad of natural resources from wildlife to wetlands.

#2: The level of construction and increased noise levels from project construction has not been adequately addressed in the environmental analysis to date.

#3: Operational noise levels from recreational use will forever result in lower property values for homeowners within that noise diameter, reduced wildlife presence, and long-term effects to locals.

#4: The reservoir would present a permanent barrier to terrestrial wildlife east-west movement. This week, we had two bighorn sheep and 12 elk along the Bonner Peak area, moving east. This would prevent free movement all the way north to Cherokee Park and beyond.

#5: The most dangerous thing we do each day is drive Highway 287. However, no matter this level of danger, rerouting the highway as proposed would result in irreversible impacts to residents currently living along Highway 287 as the road would exit the hogback (lights into homes, noise, and no buffer). Additionally, no increased safety would be recognized as the road is currently planned.

#6: Save Rural NoCo mentions light pollution. They are correct, the added effect to this area would essentially extend light pollution north of Fort Collins and Laporte, negating any night sky access until approaching Virginia Dale.

#7: Water is key, obviously. Will the pool size truly fill? With junior water rights, the water level of the proposed reservoir would be highly variable.

#8: Cultural Resources: the loss of haystack rock

#9: Wildfire risk is ever increasing. We have survived six wildfires in 24 years, with the most destructive being in the last 8 years. Loss of 80+ homes in this overall region would have significant costs to the homeowners, community, and the county. Increased recreational use could be devastating.

#10: The State and County and local utilities all have their renewable energy portfolios and target emission reductions. This project would significantly increase emissions in this region during both construction and operation (pump stations).

#11: I'll reiterate Save Rural NoCo's statement on cumulative effects. It is well state: No apparent coordination of the NISP or the proposed Seaman's expansion or the Halligan expansion. All these projects surround our properties and would leave us on a peninsula of land cut from the rural environment. We met with the City of Greeley in August 2018 and learned that they are not planning to cooperate with other cities due to "challenges" and are proceeding on an expansion of Seamen's reservoir from 5,000 to 80,000 acre-feet. In the 21st century, surface storage just doesn't make sense; this is a semi-arid climate that is getting drier. Alternatives are available and should be seriously considered.

#12 Same for Conservation and Alternatives – Conservation is not begin adequately considered. While the Colorado Front Range is land-rich for development, it is semi-arid and thus water-limited. About 2/3 of the Poudre is already taken out, and Glade would take another 40% of what's left. Yet another reservoir is nothing but a temporary fix for a small portion of the state's water needs; but one with permanent, destructive impacts on a large part of rural northern Colorado. The time is way past due for developing long-term solutions based on state-of-the-art technologies and widespread education on the absolute necessity to conserve water, and to stop relying on 19th century solutions for 21st century challenges.

This Reservoir Project represents a water project that may have been in process for decades, but reflects a time long gone for both inefficiencies and lack of support. It's fairly easy to become angry to think of losing so much in this area to the benefit of other communities. Larimer County is unique, more unique than you may realize. So, I appeal to your common sense and long-term thinking. Please vote no.

Sincerely,
Lori Nielsen

--
Ms Lori Nielsen
lorikitnielsen@msn.com
312 Granite Rdg
Laporte, CO 80535

Save Rural NoCo Member

July 6, 2020

Larimer County Planning Commission
Sean Dougherty, Chair
Re: File #20-Zone 2657
** Submitted electronically via website*

Dear Commissioners,

The members of the Larimer County Farm Bureau urge you to approve the 1041 permit for the Northern Integrated Supply Project. This project is critical for the future of Larimer County, its agriculture industry, and the future of irrigated agriculture across northeastern Colorado.

Water supplies are critical to farmers and ranchers in Larimer County and across the state, and a huge part of our agricultural industry activity relies on surface water that will be managed and protected by NISP. Agriculture and food is the second largest industry in the state of Colorado, so it is imperative that we do everything we can to increase Colorado's water storage capacity and reduce the potential for future conflicts that arise when resources become scarce.

NISP will help provide additional supply for the future growth of Larimer County, ultimately protecting the water resources used to drive production of more than 64,000 acres of irrigated farmland. Our community must work now to provide the resources to fuel our growth and allow other families and businesses to enjoy the quality of life we currently have. The potential for recreational opportunities is also important to our community and the projected economic boost from that activity is far too great to pass up.

Both municipal and agricultural water users in Colorado have made significant strides in improving water efficiency and reducing consumptive use, but we can save enough water to make up for future demand. We must store more water now. After more than a decade its time to build NISP!

We urge you to approve the 1041 permit and help ensure a secure future for Larimer County, and our region.

Sincerely,

Arthur Bee
President
Larimer County Farm Bureau

3831

Rob Helmick <helmicrp@co.larimer.co.us>

Why No Lake Tap Alternative?

3 messages

Mark Heiden <mheiden@eaglelakefchoa.com> Fri, Jun 26, 2020 at 7:48 AM
To: "pcboard@larimer.org" <pcboard@larimer.org>

Planning Commission Board –

Did you know that during the Thornton proceedings currently in court that the Board of County Commissioners felt a lake tap alternative through Reservoir 3 was a routing option that should be considered?

In the County's Answer Brief to Thornton, they say "The Board found the potential use of lake taps **may mitigate significant impacts** on established neighborhoods around reservoirs, such as the Braidwood and Eagle Lake neighborhoods. (R6836 – emphasis added by me) The Board does not dispute that lake taps cost more and have some inherent risks…..The Board agrees that more information about the reasonableness and viability of lake taps is needed."

Has this been forgotten already? The planning department should know this was an option the Board felt was important to explore to save neighborhoods. Why isn't it being requested of Northern?

I look forward to exploring this further with you during my talk on July 8th.

Best regards,

Mark Heiden

Mark Heiden, President

Eagle Lake Association

mheiden@eaglelakefchoa.com

C: 970-988-8433

Matthew Lafferty <laffermn@co.larimer.co.us> Fri, Jun 26, 2020 at 9:23 AM
To: Rob Helmick <helmicrp@larimer.org>

FYI
[Quoted text hidden]
--

Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521
W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

Lesli Ellis <ellislk@co.larimer.co.us> Fri, Jun 26, 2020 at 9:36 AM
Reply-To: ellislk@larimer.org
To: Rob Helmick <helmicrp@co.larimer.co.us>

FYI

Lesli Ellis, AICP CEP
Community Development Director

Community Development Department
200 W Oak St, Fort Collins, 80521 | 3rd Floor
W: (970) 498-7690
ellislk@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Mark Heiden** <mheiden@eaglelakefchoa.com>
Date: Fri, Jun 26, 2020 at 7:48 AM
Subject: Why No Lake Tap Alternative?
To: pcboard@larimer.org <pcboard@larimer.org>

[Quoted text hidden]

3833

Rob Helmick <helmicrp@co.larimer.co.us>

Meet Bonnie and John

1 message

Mark Heiden <mheiden@eaglelakefchoa.com> Sat, Jun 27, 2020 at 5:09 PM
To: "pcboard@larimer.org" <pcboard@larimer.org>

Planning Commission Board –

I hope you are all enjoying your weekend at your home, your castle, or whatever you may call your private nesting place. I hope for your peace and tranquility there is no construction in your back yard.

Please meet Bonnie and John Helgeson – one of the property owners in Eagle Lake whose life and property will be greatly disrupted and harmed by the Northern pipeline **through their yard.**

Bonnie and John bought their home in 1999 and have completely remodeled it over the years to meet their vision of life in retirement. Both retired, Bonnie is in her late 70's and John his mid-80's. Bonnie is a master gardener who has put extensive work into their quiet spaces in the yard for their peaceful enjoyment. They have mature bushes and trees as wind and sight breaks that are in the proposed easement for the pipeline on their property that will probably be destroyed in the project. Both their septic and utilities are also located in the proposed easement. If Northern uses the property line separating the Helgeson's from their neighbor also in the pipeline path and it extends half of the easement amount of 50' into their property, it will only be approximately 15 feet from their garage. But some of this is just a guess since no one from Northern has ever spoken to the Helgesons.

It's important to know the people you will be affecting with a vote in favor of the proposed pipeline path so you can ask yourself – how would I feel if this were me?

See you all on July 8th.

3834

3835

Respectfully,

Mark Heiden, President

Eagle Lake Association

mheiden@eaglelakefchoa.com

C: 970-988-8433

3837

Rob Helmick <helmicrp@co.larimer.co.us>

Don't Be Fooled by Open Spaces

1 message

Mark Heiden <mheiden@eaglelakefchoa.com> Sun, Jun 28, 2020 at 6:00 PM
To: "pcboard@larimer.org" <pcboard@larimer.org>

Planning Commission Board

The County staff presentation last Wednesday of the Northern Water pipeline routing preferences included pictures of siting in Eagle Lake. The pictures were taken with a wide angle lens from who knows where to make it look like there is nothing but open ground for Northern to plow through our neighborhood. Nothing could be further from the truth.

The pictures below show you the homes that are affected by the construction hauling route Northern is proposing to use on our private roads through the neighborhood to haul materials, pipe sections, excavation and other heavy equipment during the 14+ weeks they project this phase of construction will occur. The first three are in close proximity to where they want to use private land through an easement for a turnaround for trucks.

The fourth is mere feet from Hood Lane where they want ingress and egress on a dirt and gravel ditch road for construction traffic – the owner of which (Hood Lane and the house) they have not even approached or talked to about usage.

I'll share with you more pictures of the home sites they are actually proposing to cross and maps of the area for a better overall understanding of what they are proposing on private roads and property at the July 8 meeting.

The question you have to ask yourselves is, would you want heavy truck traffic maneuvering through your neighborhood and within close proximity to your home for trucks and construction equipement coming and going for weeks on end with the associated noise, dust, diesel exhaust and disruption of your home life when there are better alternatives that don' include going through a neighborhood?

Respectfully,

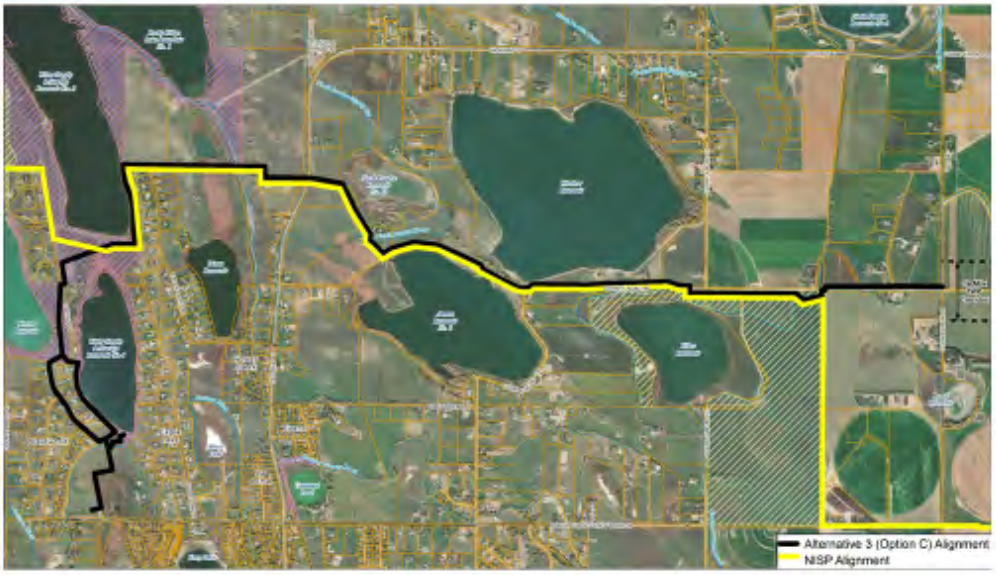
Mark Heiden, President

Eagle Lake Association

mheiden@eaglelakefchoa.com

C: 970-988-8433

County Road 56 Concept



3840

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

Location, Location, Location

1 message

Mark Heiden <mheiden@eaglelakefchoa.com> Mon, Jun 29, 2020 at 1:37 PM
To: "pcboard@larimer.org" <pcboard@larimer.org>

Planning Commission Board –

You've probably heard this 'best practices' saying about retailing success many times. It turns out to be true.

As a variant on that theme, we should be discussing Co-Location, Co-Location, Co-Location as a 'best practices' approach for the siting of pipelines. Especially when you've got the perfect storm in Larimer County's case of two projects very close together in timeframe, and two projects with nearly identical preferred routes through the County.

The attached letter from Brad Wind, General Manager of Northern Water who you heard from at the Planning Commission meeting last Wednesday, details their commitment to cooperate with both Larimer County and Thornton and "supports minimizing impacts to citizens of Larimer County by co-locating the pipelines adjacent and/or overlapping easements in the corridor shown in the attached Exhibit A".

The attached map shows the route that the County, Thornton and NSIP were cooperatively working on to mitigate impact throughout the County to the point where the pipelines directions diverge.

One of the objections the Board of County Commissioners expressed to deny the Thornton pipeline by submitting an application for only one of their proposed pipelines was, **"Thornton deprives the Board and public of the opportunity to consider cumulative impacts and the effectiveness of mitigation. A route that may be appropriate for a single pipeline may be inappropriate for additional pipelines. If this information is not considered now, future pipelines may not be able to co-locate which would result in the disorderly development of Thornton's project and compound the impacts on Larimer County through multiple different pipelines in separate locations."**

The County recognizes the need for evaluating cumulative impacts of multiple projects. The same should hold true for two projects by different entities.

Do your job and plan with vision – the NISP route should not be approved until there is resolution to the Thornton pipeline in the event they receive approval for an overland pipeline route. Everyone – the County, NISP and Thornton – were on board with a co-location best practice for impact mitigation. You should be as well. A mutually agreed upon co-located route can be found, avoiding double the pain for residents in the path of both pipelines.

Respectfully,

Mark Heiden, President

Eagle Lake Association

mheiden@eaglelakefchoa.com

C: 970-988-8433

2 attachments

Co-Location Map.jpg
349K

NISP_Thornton_Colocation_20181217[10527].pdf
916K

Northern Water
Northern Colorado Water Conservancy District
220 Water Avenue Berthoud, Colorado 80513
Phone 1-800-369-7246 • www.northernwater.org

December 17, 2018

Mr. Rob Helmick, Senior Planner
Larimer County Planning Department
200 West Oak Street
Fort Collins, Colorado 80521

Re: Northern Integrated Supply Project and Thornton Water Project Coordination

To Whom It May Concern:

The purpose of this letter is to clarify the commitment and support by the Northern Integrated Supply Project (NISP) to work with the City of Thornton to co-locate conveyance pipelines on the respective projects from the vicinity of Water Supply and Storage Company Reservoir Number 3 along Larimer County Road 56 to approximately the Turnberry Road intersection (see attached Exhibit A).

Larimer County Staff, in response to direction from the Larimer County Commissioners during recent Thornton Water Project hearings, invited Northern Water to participate in the Larimer Water Projects Working Group process along with various community stakeholders and to also participate in several related public meetings. This collaborative process helped inform the pipeline route proposed by the City of Thornton in its 1041 Permit Application Supplement 3 (dated December 10, 2018). By working cooperatively with the City of Thornton, NISP supports minimizing impacts to citizens of Larimer County by co-locating the pipelines adjacent and/or overlapping easements in the corridor shown on the attached Exhibit A. Additionally, NISP supports jointly or cooperatively constructing two segments of this reach with the City of Thornton: 1) from below Water Supply and Storage Company Reservoir Number 3 to north of Eagle Lake; and 2) the reach from southwest of North Poudre Irrigation Company Reservoir Number 10 to Larimer County Road 13. Such cooperation would, however, be contingent upon NISP: 1) securing the appropriate federal, state, and local permits; 2) successfully acquiring easements in the general alignment outlined in Exhibit A; and, 3) that no unforeseen significant challenges are presented throughout the permitting process or encountered during the detailed design and construction phase.

NISP and its participants appreciate the opportunity to work cooperatively with Larimer County Staff & Commissioners, the citizens of Larimer County, and the City of Thornton as these important water projects move forward.

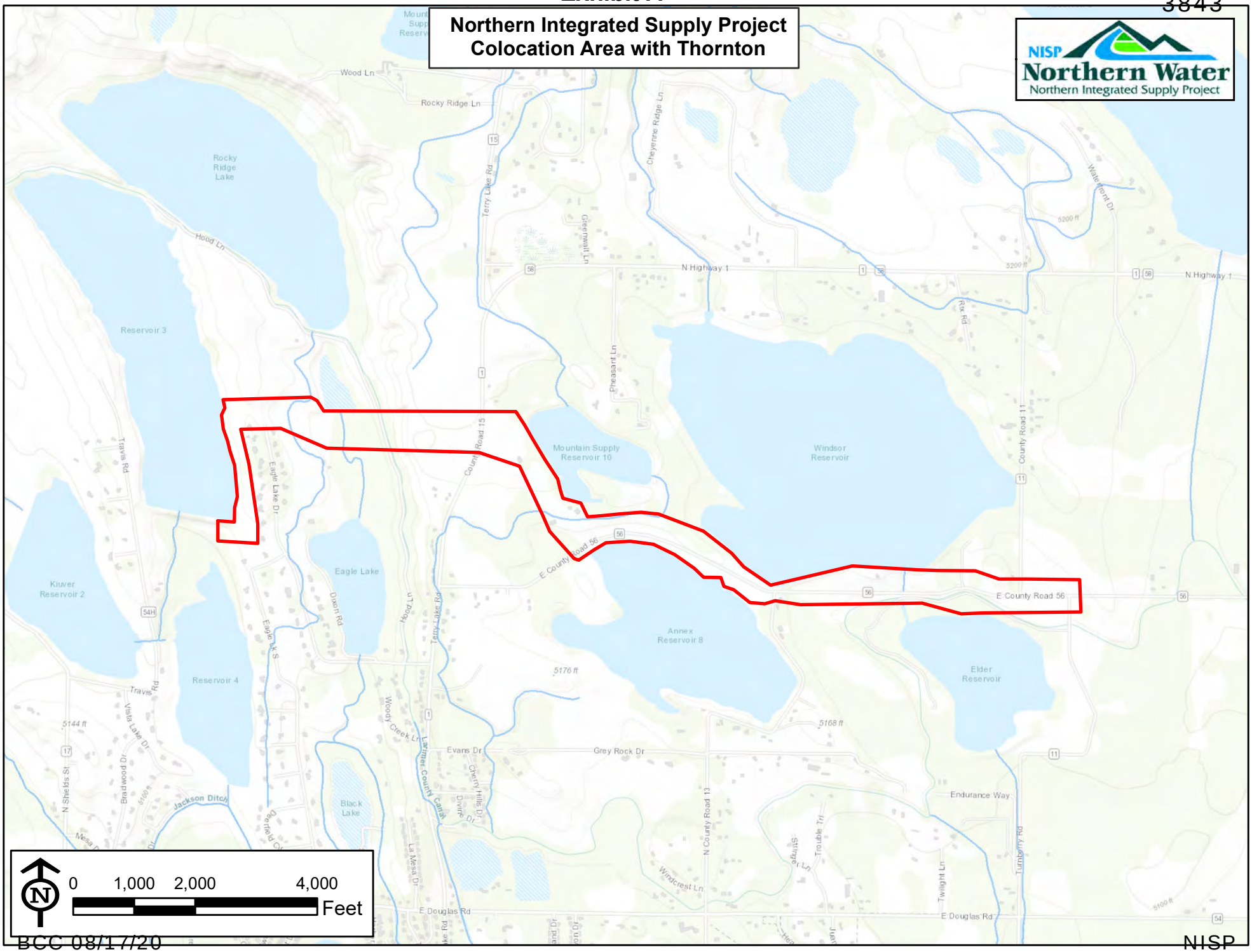
Regards,

Brad

Bradley D. Wind, P.E.
General Manager
Northern Colorado Water Conservancy District

Exhibit A

Northern Integrated Supply Project
Colocation Area with Thornton



3844

Rob Helmick <helmicrp@co.larimer.co.us>

Meet Tricia, Jim, Trey, Jace and dog Drake

1 message

Mark Heiden <mheiden@eaglelakefchoa.com> Tue, Jun 30, 2020 at 1:13 PM
To: "pcboard@larimer.org" <pcboard@larimer.org>

Planning Commission Board –

NISP is proposing to use the privately owned dirt road along the Larimer Canal behind the Hauan residence as a hauling route during construction of the pipeline from Highway 1 to Eagle Lake. Their house sits below the road (Hood Lane) and is only 20-30 feet from parts of the road.

Tricia and Jim have owned the house for 16 years and have raised their two sons, Trey -13, and Jace -8 there in a quiet, rural setting.

Tricia walks dog Drake every morning down their road where there's an abundance of birds, deer, and the occasional stray cow from the ranch behind their property. The boys frequently ride their bikes there and Tricia is comfortable in the knowledge they are safe from traffic, poor drivers and danger.

It is not a place for construction or truck traffic. Northern hasn't done their homework on this (they maybe have only looked at a map and never visited the site). They have never talked to the Hauans about the usage of their road or how incredibly disruptive it will be to their life for months on end.

Wait until you see the dangerous condition of the road that makes it unsuitable for any truck traffic at all, much less a continuous stream of large construction vehicles hauling material, excavation equipment and construction crews. I'll show you on July 8th. (The two family shots are from the front and back of the house on the road – you can see how close to their house it is.)





Respectfully,

Mark Heiden, President

Eagle Lake Association

mheiden@eaglelakefchoa.com

C: 970-988-8433

3846

Rob Helmick <helmicrp@co.larimer.co.us>

The People Left Out

1 message

Mark Heiden <mheiden@eaglelakefchoa.com> Wed, Jul 1, 2020 at 12:02 PM
To: "pcboard@larimer.org" <pcboard@larimer.org>

Planning Commission Board –

No where in the route descriptions that NISP has submitted in their 1041 application do they account for the people and homes that will be impacted by their proposed hauling routes through residential neighborhoods.

The attached map shows the two hauling routes proposed for the Eagle Lake segment of the Northern Tier of pipeline construction – privately owned dirt road Hood Lane (in red) and HOA owned Eagle Lake Drive (in blue) off of our Highway 1 private entrance.

Should our private roads – that are inadequately built for heavy construction truck traffic – be a hauling route and construction staging area for materials, pipeline sections, construction crew traffic, and equipment hauling? Past **29 different residences** with dust, traffic noise, vibrations, and diesel exhaust in a quiet residential neighborhood with children playing, residents coming and going, and retirees enjoying the peaceful time they've earned for a project that has no benefit for its residents and even minimal benefit to Larimer County as a whole?

These 29 residences (from the homes that back to Hood Lane off Highway 1 to all of the residences on Eagle Lake Drive up to and including the ones impacted by the proposed truck turnaround at the north end) are the uncounted casualties of NISP's proposal that only counts 2 or 3 residences directly impacted by construction in their yard. For up to 14 weeks if you believe their timeline estimates.

You have the option to put an end to this untenable proposal by recommending different route options. I'll share those possibilities with you on July 8.

Respectfully submitted,

Mark Heiden, President

Eagle Lake Association

mheiden@eaglelakefchoa.com

C: 970-988-8433

3848

LARIMER COUNTY

Rob Helmick <helmicrp@co.larimer.co.us>

"Demystifying the Process"

1 message

Mark Heiden <mheiden@eaglelakefchoa.com> Thu, Jul 2, 2020 at 1:38 PM
To: "pcboard@larimer.org" <pcboard@larimer.org>

Planning Commission Board –

When asked in an interview in the Fort Collins Coloradoan on March 21, 2019, what would be different about the approach NISP was going to take to get their pipeline approved over the process Thornton went through, NISP Project Manager Carl Brouwer said,

“Northern Water leaders hope a "no surprises" approach can shake the shroud of distrust left behind by the contentious Thornton pipeline public review process, Brouwer said. They plan to talk to every resident in the pipeline path and "demystify the process" before county commissioners review the route. Their proposal will also include detailed plans for reducing impacts to wildlife and reclaiming the land disturbed by the pipeline.
Brouwer admitted construction can be “annoying” for residents in the pipeline’s path. But he said individual property owners will only see active construction near their homes for one or two months because of the “train of activity” that moves a few hundred feet a day.”

NISP may yet scramble to talk to people in advance of the Commissioner’s meetings scheduled for August now that this will bring attention to their pledge, but that’s doubtful. To date, here is the list of people affected by the pipeline in our neighborhood who are waiting to be demystified and when they’ve been talked to:

- The two homeowners in Eagle Lake whose property will be crossed for the pipeline: Never.
- The developer of the newly annexed parcels to Eagle Lake (Corey Tips) to cross his property and use his gravel road turnaround for construction staging: Not in ‘years’.
- The 4 homeowners in Eagle Lake whose properties are in close proximity and overlook the proposed pipeline construction and turnaround: Never.
- The 3 property owners of the dirt and gravel road next to the Larimer Canal (Hood Lane) for permission to use it as a hauling route for construction materials and construction vehicle traffic: Never.
- The owner of the open land NISP proposes to cross north of Eagle Lake through wetlands there (Charlie Meserlian): Not in ‘years’.
- The Eagle Lake Homeowner’s Association about the proposed usage of the Association’s private entrance and roads for construction vehicle access throughout the “Construction Approach”: Never.
- The 29 homeowners on Eagle Lake Drive or private roads who will be impacted by the proposed construction vehicle traffic in front of their homes: Never.

The two homeowners who are retired and in their 70’s and 80’s whose land will be crossed are as mystified, worried, anxious, perplexed, uninformed, concerned and sleepless as ever.

Please apply an equal standard to your decision as was applied for Thornton. These folks are worse. At least Thornton talked to us.

Respectfully submitted,

Mark Heiden, President

Eagle Lake Association

mheiden@eaglelakefchoa.com

C: 970-988-8433

3850

Rob Helmick <helmicrp@co.larimer.co.us>

Do No Harm

1 message

Mark Heiden <mheiden@eaglelakefchoa.com> Fri, Jul 3, 2020 at 10:53 AM
To: "pcboard@larimer.org" <pcboard@larimer.org>

Planning Commission Board –

The Land Use Code was quoted extensively in Larimer County's decision to reject Thornton's 1041 application. One of the criteria in the

code the County used for consideration of their application is Criteria C whose purpose is to "Promote the economic stability of existing

land uses that are consistent with the Master Plan and protect them by incompatible or harmful land uses." The proposed NISP pipeline is

certainly an incompatible and harmful use of the land in the Eagle Lake neighborhood.

We recently annexed three parcels to our HOA (the TIPS Development) whose owner was required by the County to development certain aspects of the land (drainage, roads, etc) to be approved by the County before being allowed to offer the plots for sale and final residential development. The owner has spent thousands of dollars to prepare this land, yet the proposed pipeline path crosses near or on some of the new parcels rendering them virtually unsellable until the pipeline is built and completed.

No buyer will pay a premium price for a parcel with the amount of disruption, uncertainty of building site and septic placement, and ongoing nuisance this project will cause to these three parcels for well over a year. The County is in effect killing the owner's ability to sell his parcels and recoup his already substantial investment that the County has made him invest to get the land ready for development. This is not "promoting the economic stability of existing land uses" (ie. Residential development) or "protecting incompatible and harmful land uses".

Other residents in our neighborhood who may be contemplating or are in the process of listing their property are also economically negatively impacted by the proposed pipeline. Buyers will use every reason to lower the price on a sale and the uncertainty of construction traffic, noise, dirt and dust flying in the neighborhood are good leverage points for them to either not buy at all, or attempt to attain a lower selling price than normal. The County is truly hurting the economic stability of the whole neighborhood with this proposal and hundreds of thousands of dollars in values may be lost if the application is approved.

Please consider these important Land Use points as you assess whether to agree to a pipeline path directly through our neighborhood or ask NISP to consider alternate routes that can avoid negative impacts entirely. I'll share those with you on July 8.

Respectfully,

Mark Heiden, President

Eagle Lake Association

mheiden@eaglelakefchoa.com

C: 970-988-8433

3852

Rob Helmick <helmicrp@co.larimer.co.us>

Meeting Last Night

1 message

Mark Heiden <mheiden@eaglelakefchoa.com> Thu, Jun 25, 2020 at 7:52 AM
To: "pcboard@larimer.org" <pcboard@larimer.org>

Planning Commission Board –

Did anyone else notice that of all the various pictures shown last night of pipeline construction by either Northern or County planning that none of them were in residential neighborhoods – just wide open country spaces? Why?

Because pipelines of this magnitude do not belong in neighborhoods, crossing between homes with only 30 feet to the residence from the easement. There are better alternatives and I'll show you some during my talk on July 8th. Look forward to seeing you then.

Oh, and I'll have some different, more revealing photos to share.

Best regards,

Mark Heiden

Mark Heiden, President

Eagle Lake Association

mheiden@eaglelakefchoa.com

C: 970-988-8433

3853

Rob Helmick <helmicrp@co.larimer.co.us>

Northern Integrated Supply Project

2 messages

Meghan Olafson (tirelesstigress@gmail.com) Sent You a Personal Message Thu, Jun 25, 2020 at 4:31 PM
<automail@knowwho.com>
To: pcboard@larimer.org

Dear Larimer County Commissioners,

I respectfully request that you deny 1041 permit for the proposed Northern Integrated Supply Project based on solid studies that show it would be destructive to the Poudre River and its ecosystem as it flows through Fort Collins and beyond.

Currently, almost 60% of the Poudre?s water is diverted for agricultural, municipal, and industrial uses. If built, during peak flows, NISP could dry up another 71% of the flow through Fort Collins. Studies show that such a reduction would have dire consequences to fish and other aquatic life, riparian ecosystems, water quality, flow volume, and recreation use.

The NISP is expected to cost at least $1.2 billion, although those costs will rise because Northern Water has not obtained enough water rights to date to fill the reservoir. Northern Water must buy ?dozens and dozens? of Larimer and Weld County farms to obtain the water rights needed. Of the 15 communities and water districts that hold shares in NISP, many are outside the Poudre?s watershed.

The NISP is an extremely expensive project that would cause great destruction; disrupt and displace residents around the proposed reservoir, residents along Highway 287, and residents along the proposed pipeline route; and it isn?t needed. There are many conservation actions that would provide all the water proposed to be delivered by Glade, including improved water efficiency by municipal districts, industry, and agriculture; public education and awareness programs; repairs to leaking ditches and pipelines, landscape irrigation improvements, and much more.

The NISP is a controversial project that is of great interest to many people in Larimer County who want full opportunity to comment on the permitting process and to appear at public hearings. Because of the scope and controversy surrounding this proposed project, the Commissioners should wait until the coronavirus pandemic has subsided enough to allow for full in-person public participation.

Sincerely,

Meghan Olafson
3700 Quebec St 384, 19
Denver, CO 80207
tirelesstigress@gmail.com
(720) 431-4167

This message was sent by KnowWho, as a service provider, on behalf of an individual associated with Sierra Club. If you need more information, please contact Lillian Miller at Sierra Club at core.help@sierraclub.org or (415) 977-5500.

Matthew Lafferty <laffermn@co.larimer.co.us> Fri, Jun 26, 2020 at 9:23 AM
To: Rob Helmick <helmicrp@larimer.org>

FYI
[Quoted text hidden]
--

Matthew Lafferty, AICP
Principal Planner

Community Development Department
Advanced Planning
200 W Oak Street, Suite 3100
Fort Collins, Co 80521

W: 970.498.7721
mlafferty@larimer.org | www.larimer.org

June 30, 2020

Larimer County Planning Commission
Sean Dougherty, Chair
Re: File #20-Zone 2657
** Submitted electronically via website*

Dear Commissioners,

The Morgan County County Farm Bureau asks you to vote YES to approve the 1041 permit for the Northern Integrated Supply Project. The project is incredibly important to the future success of irrigated agriculture in Morgan County.

NISP will help provide new water storage for the future growth of both Larimer county, and future supply for agriculture production in Morgan County. Easing the pressure on buy-and-dry will help secure the future for irrigated agriculture, both in the area serviced by the NISP project, but also by water users further downstream, like those in Morgan County. New storage is a benefit to all Colorado water users, especially agricultural users who lack the resources to simply purchase needed supplies.

Population growth in Larimer and other Front Range counties will ultimately put pressure on resources in Morgan County. The added storage in Glade Reservoir will help reduce that pressure in the future.

After much study, Northern Water, the NISP participants, and your county staff believe this project can be completed in a way that both protects and benefits residents in Larimer County. And it has the added benefit of helping residents and businesses in downstream communities like ours.

We urge you to approve the 1041 permit in question and help ensure a secure future for Larimer County, Morgan County, and our region.

Sincerely,

Corey Ruple

Corey Ruple
President
Morgan County Farm Bureau

3856

Rob Helmick <helmicrp@co.larimer.co.us>

NISP

3 messages

Larimer.org <noreply@larimer.org> Wed, Jun 24, 2020 at 6:31 PM
Reply-To: Nancy York <nyork@verinet.com>
To: pcboard@larimer.org

Submitted on Wednesday, June 24, 2020 - 6:31pm

Submitted by user: Anonymous

Submitted values are:

Emailing (to) pcboard@larimer.org
Subject NISP
Your Name Nancy York
Phone 970-219-8069
Your Email nyork@verinet.com
Confirm Email nyork@verinet.com
Message
Are the Green House Gas emissions known for this project?
Does the Environmental Impact Statement address this?
Privacy Setting

This form was submitted from a /contact email link on larimer.org.

Lesli Ellis <ellislk@co.larimer.co.us> Thu, Jun 25, 2020 at 9:58 AM
Reply-To: ellislk@larimer.org
To: Lea Schneider <schneils@co.larimer.co.us>, Rob Helmick <helmicrp@co.larimer.co.us>, Don Threewitt <threewdl@co.larimer.co.us>

Hi Lea - I'm directing this question to you as FYI/response at hearings, and Rob we should include it for the record.

Thanks,
Lesli

Lesli Ellis, AICP CEP
Community Development Director

Community Development Department
200 W Oak St, Fort Collins, 80521 | 3rd Floor
W: (970) 498-7690
ellislk@larimer.org | www.larimer.org

[Quoted text hidden]

Lea Schneider <schneils@co.larimer.co.us> Thu, Jun 25, 2020 at 11:57 AM
To: Lesli Ellis <ellislk@larimer.org>
Cc: Rob Helmick <helmicrp@co.larimer.co.us>, Don Threewitt <threewdl@co.larimer.co.us>

Acknowledged.
Thank you!

Lea Schneider
Environmental Health Planner

Environmental Health

1525 Blue Spruce Drive, Fort Collins, 80524 | 2nd Floor
W: (970) 498-6777 | M: (970) 498-6776
lschneider@larimer.org | www.larimer.org/health

[Quoted text hidden]

3858

Rob Helmick <helmicrp@co.larimer.co.us>

Fwd: I strongly oppose NISP

1 message

Linda Hoffmann <hoffmalc@co.larimer.co.us> Tue, Jul 7, 2020 at 5:43 PM
To: "Helmick, Rob" <helmicrp@co.larimer.co.us>

Rob -- Please include this message in the public record for the application.

Linda Hoffmann
County Manager

Commissioners' Office
200 W Oak St, Fort Collins, CO 80521 | 2nd Floor
W: (970) 498-7004
lhoffmann@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Peggy LA POINT** <tnplapoint@msn.com>
Date: Tue, Jul 7, 2020 at 3:21 PM
Subject: I strongly oppose NISP
To: bocc@larimer.org <bocc@larimer.org>

Why I oppose the Northern Integrated Supply Project (NISP):

1.) It will kill the Cache la Poudre river through Fort Collins, which is already dry in spots at times through the year from being overworked
2.) It is a speculation project, projected to bring over 600,000 people to the Eastern Plains, increasing green house gas emissions in Northeast Colorado
3.) 7 miles of Highway 287 would be diverted East of the hogbacks
4.) The models and assumptions of water flows used by Northern Water don't take climate change into account
5.) Citizens of Fort Collins would lose tremendous amounts of the natural resources they have chosen to protect with their sales tax dollars
6.) The destruction of those natural resources means the decimation of the riparian edge through Fort Collins, and the wildlife it supports.

Peggy La Point
4437 Starflower Drive
Fort Collins, CO 80526

3859

Katie Beilby <beilbykm@co.larimer.co.us>

Comments for Planning Comm NISP 1041 hearing

Doug Swartz <dswartz@greyrock.org> Wed, Jul 8, 2020 at 2:05 PM
To: beilbykm@larimer.org

Hi Katie,
Attached are my comments for the Planning Commission's hearing this evening. Please include them in the packet.

Thank you,
Doug Swartz
970-222-0962

NISP 1041 - DS comments for Planning Commission hearing.pdf
71K

2232 Sun Rose Way
Fort Collins, CO 80521

8 July 2020

Larimer County Planning Commission
RE: NISP 1041 application

Dear Commissioners:

I am writing to ask that you recommend denial of the 1041 permit application for the Northern Integrated Supply Project.

Please: don't miss the forest for the trees. Northern Water and Larimer County together have severely restricted the scope of what's being considered in the current 1041 application. This is potentially illegal and, in any case, does a huge disservice to LC residents. You're being asked to put blinders on in your deliberations. I encourage you to take off those blinders and look bigger picture. NISP, if approved, will be the biggest construction project in the history of Larimer County.

Don't forget:

- NISP will export large amounts of Cache La Poudre river water out of the watershed.
- NISP will take an additional large portion of the already decimated peak flow from the river (already decimated by existing water diversions). This will have huge negative impacts on many aspects - physical, biological, recreational - of the river and the riparian corridor.
- The so-called "Fish and Wildlife Mitigation and Enhancement Plan" is an example of the "doublespeak" that Northern Water uses to spin this project. The negative peak flow diversion impacts cannot be mitigated. Providing a year-round, 18-to-25 cfs trickle on a short stretch of the river will mean the river behaves even more like a ditch than it has already become. Other touted benefits, such as improved fish passage at existing diversions, can be done independently of a new, billion-plus dollar water diversion project.
- We don't need a huge new reservoir to "bring tourism and economic growth to Larimer County." This has been happening for decades without NISP. Larimer County is already booming. We're seeing visitation to the County's on a steep growth curve, with attendant negative impacts to the Poudre Canyon, wildlife and environment in general. Poudre Canyon residents and other users can bear witness to the damage currently being done by increased visitation during the Covid-19 pandemic.
- Northern Water's presentation of the project vastly overexaggerates project benefits while vastly understating the project's negative impacts on the river and county residents.

Please: don't be dazzled by Northern Water dollars. Please don't sell the Cache la Poudre River, an extremely important part of the county's soul. Once it's gone, we won't have the chance to get it back.

Thank you for recommending denial of the 1041 permit application.

Sincerely,
Douglas Swartz

3861

Rob Helmick <helmicrp@co.larimer.co.us>

File #20-Zone 2657- letters of support

3 messages

Martini, Shawn <shawn@coloradofb.org> Wed, Jul 1, 2020 at 11:29 AM
To: rhelmick@larimer.org

Mr. Helmick,

Please include these comment letters from the Colorado Farm Bureau, Weld County Farm Bureau, and Morgan County Farm Bureau to the record for the upcoming Planning Commission meeting.

Thank you,

--

- To help prevent the spread of COVID-19, CFB staff members are working from home. You may reach me on my cell: (303) 895-5070

- For information about COVID-19 and its impact on the agriculture industry, visit www.AgisOpen.com or the CFB website.

Shawn Martini
Vice President, Advocacy
C (303) 895-5070
www.ColoradoFarmBureau.com

- Recognized as One of Denver's "Best Places to Work" in 2018 and 2019

3 attachments

Morgan+NISP+Comment+Letter.pdf
127K

Weld+NISP+Comment+Letter (1).pdf
171K

CFB NISP Comment Letter.pdf
353K

Don Threewitt <threewdl@co.larimer.co.us> Wed, Jul 1, 2020 at 1:16 PM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Kind Regards,

Don Threewitt, AICP
Planning Manager

Community Development Department
200 W Oak St, Fort Collins, 80521 | 3rd Floor
W: (970) 498-7689 |
dthreewitt@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Martini, Shawn** <shawn@coloradofb.org>
Date: Wed, Jul 1, 2020 at 11:42 AM
Subject: Fwd: File #20-Zone 2657- letters of support
To: <threewdl@co.larimer.co.us>

Hi Don,

Rob Helmick was listed on the public comment page as the contact, but it looks like he's out of town and I think you may be a better person to send these to.

Please let me know if there is someone else I should send them to in order to get them into the board book.

Thanks.

---------- Forwarded message ---------
From: **Martini, Shawn** <shawn@coloradofb.org>
Date: Wed, Jul 1, 2020 at 11:29 AM
Subject: File #20-Zone 2657- letters of support
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Shawn Martini
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CFB NISP Comment Letter.pdf
353K

Don Threewitt <threewdl@co.larimer.co.us> Mon, Jul 6, 2020 at 3:58 PM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Kind Regards,

LARIMER COUNTY

Don Threewitt, AICP
Planning Manager

Community Development Department
200 W Oak St, Fort Collins, 80521 | 3rd Floor
W: (970) 498-7689 |
dthreewitt@larimer.org | www.larimer.org

---------- Forwarded message ---------
From: **Martini, Shawn** <shawn@coloradofb.org>
Date: Mon, Jul 6, 2020 at 3:56 PM
Subject: Re: File #20-Zone 2657- letters of support
To: Don Threewitt <threewdl@co.larimer.co.us>

Hi Don,

I have one additional letter to submit on behalf of the Larimer County Farm Bureau. Thank you.

On Wed, Jul 1, 2020 at 1:16 PM Don Threewitt <threewdl@co.larimer.co.us> wrote:

> Mr. Martini,
>
> Thank you. Rob and I will make sure to get these into the supplemental packet for the July 8th hearing.
>
> Kind Regards,
>
> LARIMER COUNTY
>
> **Don Threewitt, AICP**
> Planning Manager
>
> Community Development Department
> 200 W Oak St, Fort Collins, 80521 | 3rd Floor
> W: (970) 498-7689 |
> dthreewitt@larimer.org | www.larimer.org
>
> On Wed, Jul 1, 2020 at 11:42 AM Martini, Shawn <shawn@coloradofb.org> wrote:
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> > Hi Don,
> >
> > Rob Helmick was listed on the public comment page as the contact, but it looks like he's out of town and I think you may be a better person to send these to.
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> >
> > Thanks.
> >
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> > From: **Martini, Shawn** <shawn@coloradofb.org>
> > Date: Wed, Jul 1, 2020 at 11:29 AM
> > Subject: File #20-Zone 2657- letters of support
> > To: <rhelmick@larimer.org>

Mr. Helmick,

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Thank you,

--

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Larimer+NISP+Comment+Letter.pdf
167K

COLORADO FARM BUREAU
Promoting and protecting the future of agriculture and rural values.

June 30, 2020

Larimer County Planning Commission
Sean Dougherty, Chair
Re: File #20-Zone 2657
** Submitted electronically via website*

Dear Commissioners,

On behalf of the Colorado Farm Bureau, I write in support of granting a 1041 permit to Northern Water and the Northern Integrated Supply Project. The reservoir and pipelines subject to the permit are an extremely important part of future water storage and management in the Northeast region of the state, and will benefit all Coloradans upon its completion.

The Colorado Farm Bureau is the state's largest agricultural organization with more than 24,000 members across Colorado. We have a long history of engagement in water-related activities in Colorado and have been strong supporters of the NISP project from its inception. Production agriculture is responsible for more than $20 billion in economic activity and more than 200,000 jobs in Colorado. A strong water supply is critical to the current and future success of agriculture in the state of Colorado

We believe that the construction of Glade Reservoir and its attendant pipelines will help significantly improve water management in the South Platte River Basin. The project will help to achieve the Colorado State Water Plan's goal of constructing 400,000 acre-feet of new storage capacity while protecting water quality and the ecosystems that water nourishes. NISP will help provide additional supply for the future growth of the region and protect water resources used to drive production on more than 64,000 acres of irrigated farmland, which in turn generates hundreds of millions of dollars in economic activity, tax payments and payrolls to the region.

In addition to protecting the economic activity associated with historic irrigated agriculture production, the project will also generate an estimated $13-$30 million in new economic activity, in Larimer County alone. Overall the project will drive economic growth and sustain irrigated agriculture across the South Platte River Basin, far beyond where the reservoir itself is to be situated. Both municipal and agricultural water users in Colorado have made significant strides in improving water efficiency and reducing consumptive use. But future population growth necessitates the need for additional storage capacity.

Without NISP, tens of thousands of acres of productive farmland in Colorado's most productive agricultural region would be dried, as municipalities would be forced to purchase water from agricultural users. Entire segments of the local economy would shutter and thousands of employees would lose their jobs. All while thousands of acre-feet of Colorado's water ran out of the state to be put to use by others.

303.749.7500 (phone) | 303.749.7703 (fax) | 9177 E. Mineral Circle, Centennial, CO 80112 | www.ColoradoFarmBureau.org

COLORADO FARM BUREAU
Promoting and protecting the future of agriculture and rural values.

After more than a decade of study, research and planning, the NISP Project is ready for construction. We know this project can be done in a way that minimizes impacts to the community and the environment while providing lasting benefits to both. This is why the project enjoys broad support from federal, state and local leaders, industry groups, farmers, ranchers, business owners, and residents.

We urge you to approve the 1041 permit in question and help ensure a secure future for Larimer County, the surrounding region and the entire state of Colorado.

Sincerely,

Donald J Shawcroft

Don Shawcroft
President

303.749.7500 (phone) | 303.749.7703 (fax) | 9177 E. Mineral Circle, Centennial, CO 80112 | www.ColoradoFarmBureau.org

June 30, 2020

Larimer County Planning Commission
Sean Dougherty, Chair
Re: File #20-Zone 2657
** Submitted electronically via website*

Dear Commissioners,

The Weld County Farm Bureau urges you to grant the needed 1041 permit to Northern Water and the Northern Integrated Supply Project. The project is incredibly important to the future success of irrigated agriculture in Weld County.

Production agriculture is responsible for more than $20 billion in economic activity and more than 200,000 jobs in Colorado. Water supplies are critical to farmers and ranchers in Weld County and across the state. Weld makes up more than $2 billion in agricultural sales, which is more than one-quarter of total agricultural sales in Colorado. The vast majority of that agricultural activity relies on surface water that will be managed and protected by NISP.

NISP will help provide additional supply for the future growth of both Larimer and Weld counties, ultimately protecting the water resources used to drive production of more than 64,000 acres of irrigated farmland. The project will help to achieve the Colorado State Water Plan's goal of constructing 400,000 acre-feet of new storage capacity. While much more will be needed, this project is shovel ready and a great way to advance the overall storage goal.

Both municipal and agricultural water users in Colorado have made significant strides in improving water efficiency and reducing consumptive use. But future population growth necessitates the need for additional storage capacity. After more than a decade its time to build NISP!

We urge you to approve the 1041 permit in question and help ensure a secure future for Larimer County, Weld County, and our region.

Sincerely,

Tom Honn
President
Weld County Farm Bureau

Rob Helmick <helmicrp@co.larimer.co.us>

Supplemental comment letter-NISP 1041

4 messages

John Barth <barthlawoffice@gmail.com> Tue, Jul 7, 2020 at 3:03 PM
To: pcboard@larimer.org, Rob Helmick <helmicrp@co.larimer.co.us>

Dear Planning Commissioners and Mr. Helmick:

Attached please find a supplemental comment letter and 2 exhibits submitted by No Pipe Dream Corporation, Save Rural NoCo Corporation, and Save the Poudre. The attached letter and exhibits highlight significant deficiencies with the recreational benefit analysis of Glade reservoir in Northern's 1041 permit application. Please confirm receipt of the attached and please review before tomorrow night's Planning Commission hearing. Please include the letter and exhibits into the Administrative Record for this permit proceeding. Thank you.

--
John Barth
Attorney at Law
P.O. Box 409
Hygiene, CO 80533
(303) 774-8868
barthlawoffice@gmail.com

3 attachments

Supplemental comment letter Final 07072020.pdf
90K

Rodger Ames CV 2020.pdf
165K

SRN Rec analysis FINAL.pdf
4055K

Rob Helmick <helmicrp@co.larimer.co.us> Tue, Jul 7, 2020 at 3:06 PM
To: Katie Beilby <beilbykm@co.larimer.co.us>, Lesli Ellis <ellislk@larimer.org>, Don Threewitt <threewdl@co.larimer.co.us>

I can add this to the directory of katie can now it is set up i will need to modify the memo
[Quoted text hidden]
--

Robert Helmick
Senior Planner

Community Development Department
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521
970-498-7682
rhelmick@larimer.org
https://www.larimer.org/planning

3 attachments

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90K

Rodger Ames CV 2020.pdf
165K

3869

SRN Rec analysis FINAL.pdf
4055K

Rob Helmick <helmicrp@co.larimer.co.us> Tue, Jul 7, 2020 at 4:47 PM
To: John Barth <barthlawoffice@gmail.com>

John,
Received
We will provide the information to the PC
[Quoted text hidden]
[Quoted text hidden]

John Barth <barthlawoffice@gmail.com> Tue, Jul 7, 2020 at 4:47 PM
To: Rob Helmick <helmicrp@co.larimer.co.us>

Thank you Rob,

Sent from my iPhone
[Quoted text hidden]

No Pipe Dream Corporation
Save Rural NoCo Corporation
Save the Poudre

July 7, 2020

By email
Larimer County Planning Commission (pcboard@larimer.org)
Rob Helmick (helmicrp@co.larimer.co.us)
Larimer County Planning Department
200 West Oak Street, Suite 3100
Fort Collins, Colorado 80521

Re: Supplemental comment letter to the Larimer County Planning Commission regarding the Northern Integrated Supply Project (NISP) Pending 1041 Permit Application, Project No. 20-ZONE 2657

Dear Mr. Helmick and Planning Commissioners:

On behalf of No Pipe Dream Corporation, Save Rural NoCo Corporation, and Save the Poudre (collectively "Larimer County NGOs"), we submit the following supplemental comment letter regarding Northern Colorado Water Conservancy District's ("Northern") pending 1041 permit application ("1041 application") for the Northern Integrated Supply Project ("NISP").

The purpose of this supplemental comment letter is to convey the attached report entitled, "A review and independent analysis of the feasibility of recreation at the proposed Glade Reservoir" authored by Rodger Ames in coordination with Save Rural NoCo. Mr. Ames resume is also attached.

As the title suggests, Mr. Ames report analyzes whether the promised recreational benefits to Larimer County from the proposed Glade Reservoir will be realized. Mr. Ames scrutinizes Northern's evidence and analysis that Glade will add $13 to $30 million dollars annually to the Larimer County economy. Mr. Ames applies a statistical model used to estimate a range of likely future operations of Glade that were not addressed in the federal Environmental Impact Statement process. Mr. Ames concludes that Northern's economic benefit estimates are highly overestimated and its analysis is highly speculative. Mr. Ames concludes that, at best, the recreational revenue from Glade would be approximately $1.2 million per year, possibly less than the cost of operation.

Below is a summary of the deficiencies with Northern's recreational benefit analysis:

1) **Without evidence, Northern's analysis assumes Glade's initial water storage would be 100,000 acre-feet, instead of <u>zero</u> acre-feet.**

After Northern completes construction of Glade, it will be a large, dry basin. Yet Northern's analysis assumes the initial water storage in Glade will be 100,000 acre-feet. Northern states that the initial fill will come from Horsetooth Reservoir. However, the details of this water transfer are lacking from Northern's 1041 application. Horsetooth's capacity is only 151,750 acre feet of water, so system and recreational impacts using water from Horsetooth to fill Glade must be evaluated and disclosed in the 1041 process. Ames Report, p. 8.

2) **Northern's junior Grey Mountain water right will not provide dependable flow to Glade.**

Northern's Grey Mountain Water right is a junior water right. Accordingly to Northern's own EIS, "[u]ntil the SPWCP in online, Glade Reservoir will be wholly dependent on the Grey Mountain water right. The water right has the capability of yielding water in about 4 out of 10 years. Modeling indicates that there can be several years in a row of divertible flow followed by as many as 8 years with no flow available." NISP DEIS, 2008, Section 2.4.1.3. Northern's South Platte River water rights are also relatively junior water rights. Eight years of no flows from Grey Mountain water rights could empty the reservoir in less than eight years. Combined, Northern's analysis of flow to Glade Reservoir from junior Grey Mountain and South Platte water rights is very speculative and could adversely impact recreational opportunities at Glade. Ames Report, p. 7.

3) **Northern's Water Secure Program is very <u>Insecure</u>.**

Implementation of NISP is wholly dependent on Northern's ill-defined Water Secure Program. Northern has failed to provide any detailed information on its Water Secure Program in its 1041 application. We know however that, to date, Northern has only acquired a small fraction (less than 1%) of the land and/or water rights agreements, necessary for the SPWCP. Future uncertainties, such as the high cost of land purchased and/or water rights agreements required to bring the SPWCP online, were also not evaluated in the NISP FEIS. Failure to fully implement the Water Secure Program will severely limit recreational opportunities at Glade. Ames Report, p. 7.

4) **Recreational benefits at 40,000 AF are inaccurate.**

Northern claims that recreation on Glade is viable at water storage levels higher than 40,000 AF. This claim is misleading and inaccurate. At this level, the reservoir's surface area would be 663 acre-feet (roughly 40% of the maximum surface area) and the water line would be 122 feet below the high water line. The proposed boat ramp and fishing pier would be unusable, and opportunities for hand-launched watercraft limited. For example, hand launching from the northern access road would require carrying a

watercraft across more than 1.5 miles of the lake bed to reach the reservoir's north shore. Ames Report, p. 10.

5) **The stream flow data used by Northern is not current and is incomplete.**

Northern's analysis uses historical stream flow data from 1950-2005 for the Cache la Poudre River. These data are not current and are also incomplete. For example, drought conditions that produced historic low stream flows in the early 2000s continued through 2005 and after. As such, levels of water in Glade would have been extremely depleted. Further, flows in the years following 2005 were also extremely low, resulting in a long period of time to replenish the reservoir. However, because Northern did not provide readily available flow data post-2005 its analysis intentionally hides these facts and their implications for Glade reservoir levels. Ames Report, p. 12.

6) **Northern failed to adequately consider drought and climate change.**

It is widely accepted in the scientific community that climate change will result in longer, and more pronounced, drought in the Interior West, including in the Cache la Poudre basin. The combination of climate change and drought were not adequately considered in Northern's FEIS process or 1041 application. As noted above, Northern's reliance on pre-2006 river flow data further ignores the recent evidence of drought and reduced flows in the Cache la Poudre River over the last two decades. Northern's EIS and 1041 application ignored the inconvenient truth that its junior water rights creates significant future uncertainty of the viability of NISP.

Conclusion

For the reasons stated herein, the NISP 1041 application should be denied because Northern has failed to comply with the following Land Use Code criteria:

A) Criteria #1- Northern has failed to prove that Glade is consistent with the County Master Plan and Recreation Plan because the recreational opportunities are unlikely to be realized.
B) Criteria #2- Northern has failed to present any alternative to Glade Reservoir.
C) Criteria #8- Northern has failed to prove that there will be adequate water in Glade and thus has failed to prove there will be adequate public facilities for the promised recreational benefits.
D) Criteria #10- Northern has failed to meet its burden of proving that the recreational benefits of Glade will be realized.
E) Criteria #11- Northern defers much of the mitigation measures to a later planning process and thus fails to comply with this criteria at the time of submission of the 1041 permit application.

Please ensure that the Planning Commissioners receive this letter and the exhibits prior to July 8, 2020 Planning Commission hearing. Also, please include this letter and the attached exhibits in the Administrative Record for this permit proceeding. Thank you.

Sincerely,

s/ Robert Kitchell, President

No Pipe Dream Corporation

s/ John Dettenwanger, Chairman

Save Rural NoCo

s/ Gary Wockner

Save the Poudre

Exhibits:

1) "A review and independent analysis of the feasibility of recreation at the proposed Glade Reservoir" by Rodger Ames in coordination with Save Rural NoCo;
2) CV of Rodger Ames.

A review and independent analysis of the feasibility of recreation at the proposed Glade Reservoir

Prepared by Rodger Ames in coordination with Save Rural NoCo

Table of Contents

Executive Summary

This report provides additional information to inform Larimer County's decision making process regarding Northern Water's 1041 application for the Northern Integrated Supply Project (NISP). Northern's claim of economic benefits to the County, and the assertion that Glade would provide additional recreation services to meet future demand in Larimer County, is speculative.

Extended periods of low water levels, lasting years to decades, are likely future scenarios at Glade. There is overwhelming scientific consensus that runoff will decrease in response to regional climate warming. Despite this evidence, hydrological modeling for the NISP relies on historical streamflows to predict future operations at Glade. Impacts of low water levels on recreation use, and potential adverse local and environmental impacts from prolonged severe water drawdowns at Glade, are not addressed in Northern's 1041 application.

Water supplies to Glade are extremely vulnerable to droughts

- Glade would rely on junior water rights on the Cache la Poudre to fill. Severe water drawdowns could last years to decades during which water-based recreation would not be available, revenues would be a fraction of operation and maintenance budgets, and Glade's reputation as a reliable recreation venue would suffer.

Glade will not provide another recreation venue similar to Horsetooth

- Horsetooth, and other reservoirs operated by Larimer County, are supplied by water from the Colorado - Big Thompson System, which is much larger and more drought resilient than the Poudre in part because of the more reliable water rights.
- Junior Rights to Poudre water supplies would severely limit Glade's ability to support consistent recreational use. During droughts access to the proposed boat ramp would be limited, and often curtailed altogether, for years to decades.

The management priority of Glade is to deliver water to NISP participants, not recreation or river health

- As water levels at Glade drop, recreation access would also drop, and purported benefits the NISP Alternative 2M, such as flow augmentations through the stretch of the Poudre that runs through Fort Collins, would be tiered out.

Hydrological modeling for the NISP is based on outmoded assumptions

- Northern's modeling neglects recent science that predicts declines in future runoff in response to climate warming.
- modeling assumes an initial storage volume of 100,000 acre-feet, rather than 0, creating a false impression of initial fill times.
- modeling omits the past 15 years Poudre streamflow data, denying the county valuable information on refill characteristics of Glade following severe water drawdowns.

Estimates of the economic value of proposed recreation at Glade are overestimated

- Northern Water claims economic benefits of $13-$30 million per year from recreation at Glade.
- In contrast, recreation at Horsetooth generated $2.5 million for Larimer County in FY 2019.
- Actual revenue to the County from recreation at Glade could be much less than at Horsetooth due to reduced visitation and limited recreation access during droughts.

Northern's water rights are relatively junior, adding to risk and uncertainty

- NISP relies on a 1980 storage right on the Poudre River and a 1992 water right on the South Platte River, in addition to exchanges with two local ditch companies. Given that the most senior water rights in Colorado date to the 1860s, these are very junior rights
- Adding to the uncertainty and risk, NISP relies on *both* the South Platte and the Poudre River receiving "average" or high flows in any given year to work. Prolonged drought in either basin will affect the ability to fill Glade.

1. Introduction

This report fills a knowledge gap regarding the feasibility of recreation at the proposed Glade Reservoir. Northern Water promises Glade will provide Larimer County with a “high-quality” recreation venue, and claims recreation, most prominently the lure of more flat water recreation, will pump 13 to 30 million dollars per year into the local economy (NISP FEIS, 2018). However, Northern’s 1041 application lacks evidence to support this revenue projection. Uncertainties in future water supplies to Glade make estimates of recreation value highly speculative. Informed estimates of potential recreational use and realistic assessments of adverse environmental and local impacts are important considerations as Larimer County reviews Northern Water’s 1041 permit application.

This report reviews operational characters at Glade presented in the NISP FEIS. A simple statistical model is used to estimate a range of likely future operations that were not addressed in the FEIS. This analysis suggests that Northern’s estimates of recreational use at Glade are likely to be highly overestimated. We show that prolonged low water levels, resulting from realistic estimates of the time required for the initial fill; the time required for Glade to refill following severe water drawdowns; inclusion of recent Cache la Poudre streamflow data; and consideration of plausible risks to future water supplies, combine to significantly reduce estimates of recreation use at Glade.

Cyclical droughts, which are common throughout this climate region, are increasing in frequency and duration in response to climate warming (Udall and Overpeck, 2017; Williams, 2020). Hydrological modeling conducted for the NISP DEIS indicates that water levels at Glade are particularly sensitive to prolonged droughts. For example, in the year 2005 of the NISP modeling simulation, storage volumes at Glade dropped to 11% of maximum capacity, causing predicted water levels to plummet 160 feet below the high water line. Unfortunately, hydrological modeling for the NISP ended in the same year, thus refill characteristics following this severe water drawdown were not evaluated. Since streamflow data are readily available, it is particularly concerning that recent Cache la Poudre streamflow data were not included in hydrological modeling for the NISP FEIS.

Neither the NSIP FEIS nor this analysis consider the full range of water supply risks to Glade. To date, Northern Water has obtained only half of the water rights required for the NISP. Northern’s Grey Mountain Right is estimated to provide half of the required water supplies, with the remainder coming from the proposed South Platte Water Conservation Project (SPWCP) exchanges. Until the SPWCP is online and at full projected yields, NISP will fall well short of its water delivery commitments, and Glade will rarely, if ever, fill.

The lack of a robust water supply vulnerability study that evaluates plausible water supply vulnerabilities denies the public and the county valuable information on future operational characteristics at Glade. The City of Fort Collins recently commissioned a comprehensive water supply vulnerability study (Stanec, 2019), which concluded that climate change is the most significant risk facing the CIty’s future water supplies. However, hydrological modeling for the NISP relies on the outdated assumption that past water supplies can be used to predict future hydrology. As it stands, Northern Water’s 1041 application fails to provide adequate information for the county to make informed decisions on recreation value and overall feasibility of Glade as a new recreation venue for Larimer County.

2. Conformity with Larimer County's 1041 Issuance Criteria

The list below summarizes deficiencies that Save Rural NoCo (SRN) has identified in Northern Water's (the Applicant) 1041 permit application. The full list of issuance criteria is specified in Sec. 14.10 of the Larimer County Land Use Code (Larimer County, 2020). Because this technical document focuses on the proposed Glade Reservoir, recreation components, and siting issues related to Glade are highlighted.

Criterion 1. Conformity with Larimer County's Comprehensive Plan: Northern's application does not demonstrate how the project protects air and water quality, cultural and natural resources, minimizes fragmentation of the landscape; it does not consider the natural terrain in its design and siting to minimize environmental impacts; it does not adequately mitigate risks and reduce economic costs of natural hazard events to increase resiliency; it does not conform with the county's vision for environmental stewardship, and it does not promote "overall community interests" because most of the benefits of the project would accrue to communities outside Larimer County. **Proposed recreational benefits would likely never materialize because the water to fill the reservoir will not be available to keep the reservoir at levels suitable for boat access in most years. Adverse environmental impacts resulting from persistent low water levels at Glade are at odds with the County's Resiliency Framework. Rather than promote resiliency, NISP would increase Larimer County's exposure to the impacts of a rapidly changing climate.**

Criterion 2. Reasonable siting and design alternatives: No alternatives are presented. The applicant refers to the alternatives analysis conducted for the federal process, which is unnecessarily limited to a water storage project and is out of date. There are many less costly and less environmentally destructive alternatives for water development now available. Alternatives must be presented in the 1041 application to Larimer County consistent with the land use code and 1041 review provisions. Finally, the application is for an alternative that involves both the Glade Reservoir and a farm-buying scheme which has not been evaluated in any of the environmental documents. Analysis of the farm-buying scheme in the existing 1041 application falls short of providing adequate information to meet the review criteria. In addition, NISP admits that the farm acreage needed to implement this scheme has yet to be obtained, a fatal deficiency. **Pointing to alternatives presented to or developed by a federal agency subject to different legal frameworks than County law and policy is an admission that the 1041 proposal is incomplete.**

Criterion 4. Environmental impacts: The application does not adequately identify environmental impacts. Analysis of key impacts to the land and natural resources is incorrect or inadequate, is not specific enough for local land-use decision-making, or is deferred to some later permitting/approval process. Adverse impacts, including **increased noise levels from recreation activities at Glade and Highway 287 realignment; visual, aesthetic and potential air quality degradation during prolonged (multi-year) water drawdowns at Glade;** increased wildfire and trespass risks, increased GHG emissions from pumping operations and inundation, are either dismissed, not addressed, or mitigation plans for environmental impacts are either inadequate or not provided.

Criterion 5. Cultural sites: The Final EIS states there are 82 eligible or potentially eligible cultural sites present in the Glade Reservoir APE. The County cannot approve a proposal that will adversely affect any sites and structures listed on the State or National Registers of Historic Places. Sites that would be inundated by the proposed reservoir or highway location would be entirely lost. They must be fully surveyed, identified and analyzed prior to obtaining a permit. Criterion 5 is not met because the sites have only been generally listed, but not specifically evaluated, inventoried or disclosed.

Criterion 6. Public health and safety: Wildfire hazard will increase, and Northern cannot ensure adequate mitigation. Furthermore, the **public health and aesthetic issues surrounding fugitive dust from exposed lake bed during prolonged water drawdowns, as noted above, and increased ozone precursors from motorized boating,** are not addressed**.** Wildfires are a very real risk that threaten homes and private property adjoining the reservoir as well as natural resources (forests, grasslands, rangeland and forage for wildlife).

Criterion 8. Adequate public facilities and services: The Applicant should commit the full amount of financial resources required to develop proposed recreation facilities at Glade, rather than having the county and its taxpayers pay for one-quarter of the development costs. Furthermore, the application fails to disclose how the siting, construction, and operation of a massive facility in a rural setting will impact sheriff, fire, and other emergency services. Budgetary analysis needs to include total costs, breakdowns and funding; including analysis in light of the fiscal challenges to County and other budgets resulting from Covid. Finally, the proposed recreation facilities are designed to accommodate levels of visitation that may be grossly overestimated. **The Applicant has not demonstrated that water supplies to Glade would be adequate for the proposed recreation use, particularly during prolonged droughts.**

Criterion 10. Cost benefits: **The benefits of this proposed Project likely cannot be achieved because the water to support prosed recreation activities is not available in the quantities and number of years asserted by Northern.** Reduced recreational use during prolonged droughts could significantly undermine revenue to the county, rendering Glade financially unsustainable over the Project's lifespan. Risks to future water supplies to Glade make estimates of recreation value at Glade highly speculative. The Applicant's estimates of the economic value of recreation at Glade are overestimated, based on unsupported assumptions about future flows, precipitation and runoff that fails to account for climate change. A robust evaluation of risks facing water supplies to Glade should be part of Larimer County's decision-making process when considering Northern's 1041 permit application. **Currently, the application is incomplete and/or based on flawed data and analysis.**

Criterion 11. Reasonable balance between costs to mitigate significant adverse affects and the benefits achieved by such mitigation: The application defers much mitigation planning to a later permit or process, so for many resources, insufficient information has been provided to assess whether this criterion is met. The applicant must provide concrete, not conceptual, mitigation plans, and the costs thereof and the benefits to be achieved. The application should also disclose which adverse effects cannot be mitigated.

3. Hydrological Modeling

1. Water supplies

Northern Water proposes delivering 40,000 acre-feet of water to NISP participants each year, mainly to municipal water districts outside Larimer County (12/15 participants are outside the County). Water supplies for the NISP would come from a combination of Northern's Grey Mountain Right and proposed SPWCP exchanges. The junior status of Northern's Grey Mountain Right allows for water diversions to Glade only during high flow conditions. During dry years, water supplies to Glade would be wholly dependent on SPWCP exchanges. As noted in the NISP DEIS:

> "*Until the SPWCP is online, Glade Reservoir will be wholly dependent on the Grey Mountain water right. This water right has the capability of yielding water in about 4 out of 10 years. Modeling indicates that there can be several years in a row of divertible flow followed by as many as 8 years with no flow available."* (NISP DEIS, 2008)[1]

Reliance on the junior Grey Mountain Right, and relatively junior South Platte Rights from proposed SPWCP exchanges, represent significant risks to the NISP's water supplies. To date, Northern Water has acquired only a small fraction (less than 1%) of the land necessary for the SPWCP (AKA, Water Secure). Future uncertainties, such as the high cost of land purchases required to bring SPWCP online, were not evaluated in the NISP FEIS (STP 2019).

8 years of no flows from Grey Mountain water rights would empty the reservoir in less than 8 years, depending on the water level before the sustained drought resulting in these water deficits. To the extent that projection dates to the 2008 DEIS, 12 subsequent years of climate science and hydrological understanding all contributes to a mountain of evidence (including Udall and Overpeck 2017) that droughts and aridification will be far in excess of what hydrological modeling for the NISP EIS predicted.

Furthermore, because hydrological modeling for the NISP is based on historical water availability, and due to uncertainties associated with Northern's proposed SPWCP exchanges, actual operations at Glade may provide significantly lower levels of service than predicted by Northern's modeling.

2. NISP modeling

The Common Technical Platform (CTP) modeling system (CDM Smith and DiNatale, 2018) was used to estimate operational characteristics of the NISP. Streamflows below the Poudre Valley Canal (PVC), the proposed diversion point for water to fill Glade, and operational characteristics at Glade were simulated for three scenarios.

Hydrological modeling for the NISP Preferred Alternative (Alternative 2M) includes "current conditions (NISP run 3a2)", "future conditions" (NISP run 4a2), and "cumulative effects" (NISP run 5a2) simulations. All modeling performed for the NISP use historic (1950-2005) naturalized Poudre River streamflows. Run 3a2 assumes 2010 water demands; Run 4a2 assumes demands projected to the year 2050; and Run 5a2 includes both 2050 demands and Reasonable Foreseeable Future Actions (RFFAs) of the Halligan and Seaman Reservoir Water Supply Projects (HSWSP).

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[1] NISP DEIS, 2008, Sec 2.4.1.3.

Hydrological modeling for the NISP assumes that historical (1950-2005) naturalized streamflows can be used to predict future water supplies. Other assumptions are an initial storage volume of 100,000 AF, and that the SPWCP is both online and operating at maxim yield throughout the simulation period.

We raise the following questions regarding assumptions in Northern's hydrological modeling:

- **Why was the initial water storage in Glade assumed to be 100,000 AF, rather than 0?** Northern states that water for the initial fill will come from Horsetooth, however details on the conveyance of water to Glade, and broader systems impacts, such reduced water supplies and recreation opportunities at Horsetooth, were not evaluated. Analysis of direct, indirect and cumulative impacts to Horsetooth and all rivers and reservoirs on both sides of the Divide that would be impacted by a fill from Horsetooth is lacking from the 1041 application. Also lacking from Northern's 1041 application is a legal analysis of whether water rights now stored in Horsetooth could be diverted to and stored in Glade for use by the Participants. Horsetooth's capacity is 151,750 acre feet, so the system impacts of using water from Horsetooth, or other supplies, for Glade's initial fill must be evaluated.
- **Why are recent Poudre River streamflow data not included in hydrological modeling?** The importance of recent streamflow observations cannot be understated because hydrological modeling following predicted severe low water levels in year the 2005 of the modeling simulation provides valuable information on the refill characteristics of Glade following severe water drawdowns. Absent current and updated streamflow data from the Poudre, the application is incomplete.
- **Why does hydrological modeling for the NISP rely solely on historical (1950-2005) streamflows to predict future operations?** The assumption that historical streamflows can predict future flows and be relied on for future water development projects and operations is outdated and neglects current scientific consensus on impacts of climate change on future runoff.

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a. Water levels

Figure 1 shows water levels at Glade predicted from hydrological modeling performed for the NISP EIS. Streamflows measured at the Cache la Poudre Canyon Mouth station[2], the minimum water level for recreational boat access via the proposed boat ramp[3], and cyclical droughts are superimposed on Figure 1.

[2] Colorado Department of Water Resources, https://dwr.state.co.us/surfacewater/

[3] Assuming a 35 vertical foot boat ramp (Northern Water, 2019)

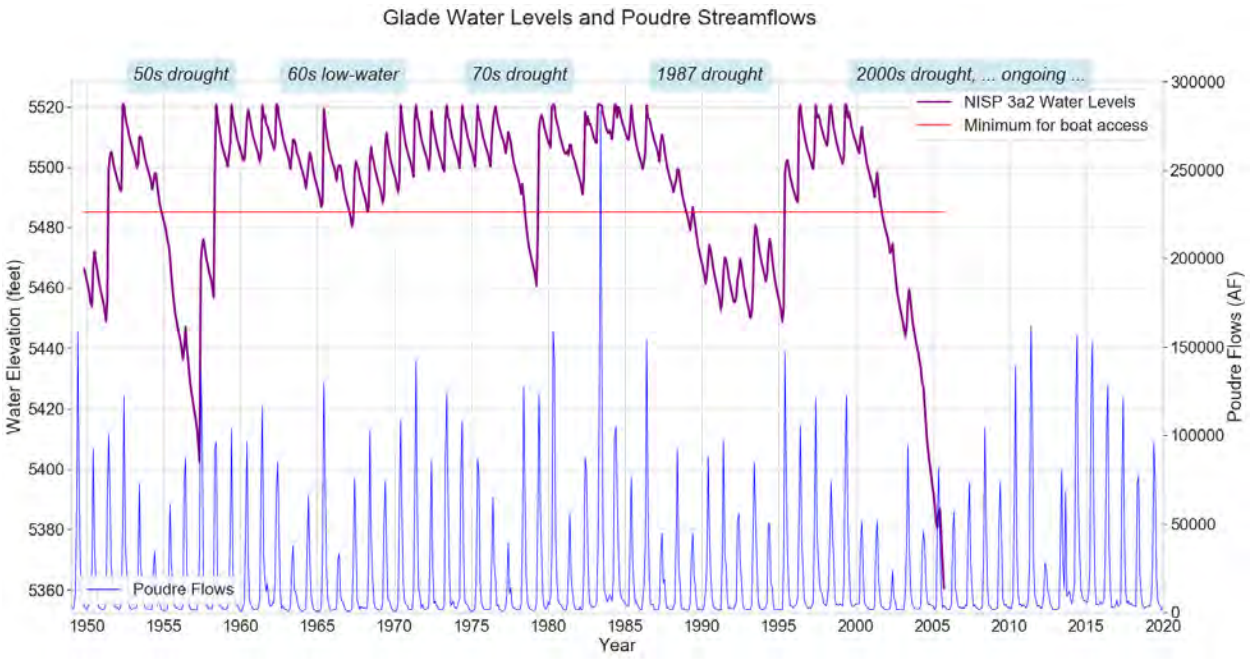

Figure 1. Predicted monthly water levels at Glade (NISP run 3a2) and streamflows at the Poudre Canyon Mouth. The horizontal red line indicates the minimum water level required for recreational boat access via the proposed boat ramp.

Figure 1 demonstrates the sensitivity of water levels at Glade to droughts. Due to their junior status, the NISP's water rights quickly fall out of priority during dry years. With inflows to Glade quickly outpaced by demands during drought conditions, water levels plummet and often remain low for multiple years. The refill characteristics of Glade following major water drawdowns, such as what is predicted at the end of 2005, are critical to the informed assessment of recreation value at Glade. Since streamflow data are readily available, it is particularly concerning that recent Cache la Poudre streamflow data were not included before the publication of the NISP FEIS in 2018.

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b. Surface area

A map view illustrates the relationship between water storage and water surface area at Glade. Figure 2 shows water surface area at three operational levels: full capacity, 70% storage (which corresponds to 35 feet below the high water line), and 11% storage (the level predicted in the year 2005 of Northern's hydrological modeling for the NISP). The low water level, shown in orange, represents a 75% reduction in the water surface area, which would expose 1183 acres of the lakebed.

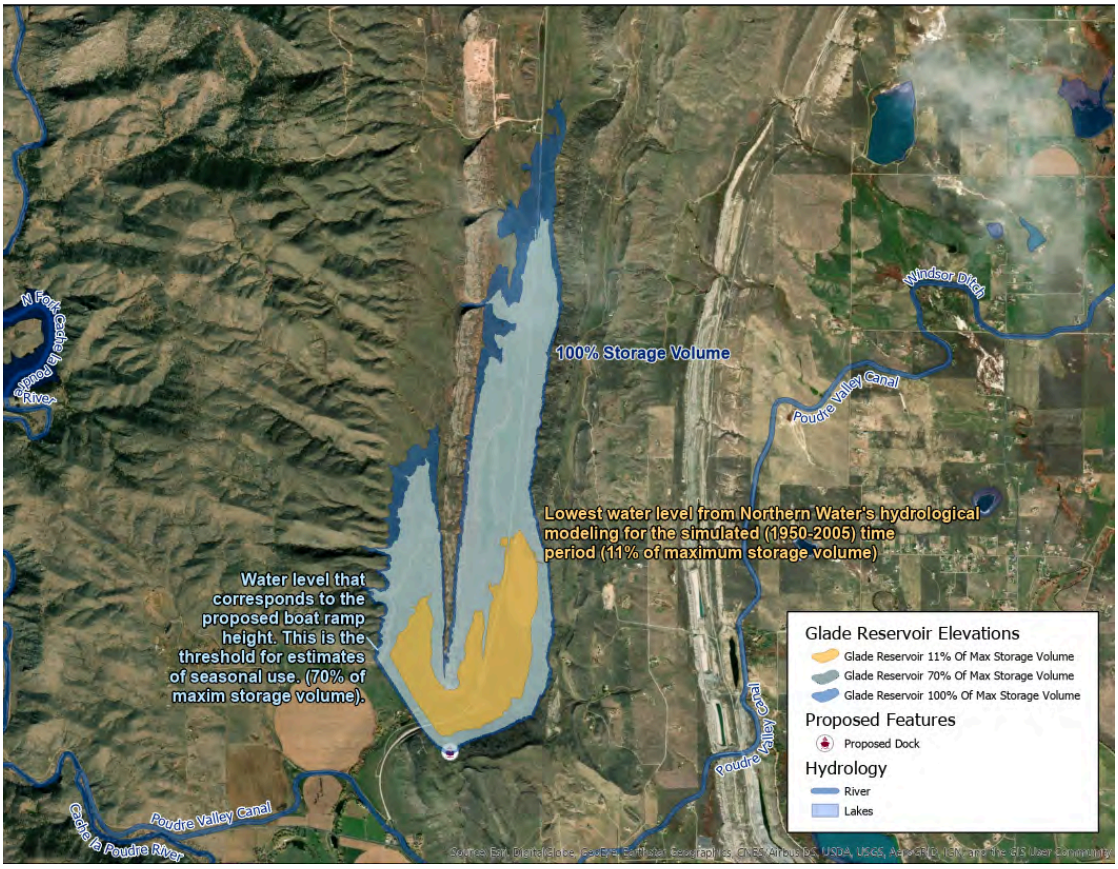

Figure 2. Map of simulated Glade water levels at capacity (dark blue), the water level corresponding to the bottom of the proposed boat ramp (35 feet below the high-water line) (light blue), and the lowest water level predicted from Northern Water's hydrological modeling (orange).

Northern Water claims that recreation at Glade would be viable when storage is higher than 40,000 AF. At this level, the Reservoir's surface area would be 663 AF (roughly 40% of maximum surface area), and the water line would be 122 ft below the high water line. The proposed boat ramp and fishing pier would be unusable, and opportunities for hand-launched watercraft limited. For example, hand launching from the northern access road would require carrying a "watercraft" across more than 1.5 miles of the lake bed to reach the Reservoir's north shore.

3. SRN modeling

A simple statistical approach is presented to estimate a range of likely future operations at Glade. The model used for this analysis is based on results from the NISP hydrological modeling run 3a2. Thus, the statistical analysis's underlying data model is based on historical hydrology used for the NISP simulation.

Furthermore, this analysis adopts the assumption from the NISP modeling that the SPWCP is online and operating at full projected yields throughout the simulation period. However, the NISP FEIS states that the SPWCP will not be online until after Glade is constructed. Thus, water supplies to Glade would be further limited until the SPWCP is online. Without SPWCP online, it would be virtually impossible for water levels at Glade to support viable recreation, and the reservoir would likely never fill during this period. Nonetheless, this analysis assumes the SPWCP is online from the start of the simulation. Goals for this analysis:

1. Estimate diversions, or inflows, to Glade for 1950 to 2019 (e.g., for a 70 year simulation vs. the 56 year period modeled in the NISP FEIS), and

2. evaluate the effects of alternative streamflow scenarios (i.e., inflows) and operations (e.g., different initial storage volumes) on predicted operational characteristics at Glade.

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a. Inflows

i. 1950-2005

Northern Water provided monthly storage volumes at Glade corresponding to the NISP Run 3a2.[4] Inflows were derived from monthly storage volume changes (dS). First, monthly demand was estimated by taking the minimum dS and assuming the absolute value, $|dS_{min}|$, equals monthly demand. Applying the resulting monthly demand profile across all years yields monthly inflows:

$$\text{Eqn. 1: Inflow} = dS + \text{demand}$$

This approach yields an annual average inflow of 43,500 AF per year, which is close to the 43,400 AF per year annual average diversion to Glade reported in the NISP FEIS (NISP FEIS, 2018)[5]. Storage volumes can be estimated from the inflows by rearranging Eqn. 1, and assuming an initial storage volume:

$$\text{Eqn. 2: } S(i) = S(i-1) + \text{inflow}(i) - \text{demand}(i)$$

Where S is the storage at time step *i*. Figure 2 shows diversions to Glade from the NISP 3a2 run (Figure 3a) and inflows calculated for this analysis (Figure 3b). Annual, 10-year running mean, and long-term mean inflows for the two simulations are virtually identical.

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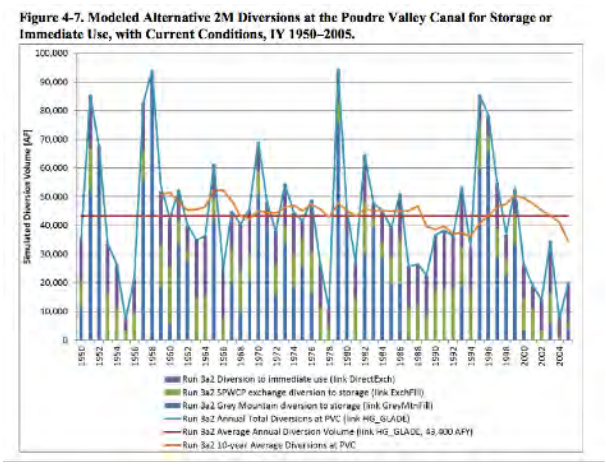
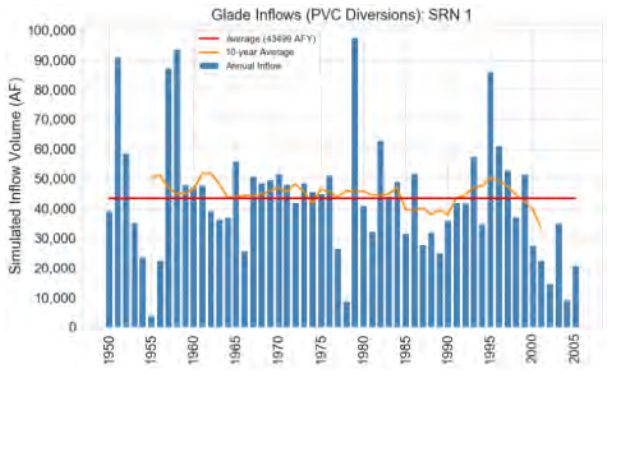
[4] A request to Norther Water to confirm that the storage volume data provided for this analysis corresponded to NISP run 3a2 was not received. Additional requests to Northern for other modeling results, including results from NISP Runs 4a2 and 5a2, were deferred to the USACE.

[5] NISP FEIS (2018), Ch. 4, pg. 4-31.



a. NISP run 3a2 annual diversion to Glade



b. SRN run 1 annual inflows to Glade

Figure 3. Predicted diversions to Glade from the NISP 3a2 modeling simulation (a) and the inflows used for this analysis (b) for 1950-2006. The 10-year running mean for the NISP data reflects the average of the previous 10-years of inflows, while in the SRN plot the 10-year running mean is positioned over the midpoint of the averaging period.

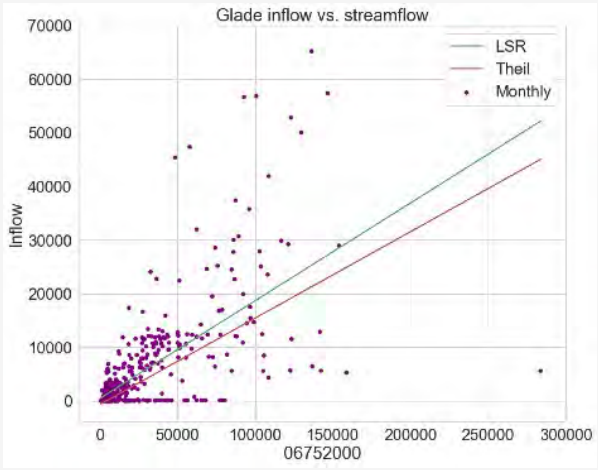
Note that the long term average diversion at the PVC from the NISP modeling is 43,400 AF. That is, Northern has used the entirety of its combined Grey Mountain and projected SPWCP exchange water rights. At the end of 2005, when Glade is predicted to be nearly empty, there is no “money in the bank” to refill Glade, maintain water deliveries to NISP Participants, and sustain water levels sufficiently for “high-quality” flat water recreation. To fill Glade by 2019, Northern would need to borrow heavily against future year allocations.

ii. 2006-2019

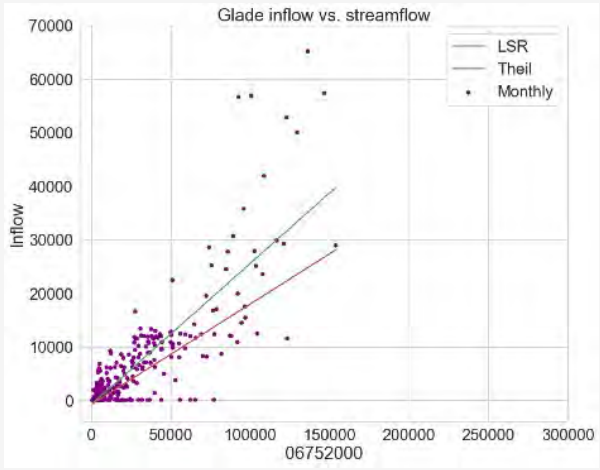
Glade inflows from 2006 - 2019 were estimated from streamflows measured at the Cache la Poudre Canyon Mouth station. Monthly streamflow observations from 1950-2005 were fit to inflows from Eqn. 1 over the same period using linear regression. Observed 2006-2019 streamflows were then scaled to inflows.

Two regression methods were used for this analysis: the nonparametric Theil regression and a least squares regression (LSR). Figure 4a shows 1950-2005 monthly inflows vs. Poudre streamflows. LSR and Theil recreation lines are superimposed as green and red lines, respectively. Figure 4b shows monthly inflows vs. streamflows from a subset of years (43 out of the 56 year simulation period) where the annual LSR regression coefficient is highly significant (p-value < 0.05). The regression slopes in Figure 4b maximize monthly inflow estimates, and likely corresponding to operational conditions where NISP water rights are in priority and inflows are not constrained (e.g., times when storage volumes are low enough that predicted inflows would not exceed reservoir capacity).

SRN 1. Estimated inflows for the SRN 2005 - 2019 simulation period



a. SRN 1a Inflows



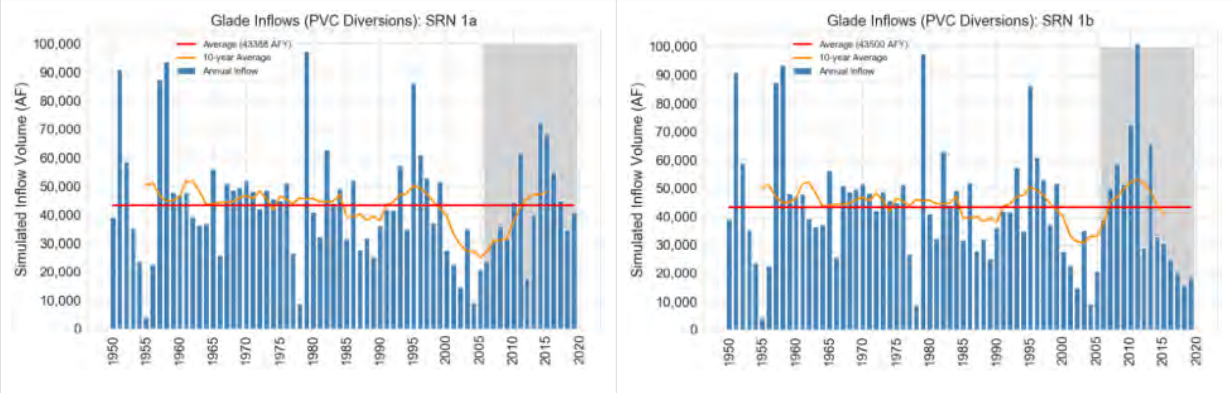
b. SRN 1b inflows

Figure 4. Monthly inflow vs. Poudre streamflows (AF per month). Figure 3a shows Theil and LSR fits to all data for the 1950-2005. Figure 3b shows data and corresponding regression slopes from years where annual coefficients are highly significant (p value < .05).

Inflows derived from Eqn. 1 (1950-2005) and inflows derived from the respective regression methods (2006 - 2019) are shown in Figure 5. Inflows predicted from the Theil estimator (Figure 5a, shaded region) predicts average inflows for 2006-2019 that closely match the 43,400 AF per year annual average for the 1950-2005 data.

On the other hand, the LSR method described above over-predicts average inflows for 2006-2019 (70,280 AF per year). To keep the average inflows in line with the NISP water right, while also maximizing inflows following 2005, inflows from 2006-2013 were prescribed from the LSR coefficient, and inflows from 2014-2019 were reduced so that the long-term annual inflow equaled 43,500 AF per year. Inflows corresponding to the LSR method are shown in Figures 5b.

In Figure 5, inflows using the Theil method are referred to as "SRN 1a", and inflows derived from the LSR are referred to as "SRN 1b".



a. SRN 1a **b.** SRN 1b

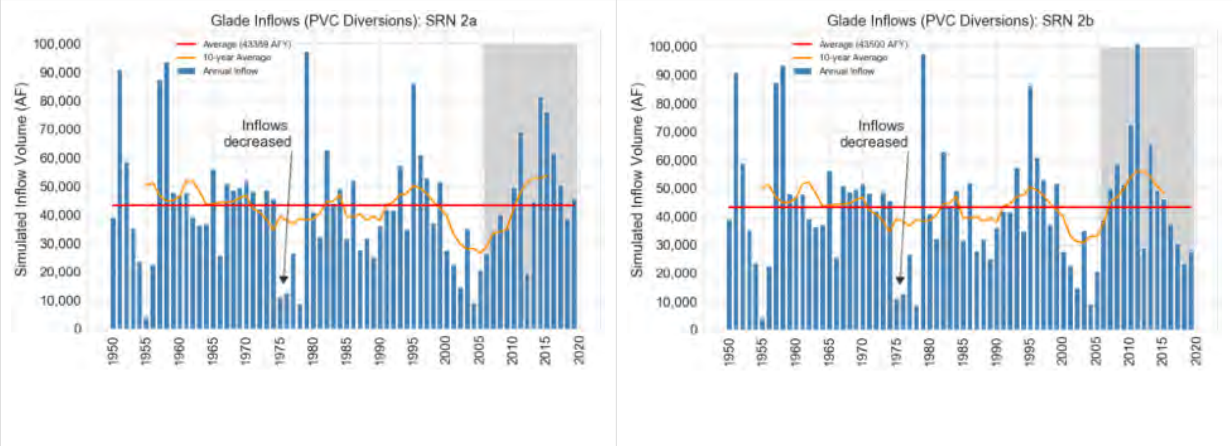
Figure 5. Estimated inflows for 1950-2019. Inflows for 2006-2019 (grey background) are estimated from streamflows measured at the Poudre Canyon Mouth. 10-year running mean (orange line) and long-term annual mean (red line) inflows are superimposed.

iii. Simulated drought

Cyclical droughts, which are common throughout this climate region, are increasing in frequency and duration in response to climate warming (Udall and Overpeck, 2017; Williams, 2020). Hydrological modeling for the NISP FEIS does not address future water availability scenarios. This analysis attempts to fill this gap by simulating impacts of “additional” drought frequency, while not decreasing average inflows.

To simulate the effects of increased droughts on storage at Glade, inflows during two years of the 70-year simulation were reduced by 75%. Inflows for 1975 and 1976 were reduced to create a four-year drought interval (1975-1978). The simulated inflows are consistent with inflows during other droughts in the historical record (e.g., 1954, 1978, 2002, and 2004). To maintain long-term annual average inflows at 43,500 AF per year, inflows during the later part of the 2006-2019 simulation (e.g., 2014-2019) were increased to compensate for the reduced inflows.

Figure 6 shows the modified inflows for the “SRN 2a” and “SRN 2b” “drought” simulations. As with the SRN 1 simulations, SRN 2a uses the Theil method to estimate 2006-2019 inflows, and SRN 2b uses the LSR method described above.



a. SRN 2a Inflows

b. SRN 2b Inflows

Figure 6. Annual inflows for the SRN 2 simulations. Inflows for 2006-2019 (grey background) were estimated from Cache la Poudre streamflows. Inflows during 1975 and 1976 were artificially reduced to simulate effects of more frequent prolonged droughts on storage volumes. Inflows during 2014-2019 were increased so that long-term average inflows were consistent with the SRN 1 simulations.

b. Stochastic model

A “bootstrap” statistical model was developed to evaluate operational characteristics at Glade for a range of likely future operations and streamflow sequences. The model presented here follows other data-driven stochastic approaches for streamflow modeling (Laal and Sharma, 1996; Nowak et al., 2010).

The model developed for this analysis generates an ensemble of inflow “traces” by randomizing inflows (e.g., from Eqn. 1). Storage traces are built from individual inflow traces (e.g., using Eqn. 2). The ensemble of storage traces can be used to calculate statistics, including confidence intervals, for specific operational characteristics. Model criteria:

1. Statistics of simulated storage volumes profiles should reproduce characteristics of the *a posteriori* data (e.g., storage volumes from the NISP 3a2 run), such as mean storage volume, and

2. the model should have the flexibility to mimic reservoir operations in response to alternate conditions or hydrological scenarios, such as changes in initial storage volume or simulated droughts.

Inflows from Eqn. 1 were used as inputs (e.g., the a posteriori data). Inflow traces were generated by disaggregating annual inflows using a K Nearest Neighbor (K-NN) approach (Nowak et al., 2010) to create monthly inflows. Inflow traces were then converted to storage traces following Eqn. 2. As the storage traces evolved in time, storage was confined to the lower and upper storage limits for Glade (2005 AF, or the “dead pool” volume, and 170000 AF, or “maximum storage capacity”, respectively).

The K-NN disaggregation effectively randomized monthly inflows, generating an ensemble of traces with statistics that matched those of the a posteriori distribution (K=7 was used based on literature values). However, the disaggregation approach did not sufficiently randomize annual inflows to satisfy the second model criteria, above. For example, the storage traces could not reach full capacity if the initial storage volume was lower than what was used in the NISP simulation.

To create a model that satisfied the second model criteria, two modifications were made to the K-NN disaggregation approach. First, a moving window was placed on the annual inflows by selecting the K nearest neighbors for each annual inflow value. Second, a subset of storage traces was selected by selecting traces with means within 10% of the a posteriori mean. This modification essentially “self selects” traces that maximize storage volume within the range of simulated inflows.

Unlike naturalized streamflows, reservoir inflows (and hence, storage volumes) cannot necessarily be represented by a fully stochastic process. The first modification (describe above) provides sufficient randomization to allow the model to respond to alternate scenarios, while the second modification allows the model to mimic likely reservoir operations. Ideally, a stochastic approach would be applied to naturalized streamflows. The randomized streamflow sequences would then be used as inputs to decision support tools, such as the CTP used for the NISP hydrological modeling. However, such modeling was beyond the scope of this analysis.

Figure 6 shows storage traces generated with the SRN statistical model. In this example, the initial storage volume was set to 100,000 AF to match the NISP 3a2 simulation. Individual storage traces from the SRN model are shown in green, and the median of all traces from the SRN model is shown in red. The NISP 3a2 simulation is shown in blue. Annual mean storage from the NISP and SRN simulations are within 3%. This “SRN benchmark” simulation indicates that the SRN model can reproduce statistics of the NISP run, while also providing a range of expected storage volumes to estimate confidence intervals for specific operational characteristics.

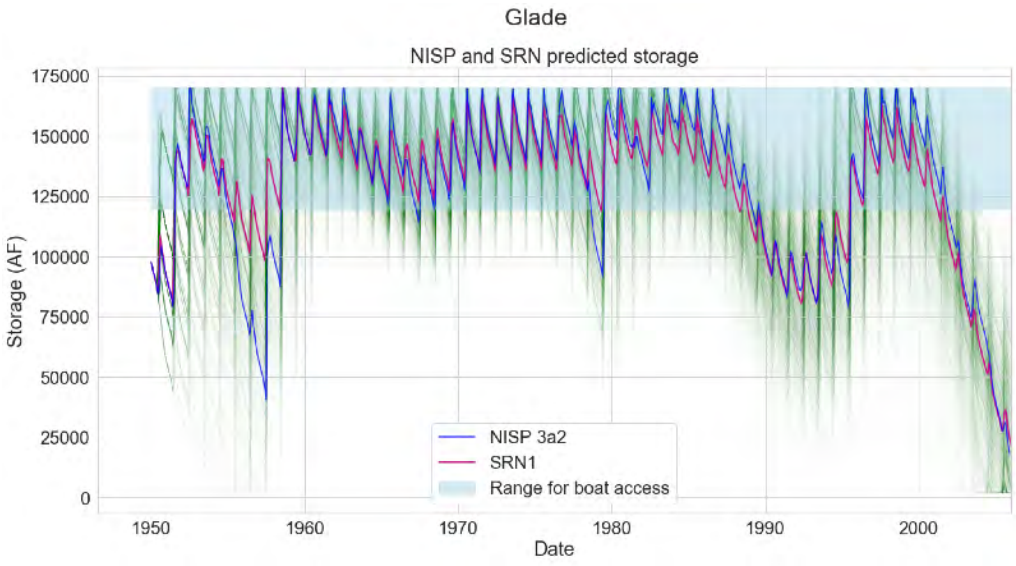


Figure 7. Storage volumes from the NISP 3a2 simulation (blue) and SRN “benchmark” simulation. Individual traces from the SRN simulation are shown in green and the median of all storage traces is shown in red. Initial storage is 100,000 AF for NISP and SRN simulations.

c. Predicted storage volumes

Figure 8 shows predicted storage volumes for the SRN modeling scenarios. The "SRN 1" simulations (top row) includes 1950-2019 hydrology, and the "SRN 2" simulations (bottom row) includes a simulated drought during 1975 and 1976. Versions "a" and "b" correspond to the method used to estimate 2006 - 2019 inflows.

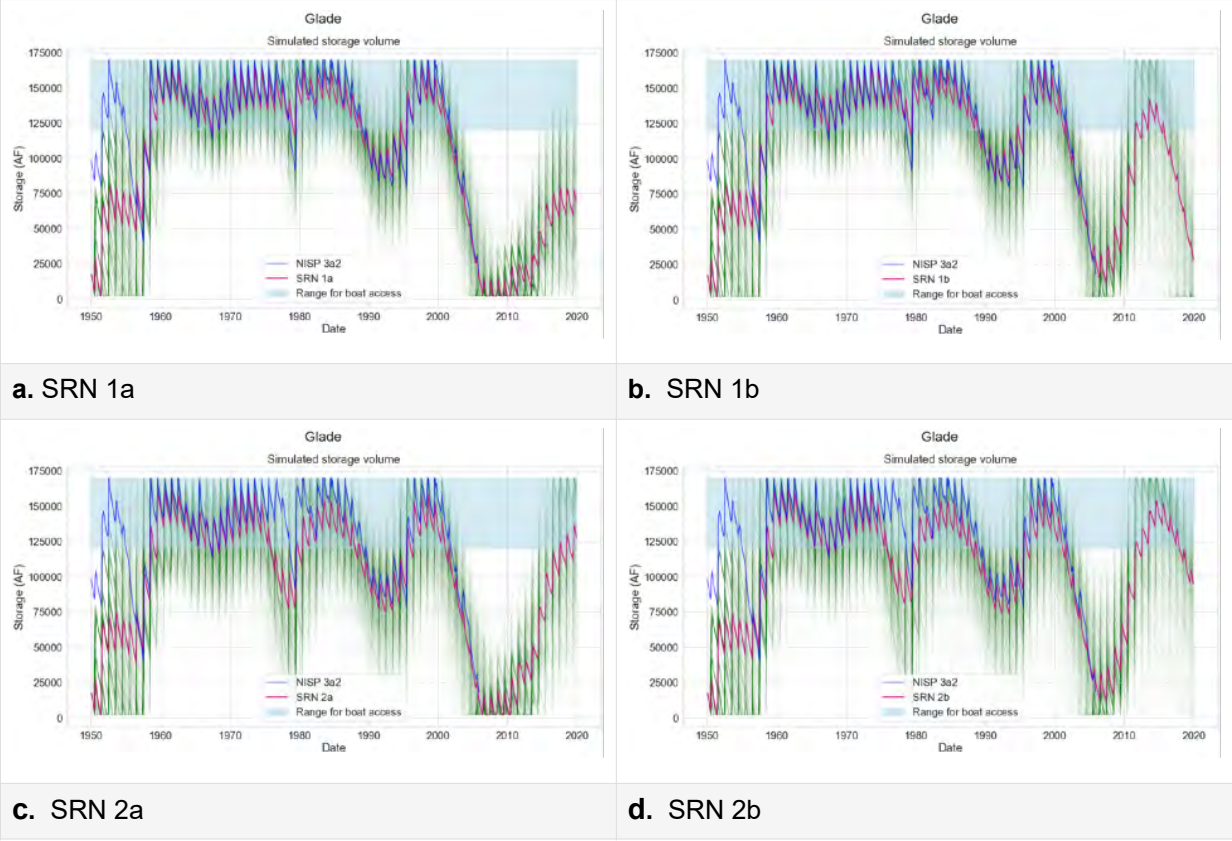
All SRN simulations shown in Figure 8 assume an initial storage volume of 20,000 AF. The NISP 3a2 simulation, which assumes initial storage is 100,000 AF, is shown for comparison. The SRN model demonstrates "realistic" operational characteristics, allowing simulated storage to reach capacity. Confidence intervals for specific operational characteristics, such as the time to fill, are estimated from the ensemble of storage traces.

The top row of plots in Figure 8 shows storage trajectories corresponding to the "SRN 1" inflows shown in Figure 5. The bottom row shows storage trajectories corresponding to the "SRN 2" inflows.

All four SRN simulations have nearly identical initial fill profiles, which is expected because the inflows and initial storage volumes are the same. The median fill time is approximately ten years, with initial storage of 20,000 AF.

"SRN 1a" and "SRN 1b" simulations differ in their refill characteristics following the severe water drawdown predicted in 2005. In the "SRN 1a" simulation (Figure 8a), storage hovers near the Glade's "dead pool" volume following 2005 and remains below 50% of capacity through 2019. In the "SRN 1b" simulation (Figure 8b), which has larger inflows following 2005 to allow Glade to refill as quickly as possible, storage volumes were able to reach the minimum required for boat ramp access. However, storage volumes declined at the end of the simulation because inflows were reduced to keep average diversions within NISP's allocation.

The bottom row of plots in Figure 8 (Figure 8c and 8d) show storage trajectories for simulations where inflows were artificially reduced in 1975 and 1976 to simulate an extended drought. Average diversions for the SRN simulations were set to match average diversions in the NISP simulations. The amount of flow reduction during the "induced" drought was added to the 2014-2019 inflows to maintain this balance. The additional inflow at the end of the simulation period explains why storage for the "SRN 2" simulations ends higher than the corresponding "SRN 1" simulations.



a. SRN 1a **b.** SRN 1b

c. SRN 2a **d.** SRN 2b

Figure 8. Storage volumes from the NISP 3a2 simulation (blue) and four SRN simulations. Individual traces from the SRN simulations are shown in green and the median of all traces is shown in red. Initial storage is 100,000 AF for the NISP Run and 20,000 AF for the SRN simulations. SRN 1 (top row) uses 1950-2019 hydrology, and SRN 2 (bottom row) includes an artificial drought during 1975 and 1976.

All simulations in Figure 8, including the NISP Run, use the same annual average inflows across the simulation period. Differences in the individual storage profiles result primarily from the temporal sequence of storage and available inflows. The SRN 1 simulations show that a possible refill characteristic following the 2005 water drawdown is a prolonged operational mode in which Glade is unable to accumulate storage. The SRN 2 simulations reveal another possible operational mode, where refill is more rapid following 2005. However, water rights limitations cause storage to decline at the end of the simulation. In any of the SRN simulations, Glade would be unable to reach full capacity following 2005 without borrowing heavily against future year's water allocations.

4. Recreation

1. Levels of Service

Neither Northern's Recreation Plan for Glade nor their 1041 permit application, address ***Levels of Service*** for recreation at Glade. For example, ***how often*** would water levels be high enough to provide access for motorized boating, ***how long*** would low water levels last, and ***how severe*** would water drawdowns be during droughts? This analysis attempts to answer these questions by evaluating four specific metrics:

1. How often would water levels be high enough to provide access for motorized boating via the proposed boat ramp,
2. how often would water levels be high enough to provide fishing from the proposed fishing pier,
3. how severe would water drawdowns be, and 4. how long would severe low water levels persist?

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a. Boat ramp and fishing pier use

To address the first two metrics, the SRN simulations were evaluated to determine the amount of time water levels at Glade would support boat ramp access and fishing pier use during the peak recreation season (May - August). Boat ramp access is determined from the number of months water levels are within the height of the proposed 35 (vertical) foot boat ramp[6]. Fishing pier use assumes water levels are within 25 feet of the high water line[7].

Table 1 shows levels of service for Metrics 1 & 2 for the NISP and SRN simulations. The SRN benchmark and NISP simulation predict similar boat ramp access (roughly 73% of peak seasons months, or 41 out of 56 years). However, if the initial storage volume is reduced to 20,000 AF (from 100,000 AF as assumed in the NISP simulation), and recent Cache la Poudre streamflows are included, boat ramp access drops to 54%-59% (38-41 years out of 70). Adding two additional drought years further reduced boat ramp access to 47%-51% (33-36 years out of 70).

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[6] The proposed boat ramp height is taken from the Glade Recreation Plan (Northern Water, 2019).

[7] Water level required for the fishing pier were estimated from drawings in the May 2020 NISP E-Water News.

Level of Service Metrics: Boat ramp and fishing pier use				
Simulation (description)	**Simulation period**	**Initial storage volume (AF)**	**Peak season months with motorized boat access**	**Peak season months with fishing pier access**
NISP Run 3a2	1950-2005	100,000	73%	68%
SRN 1 “Benchmark” (initial storage = 100,000 AF)	1950-2005	100,000	74%	63%
SRN 1a (Theil regression to estimate 2006-2019 inflows)	1950-2019	20,000	54%	45%
SRN 1b (LSR regression to estimate 2006-2019 inflows)	1950-2019	20,000	59%	50%
SRN 2a (Run 1a with simulated drought in ’76 and ’77)	1950-2019	20,000	47%	37%
SRN 2b (Run 1b with simulated drought in ’76 and ’77)	1950-2019	20,000	51%	40%

Table 1. Estimated levels of service for motorized boat and fishing access via the proposed Glade boat ramp and fishing pier. The fishing pier requires higher water levels, thus estimated use is less than for the boat ramp.

As mentioned earlier, the NISP and SRN simulations assume the proposed SPWCP is online and at full yield throughout the modeling period. Because the SPWCP is not expected to come online until after Glade begins operation, actual levels of service would be lower than shown in Table 1, particularly during initial operations.

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b. Time to fill

Hydrological modeling for the NISP assumes an initial storage volume of 100,000 AF. In practice, the initial storage volume would be close to zero, and the time required for the initial fill would be significantly longer than indicated by the NSIP modeling.

The SRN simulations were used to estimate the time required for Glade to fill assuming initial storage volumes of 20,000 and 100,000 AF. 20,000 AF was chosen because it is a reasonable proxy for filling an “empty” reservoir. 100,000 AF matches the initial storage used in the NISP modeling. Initial fill times are six years when initial storage is 100,000 AF, and ten years when storage is initialized at 20,000 AF. Table 2 shows the median time for the initial fill from 1000 traces in each SRN simulation. Note that the upper confidence intervals suggest the initial fill could take decades.

Time required for initial fill			
Simulation	**Starting Volume**	**Median**	**Range (95% Confidence Interval)**
SRN 1a. (Years to reach full storage starting in year 1950)	20,000	9.7 years	4.7 - 30 years
	100,000	4.7 years	1.7 - 15 years

Table 2. The number of years required to reach full storage from initial storage volumes of 20,000 and 100,000 AF. The median time in years, and 95% confidence interval, are estimated from 1000 storage volume traces.

Figure 9 shows the time required for traces to reach full storage (170,000 AF) starting from an initial storage volume of 20,000 AF. Note that fill times shown in Figure 9 and Table 2 are tied to the hydrological sequence used for the modeling simulation.

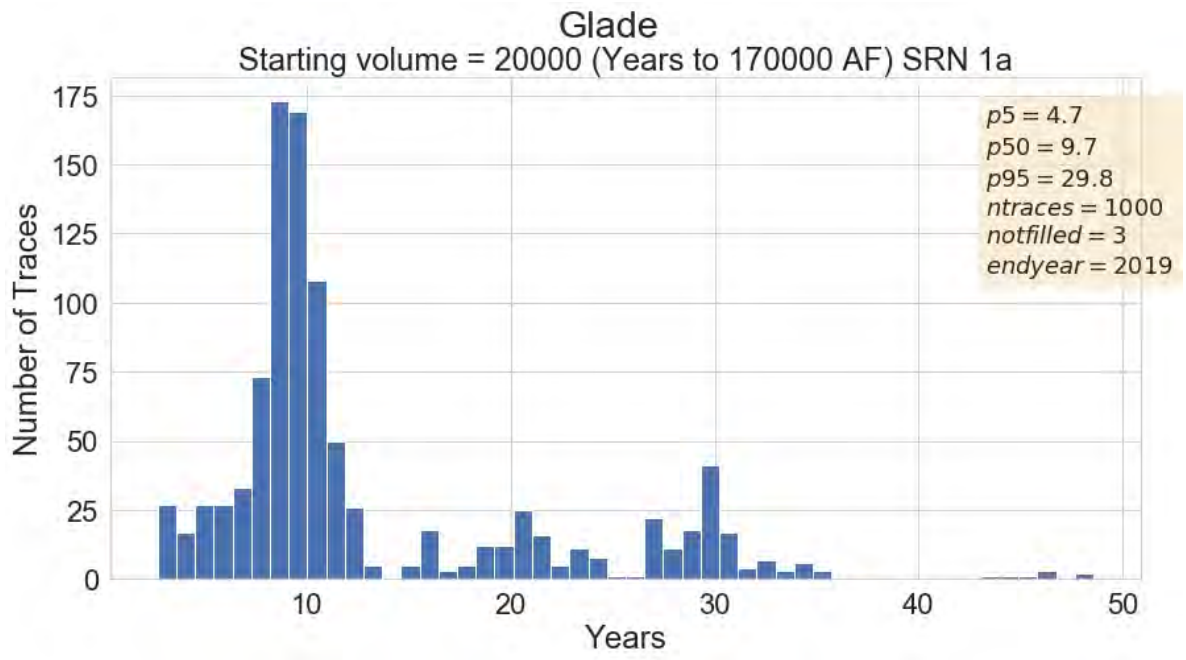

Figure 9. Time to reach full capacity assuming an initial storage volume of 20,000 AF and hydrological sequence starting in 1950.

Estimated refill characteristics following the severe water drawdown predicted at Glade in 2005 are shown in the series of plots in Figure 8. The SRN simulations indicate that low water levels would likely be an ongoing operational mode for Glade from 2000 through 2019.

An accurate evaluation of refill times based on 2000s hydrology would require a longer simulation period. Ideally, hydrological modeling for the NISP would include a robust modeling study that evaluates impacts on recreation levels of service from a range of plausible risks to water supply at Glade.

5. Economic Value

The Glade Recreation Plan (Northern Water, 2019) states that Glade will provide a “high quality” recreation experience. Estimates of annual visitation at Glade range from 45,000 to 379,000 visitors per year (Headwaters, 2017). The FEIS mentions only the high end of this estimate:

> “*Visitation at Glade Reservoir is estimated to be 379,000 visitors annually at full development (Headwaters 2017). Visitation at Horsetooth Reservoir is currently near 660,000 visitors annually. Based on the ranges identified for possible visitation and its value, total economic effects of Glade Reservoir would be a major benefit under any combination and may range from about $13 million per year to $30 million per year.”* (NISP FEIS, 2018)[8]

The FEIS does not provide documentation to support the $13 to $30 million per year range of economic value. The economic analysis referenced in the NISP FEIS (BBC and Honey Creek, 2015) estimates economic value using a "unit-day approximation of willingness-to-pay" approach, which is roughly $39 per visitor day. Applying this daily rate to the Headwaters Report's visitation range yields a range of annual recreation revenue from $1.8 to $15 million per year. The proposed broader economic value of recreation at Glade is not addressed in the NISP FEIS or Northern’s 1041 application.

In comparison, Larimer County's FY 2019 revenue from recreation at Horsetooth Reservoir was $2.5 million. Since visitation at Glade is estimated to be roughly half that of Horsetooth, a reasonable estimate of the county's revenue from recreation at Glade, assuming similar operational characteristics for the two reservoirs, would be in the neighborhood of $1.2 million per year.

However, the assumption of operational similarities between Glade and Horsetooth is misleading, and leads to potential overestimates of recreation value at Glade. Supplemental documents to the NISP FEIS point out the vulnerability of recreation vulnerability at Glade due to low priority water rights. "… Glade's recreation value may diminish toward the end of prolonged dry periods." (BBC and Honey Creek, 2015). Actual revenue to the County from recreation at Glade could be much less than at Horsetooth due to reduced visitation and reduced levels of service for recreation during droughts.

Northern's 1041 application does not account for diminished recreation value due to prolonged droughts. As climate warming advances, more frequent prolonged droughts will add additional stress to Glade water supplies. A robust evaluation of the risks facing water supplies to Glade should be part of Larimer County's decision-making process when considering Northern's 1041 permit application.

Are Larimer County residents better served by investments in traditional open space and conserving natural resources with natural habitat and ecosystem values that compliment recreational values? Climate change will increasingly stress natural resources and landscapes, necessitating greater investments and more intensive management for existing holdings. Climate change adaptation and resiliency makes it important to better protect the Poudre River ecosystem and corridor, the most valuable natural asset in the County; as well as to connect existing protected areas including federal lands, state parks and wildlife areas, and local government-owned or managed conservation properties.

[8] NISP FEIS, 2018. Ch. 4, Sec 4.16.3.5

6. What About the Future?

There is overwhelming scientific consensus that temperatures in the Colorado and Cache la Poudre River Basins have increased during the last part of the 20th Century, and that warming will continue in the 21st Century. (WRF, 2012; Cook et al., 2015). Streamflows across the U.S. Southwest are in decline, and some of the most severe droughts on record have occurred in recent years. While some climate models predict increases in precipitation, overall projections for the next Century are uncertain. Furthermore, recent studies show that regional climate warming would largely offset any future increases in precipitation.

> "*Moreover, we make a novel—and important—case that there is a high likelihood that the impacts of continued atmospheric warming will overwhelm any future increases in precipitation because prolonged dry periods lasting multiple decades are likely to negate the beneficial impacts of additional precipitation during other times."* (Udall and Overpeck, 2017).

A recent USGS study found natural flows in the Upper Colorado River Basin have decreased by 20% in the past century, with declines of 16% during 2000-2017. The study suggests that evapotranspiration will moderate moisture added from increased precipitation.

> "*Projected precipitation increases likely will not suffice to counter fully the robust, thermodynamically induced drying. Increasing risk of severe water shortages is expected."* (Milly and Dunne, 2020).

Recent droughts stand out in the long-term hydrological record. Analysis of tree ring data shows that droughts in the late 1990s and 2000s are the two driest in the historical record, going back to Medieval times.

> "*Temperatures keep going up," said Meko, of the University of Arizona tree ring lab.* "*We keep breaking records year after year. It's additional stress on the water system." Meanwhile, the two driest years all the way back to the 1200s occurred in 1996 and 2002.* "*It's a little worrisome to see the most extreme years right near the present,"* (Robbins, 2019).

> "*Anthropogenic trends in temperature, relative humidity, and precipitation estimated from 31 climate models account for 47% … of the 2000–2018 drought severity, pushing an otherwise moderate drought onto a trajectory comparable to the worst [Southwest] megadroughts since 800 CE."* (Williams et al., 2020)

Storage volumes at reservoirs in the Colorado River Basin are at record lows, and the threat of a "compact call" looms over Front Range water projects (Aspen Times, 2019; Childs, 2020; Denver Post, 2019, STC, 2019). In recent testimony to Congress, Dr. Brad Udall emphasized the severity of the current water shortage in the Upper Colorado River Basin and the vulnerability of Front Range reservoirs to Colorado River water supplies.

> "*Were [a compact call] to occur, the Upper [Colorado] Basin would have been in serious drought for a number of years and its reservoirs would likely be empty. In addition, water to meet such a* '*compact call*' *would come disproportionately from already suffering Upper Basin municipalities including Colorado*'*s Front Range, Albuquerque, and Salt Lake City."* (Udall, 2019).

The City of Fort Collins Utilities (FCU) recently commissioned a Water Supply Vulnerability Study to evaluate the vulnerability of the City's water supplies to a range of future risks, including climate change:

> "*Uncertain future hydrology is the most significant threat to FCU's future water supply, as global climate models have a wide range of predictions for the Poudre River and Upper Colorado River basins."* (Stanec, 2019)

We face a different climatological landscape than when NISP was conceived over 20 years ago. The omission of recent streamflow data, the reliance on historical water supplies to predict storage volumes at Glade, and the lack of a robust water supply vulnerability study deny the public and the County valuable information on likely operational characteristics at Glade. The current application is incomplete. The missing data and analysis goes to the heart of viability. As presented, the proposal is deficient under the 1041 review criteria.

7. Local and Environmental Impacts

The NISP FEIS also fails to adequately address local impacts from future operations at Glade, including construction, proposed recreation activities, and impacts of severe water drawdowns during droughts.

Local impacts include noise from motorized watercraft, pumping facilities, increased vehicle noise from the proposed realignment of highway 287 (Tschirhart 2020a), increased likelihood of trespass, and increased risk of wildfires (Tshirhart 2020b). Mitigation plans for these impacts are either lacking from Northern's 1041 application or are woefully inadequate.

Hydrological modeling, both for the NISP FEIS and from this report, indicate that low water levels at Glade levels could persist for multiple years, rendering the proposed Reservoir a vast dry lake bed and an eyesore to local residents. Local impacts resulting from persistent low water levels include adverse air quality from windblown dust, reduced property values, and degradation of the natural environment. These impacts must be thoroughly disclosed through analysis by an independent expert.

Adverse environmental impacts related to persistent low water levels at Glade are at odds with the the County's climate resiliency planning. Larimer County's 2016 Resiliency Framework (Larimer County, 2016) identifies droughts as a significant natural hazard facing Larimer County. The Framework's Resilient Natural and Built Infrastructure section recommends projects that have a system-wide ecosystem benefit. However, rather than promoting resiliency, the NISP would increase Larimer County's exposure to the impacts of a rapidly changing climate.

An overarching themes of the County's Comprehensive Plan (Larimer County, 2019) calls for Environmental Stewardship:

> *"Valuing, identifying, protecting, and responsibly managing its natural and cultural resources to minimize impact and protect our air, soil, open spaces, watersheds, water supply, and other ecosystem services."* (Larimer County, 2019)

Pumping activities alone would add the equivalent of 7000 fossil fuel burning vehicles to the County's GHG emissions inventory. Potential local air quality impacts of exposed lake beds are inadequately addressed, and a robust assessment of risks to water supplies are serious omissions from Northern's 1041 Application.

8. Conclusion

This report fills a knowledge gap regarding the feasibility of recreation at the proposed Glade Reservoir. Northern Water promises Glade will provide Larimer County with a "high-quality" recreation venue, and claims recreation, most prominently the lure of more flat water recreation, will pump 13 to 30 million dollars per year into the local economy (NISP FEIS, 2018). However, Northern's 1041 application lacks evidence to support this claim. Uncertainties in future water supplies to Glade make estimates of recreation value highly speculative. Northern either ignores or gives little or no credence to an emerging body of science that undercuts core assumptions for the NISP.

We review hydrological modeling from the NISP FEIS to illustrate the potential impacts of historical droughts on recreation at Glade, including several prolonged dry periods that would have severely limited, and at times curtailed, access to flatwater recreation for multi-year periods. Furthermore, because the NISP modeling is based on historical water availability, and due to lingering uncertainties associated with Northern's proposed SPWCP exchanges, actual operations at Glade may in fact provide significantly lower levels of service the predicted by Northern's modeling.

There is overwhelming scientific consensus that impacts of regional climate change will add additional stress on future water supplies. Despite this evidence, modeling for the NISP relies on historical streamflows to predict future operations at Glade. A landmark paper by USGS scientists points out the fallacy of this assumption in light of the current scientific understanding of climate change and its impacts on natural water supplies:

> *"Projected changes in runoff during the multi-decade lifetime of major water infrastructure projects begun now are large enough to push hydroclimate beyond the range of historical behaviors."* (Milly et al., 2008).

We present results from a simple statistical model that considers recent Cache la Poudre streamflows, realistic initial fill conditions, and plausible future hydrologies. Under these scenarios, our analysis indicates levels of service for specific recreation metrics, such as access to the proposed boat ramp, would be significantly lower than those claimed by Northern Water.

It speculative at best to portray the proposed Glade Reservoir as a boon for recreation in Larimer County. This massive water storage project's management priority is to deliver water to growing municipalities, the majority of which are outside Larimer County. Recreation is not a priority, and Larimer County residents could get left holding the bag for costs of recreational facilities that sit idle when water levels are too low to provide boat access and attract other feepaying visitors.

A robust water supply vulnerability study that considers the range of plausible risks to water supplies at Glade, akin to the recent Fort Collins Water Supply Vulnerability Study (Stanec, 2019), should be part of the County's review process. As it stands, Northern Water's 1041 application does not provide decision-makers and the public the information necessary to evaluate the feasibility and potential value of proposed recreation at Glade. It should be denied because it fails to meet the County’s review criteria.

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Rodger B. Ames, M.S.

1638 N. Greyrock Rd. Laporte, Colorado 80535 | 970-231-2572 | rodger.b.ames@gmail.com

Overview

I am passionate about promoting evidence-based understanding of environmental science. I have extensive experience in climate and atmospheric science, data analysis, air quality modeling and evaluation, and statistical methods.

Education

- M.S., Atmospheric Science, Colorado State University (CSU)
- B.A., Chemistry, the University of California at Santa Cruz (UCSC)

Postgraduate Courses & Trainings

- Global Carbon Cycle, Chemical Kinetics and Photochemistry of the Atmosphere, Atmospheric Boundary Layer, Remote Sensing, General Circulation (CSU Atmospheric Science Department)
- Applied Remote Sensing Training in scenario-based ecological forecasting (NASA/ARSET)
- Renewable Energy and Photovoltaic Systems (Solar Energy International)

Employment

Cooperative Institute for Research in the Atmosphere (CIRA), Fort Collins, CO

Research Associate III, 2014 – 2019

My recent work focused on providing support for air quality modeling studies sponsored by the National Park Service Air Resources Division. Other roles included project coordination, data analysis, and stakeholder interactions to ensure high-quality and timely deliverables.

- I worked on a National Park Service sponsored air quality modeling study that will contribute to exploring Rocky Mountain National Park's vulnerability to Front Range pollution sources;
- Worked on air quality projects to support regulatory planning for the National Ambient Air Quality Standards and Haze Regulations;
- Engaged with state, local, tribal and federal air agencies, led multi-stakeholder working groups, and provided policy-relevant analysis to project stakeholders;
- Proven track record developing innovative tools to analyze and visualize large air quality datasets.

Center for Multiscale Modeling of Atmospheric Processes (CMMAP), CSU Atmospheric Sci. Department

Knowledge Transfer Manager, 2007 – 2014

I managed Knowledge Transfer (K.T.) activities for a National Science Foundation (NSF) funded Science and Technology Center based at CSU. I worked closely with the Center's Directors to advance the Center's K.T., education and climate science outreach goals.

- I contributed to the Center's annual reporting to NSF, participated in the Center's annual NSF reviews, and helped organize the Center's Science Team Meetings;
- Helped advance the scientific publication projects, including a new peer-reviewed journal, and book on the history of climate models;
- Mentored student interns on projects to support climate science education and curriculum development for global carbon cycling, climate warming and adaptation;
- Co-founded a nonprofit organization to sustain the Center's education and outreach activities, and organized public events to increase public awareness of climate science. I currently serve as the organization's Director.

Cooperative Institute for Research in the Atmosphere, Fort Collins, CO

Research Associate II, 2001 – 2007

I performed research to support air quality policy development and regulatory compliance. I developed data driven decision support systems. I published research results in peer-reviewed journals and presented research results at conferences and workshops.

Cooperative Institute for Research in the Atmosphere, NPS Air Resources Division, Fort Collins, CO

Research Coordinator, 1996 – 2001

I researched ambient air quality monitoring networks and participated in fieldwork at Grand Canyon and Great Smoky Mountains National Parks.

CSU Atmospheric Science Department, Fort Collins, CO

Graduate Research Assistant, 1994 – 1996

I conducted research in atmospheric chemistry and participated in the 1995 Southeastern Aerosol and Visibility Study (SEAVS) field program.

Ocean Genetics, Superior Analytical, and Glycomed, Santa Cruz, Martinez and Alameda, CA

Chemist, 1990 – 1996

I headed a laboratory teams for environmental analysis and performed chemical analysis and processes development.

Department of Earth Sciences, UCSC

Research Assistant/Geophysical Field Assistant, 1985 – 1987

I conducted research leading to my undergraduate thesis. I utilized electron microscopy and X-ray fluorescence facilities at UCSC, UC Berkeley and Cal Tech, and participated in fieldwork in the Los Padres State Forest and Point Reyes National Seashore.

Selected Publications & Conference Presentations

Ames, R.B., Novel Tools for Emissions Inventory Development and Verification, Presented at the EPA International Emission Inventory Conference, Dallas Texas, July 30-August 2, 2019.

Ames, R.B., Intermountain West Data Warehouse Overview and Data Products, Presented at the Western U.S. TEMPO Early Adopters Workshop, Fort Collins, Colorado, April 10-11, 2018.

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Reports

- EPA Guidance Document, *Estimating Natural Visibility Conditions Under the Regional Haze Rule*, EPA 2003
- IMPROVE Report,CIRA ISSN No. 0737-5352-47, Colorado State University, 2000
- Project MOHAVE Final Report, EPA, 1999

Theses

Optical Measurements of Aerosol Size Distributions in Great Smoky Mountains National Park. *M.S. Thesis, Department of Atmospheric Science, CSU.*

Origins of Natural Remanent Magnetization in Miocene Monterey Dolomite. *Senior Research Thesis, Department of Chemistry, UCSC.*

Community Service

- Recently appointed to the Larimer County Environmental and Science Advisory Board
- Board Member for *SaveRuralNoCo,* a Colorado nonprofit that focuses on local environmental issues,
- Board Member and Director of Reach, a local nonprofit organization that promotes climate science education
- CSU *Little Shop of Physics* (primary and secondary science education organization) volunteer

Record ID	DateSubmitted	LAST NAME	FIRST NAME	EMAIL	COMMENTS
6	6/19/2020 8:57	Bieritz	Serena	serenaservicesco@gmail.com	We are Terry and Serena Bieritz. We have lived at 4835 Eagle Lake Drive in Fort Collins 80524 for 10 years. We are in our 70's and this is our retirement home. We both worked full time for 50 years to save for a happy and peaceful retirement. Our home is located in Segment 4 of the NISP "Construction Approach" document. That document states they expect to interrupt our lives for 16 weeks of construction. From the south wall of our home to the southern property line is 92.5 feet. That south wall is where our master bedroom and office are located on the first floor. That south wall is where two more bedrooms are located on the second floor. That south wall is where the finished portion of our basement is located. Another south wall on the first floor is our sunroom which is all glass on 3 sides. These rooms constitute the majority of our daily living area. From our south wall to our southern property line is 92.5 feet. NISP proposes an easement of 100 feet running west to east along the ENTIRE south side of our property, from our back yard through our front yard to the street. That path includes fruit trees, irrigation, our septic system, and underground utilities. That is in essence ONE-THIRD of our 2.6 acre lot!!! We would not be able to plant trees or build anything EVER AGAIN on that easement. We would be required to have NISP maintenane people on our property regularly and in perpetuity. We are concerned about subsidence issues as a result of drilling so close to our home. NISP should not be allowed to plow through someone's yard in a private neighborhood. PERIOD There are many empty lots of 10 to 100 acres North of our neighborhood, some of which are for sale right now. They can easily find another route with no improvements. PLEASE do not allow NISP to ruin our retirement years and disrupt our neighborhood. You are welcome to come and see our lot for yourself.... call us at 970.672.3772 ... leave a message and we will return your call. And by the way, Northern Water has never contacted us to discuss their plans. As a resident of the Eagle Lake neighborhood, I am writing you to ask that Larimer County not approve the 1041 Application that is before you for a pipeline through the county by Northern Water (NISP). The issues revolving around this application and the reasons it should be denied closely mirror that of the City of Thornton 1041 pipeline application that was rejected by the Board of County Commissioners.

10	6/22/2020 9:47	Bartecchi	David	dbartecchi@gmail.com	I can't believe it's 2020 and after all we know about the impacts and inefficiencies of dams, we're here debating building another one northern Colorado. The science is clear but what is not clear is the political economy behind dam construction. NISP is not driven by science and best practices but rather the short-sighted selfish interests of housing developers and municipalities through unplanned and unsustainable growth - building dense communities of McMansion in some of the most prime farmland in Northern Colorado. And now they want to tax payers to reward them and ensure the continuation their unsustainable growth by building a dam. When will it stop? Are we going to drain every last drop of Colorado's only Wild and Scenic River while we make virtually no sacrifices to better utilize and conserve the water we already have.

17	6/24/2020 11:52	Finnman	Doug	dfinnman72@yahoo.com	Dear County Commissioners, I ask that you oppose the NISP and the related 1041 permit. My reasoning? Allow me to put into context the negative environmental impacts, risks, and sacrifices the people of Larimer County (especially those who reside in the immediate vicinity of the proposed Glade Reservoir), will end up bearing for NISP. -Residents and landowners in rural areas and communities in the vicinity of Glade (including myself, a resident of the Bellvue area) will endure an estimated 4-6 year massive construction project with the attendant noise, traffic, pollution, and overall disruption of a quiet lifestyle residents enjoy in this area. It is likely that some will experience a de-valuation of their property as a result of NISP. -Most Larimer County residents value our wildlife resources very highly. Make no mistake about it: NISP will adversely impact the wildlife that now flourishes in and around the Glade site. Construction of the dam, forebay, , the reservoir, the re-routed highway, and related pipelines will negatively affect the movement of deer and elk herds that reside in the footlhills. Other animals and birds will also suffer through loss of habitat. -As a result of NISP, residents will witness the degradation of the Poudre River itself, as well as existing Natural Areas that are part of the river corridor. Fish, plants, and animals that depend on this riparian habitat will be irreparably harmed or destroyed by further de-watering of the Poudre. These concerns have been clearly articulated by the City of Fort Collins Land Conservation and Steward Board in a memo they issued earlier in June 2020. -If NISP is approved and moves forward, County residents will also witness violations of several elements of the Larimer County Comprehensive Master Plan for the mountains, foothills, and natural resource areas that Glade would occupy. -County residents are well aware of climate change impacts. Yet the architects of NISP seem to conveniently ignore the realities climate change. The recreation and water resource benefits touted for the NISP will likely not be realized if Glade cannot be filled in an era of frequent droughts. The price of NISP is way too steep for Larimer County in terms of the negative impacts on its people, land, water, and wildlife. For Larimer County NISP is simply a lousy deal. As stewards of this County, please make a bold and courageous statement by voting 'No' on NISP. Thank you for your consideration, Doug Finnman, Bellvue, CO
23	6/29/2020 5:40	Sondrup	Carole	Scooter-pookie@hotmail.com	This pipeline is scheduled to go down Larimer County Road 1 (aka: Weld County Road 13, Colorado Blvd and Latham Parkway) Have ANY of the commissioners driven this little two lane road? Currently we have a large electrical line and fiber optics line down the side of the road. With the massive Thornton water pipeline coming with in the next 18 months. This little Road and the surrounding property owners can not take another public utilities project! Please reconsider this route...Thank you.
26	6/30/2020 16:14				
27	6/30/2020 16:14				

29	7/1/2020 11:56	Pixler	Dennis	dpbendur38@gmail.com	The Poudre River should not be damned. It is one part of what makes Colorado great, it's beauty. Northern Colorado is beautiful and damming the Poudre River takes away that natural beauty. Why should the enjoyment of all Coloadoans, especially us in the north, be sacrificed to water the lawns in the Denver area. The Denver area needs to learn to live with what the water resources they already have. If they have a right to this water, figure out another way to get it without imposing their will on us to the north. Thanks for letting me have a voice.
35	7/3/2020 9:53	Aravis	Dori	dori.aravis@gmail.com	I am Dori Aravis, 49 years a resident of Fort Collins, Larimer County, and I can't believe that I am once again having to stand up to save the Poudre from the vested interests that would destroy it. Glade Reservoir, Glade freaking reservoir - a monster that should have been laid to rest many, many years ago. It is an ill-conceived disaster that would destroy not only the land it would go on, the Poudre River, who's water would be stolen, but the lives of the people who live around it and the people whose land would be stolen by pipe lines needed to deliver water to communities beyond Larimer County. But like a Walking Dead Zombie, it's rearing its ugly head again. And like a zombie we need to shoot this thing in the head - get rid of it once and for all. It is the ONLY right thing to do. Thank you.
42	7/5/2020 11:43	Madsen-Pixler	Stephanie	stephaniegmp@gmail.com	Please do not allow the Poudre to be dammed in this way to feed the interests of other communities. It will be Northern Colorado that pays the price in lost water, land, recreation, not the communities that the dam will serve. The cost is too great.

46	7/6/2020 7:59	Pault	Jerrold	jerroldpault@gmail.com	July 6, 2020 To: Larimer County Planning Commissioners (via email) From: Jerrold Pault President - The Hill Community Homeowners Association (HOA) President – Cobb Lake Preservation & Recreation Association (CLPRA) Subject: NISP Planning Commissioners' Hearings Dear Commissioners, On behalf of The Hill Community HOA (60 homeowners) and CLPRA (104 members), we strongly oppose NISP and request that you vote against this environmentally devastating project. The following concerns are cited: • This project would take additional water from the Poudre River, which is already seriously depleted by agriculture and residential use. The diminished flows would due irreparable harm to the riverbed and its wildlife habitat and the City of Fort Collins beautiful new water park would be rendered virtually useless. We are grateful for the efforts of the Save The Poudre organization and support their efforts to protect this precious resource for our children and future generations. • This project does not own sufficient water rights to be feasible, which will result in NISP purchasing additional water rights, likely from our local farms. While NISP has promised not to "Buy and Dry" farms like Thornton did, we do not believe they will honor this commitment after spending a Billion dollars and then not be able to fill Glade Reservoir. We must protect the rich tradition of family farming in our region before it is lost forever! • NISP originally planned to run a huge 54" pipeline thru the middle of deeded conservation space owned by The Hill HOA (600 acres of native grasses full of wildlife). Now they are proposing a different route along CR 52, which will impact access and egress to our community along with the many residents who live along this route. Why do we need more massive and disruptive pipelines in Larimer County, when we have nature's solution for moving this water in the Poudre River? We are thankful for the efforts of the No Pipe Dream organization in opposition to both NISP and Thornton's Pipeline last year. • NISP will bring unwanted growth, development and urban sprawl to the areas north west of Fort Collins. These quiet and peaceful rural areas will be forever changed and overrun with traffic, noise and residential and commercial development. We need to preserve the remaining open spaces and rural character of our county. We support Save Rural NOCO, another organization against NISP, and think it is important that we protect the lifestyle of our rural residents. • Cobb Lake is a pristine recreation and preservation area that is nourished by the clean waters from the Poudre River every year. NISP could be potentially devastating to our lake if they are permitted to utilize water exchanges, which would divert clean Poudre River water from Cobb Lake to Glade Reservoir and replace it with dirty water from the South Platte. CLPRA is against NISP. Why should we agree to all of these environmentally devastating and permanent impacts to Larimer County ... just to send water to municipalities and water districts in other counties so that they can develop more

48	7/6/2020 8:35	Williams	Dolores	tinytornado@mac.com	NISP simply would kill a wild and science river -- one of the last wild rivers in the US. The huge pipeline required to carry this off would be a huge disruption in Larimer County and of little benefit to the people of Fort Collins. Conservation in all of the cities hoping to benefit from this disruption and death of the river has not been implemented. The necessary drying up of farmland to acquire irrigation rights (not domestic drinking water rights) should not be allowed because agriculture is second to tourism it the State. Staying sustainable locally required keeping farming land in use into the future. Please use the 1041 law to deny this killing of the Poudre River and let it run through Fort Collins and along to contribute to natural waterways as in the past.
54	7/6/2020 9:18	Eisenberg	Cailea	caijeis1092@gmail.com	The migratory and native bird populations would be decimated, if NISP was confirmed. Birds evolved and adapted to every continent before the humans were even bipedal! Let us be better than the original settlers of Northern Colorado who came in, massacred the Native peoples and claimed the area through "Manifest Destiny". Please break the cycle of raping the land of its resources. If the region does not have enough water it should not be building human communities to further destroy the natural habitats of creatures that have been there for thousands of years.

55	7/6/2020 10:40	Rothe	Jan	lemmule@gmail.com	As a retired wildlife ecologist, who has lived in Larimer County for over 35 years, I cherish our beautiful rural landscapes and incredible natural resources. I believe that all of us living here do. Therefore, we all must carefully consider the long term, cumulative effects of the Glade Reservoir development project on the natural resources of Larimer County. I am asking you to read my testimony and please reject Northern Irrigated Supply Project's (NISP) 1041 application. Section 8.4.1 of the Larimer County Land Use Code states that all developers are obligated to "maintain and enhance diversity of wildlife species and habitat in Larimer County and to plan and design land uses to be harmonious with wildlife habitat and the species that depend on that habitat....". And in NISP's Wildlife Conservation Plan (Technical Memorandum No. 7), they state the purpose of their plan is "to document impacts to wildlife, identify strategies for avoiding, minimizing, mitigating and enhancing wildlife...". Clearly, the NISP project will not be maintaining or enhancing any existing wildlife, nor their habitat. They will, in fact, be flooding well over 1600 acres of land and taking even more water out of the Poudre River than is currently being diverted, causing unforeseen damage to the riparian corridor and all the wildlife species residing there, including the federally-listed Preble's Meadow Jumping Mouse. I also fail to see how they will be "avoiding or minimizing" damage to wildlife species in general, when they will most likely be killing large numbers of small mammals, ground-nesting birds, and reptiles by drowning, digging them up, or driving over them with heavy machinery during the construction of this project. According to Webster's Dictionary, to mitigate is "to cause to become less harsh or hostile". The NISP planners, designers, and engineers all appear to be either completely oblivious or totally insensitive to the huge environmental and aesthetic destruction they will be causing. The devastation they will cause is impossible "to mitigate"! The Glade Reservoir project cannot be mitigated because its effects are too serious and far-reaching. It will be an enormous undertaking, which will include flooding 1600 acres of a relatively pristine valley, moving 7 miles of federal highway, installing miles and miles of water pipeline, digging a 2,000 acre foot forebay, building a visitor center, paving parking lots for up to 500 cars, and building a 40,000 horsepower electrical pumping station to transfer water from the forebay up and over a 275 foot dam. How is it possible to mitigate all that incredible damage and destruction? NISP states, as one of the key components in their enhancement plan, that they will be "protecting additional lands west of Glade Reservoir for wildlife habitat". I fail to see, exactly, how protecting land, which I'm assuming means buying and holding for perpetuity, that wildlife is currently using (I'm guessing wild animals don't really understand real estate ownership and probably think the land they inhabit belongs to them already) will "enhance" all the thousands of acres of habitat that will

57	7/6/2020 13:20	REDMOND-OTT	randy	randyredmondott23@gmail.com	Water storage and availability will continue to be a growth limiting factor in Colorado and the West. NISP has always been a poorly conceived on many levels, especially that of putting a burden on Larimer County residents without benefit to them. Degradation of water quality was one of the primary reasons the City of Fort Collins was historically opposed to this project, both in stream flow and drinking water quality. The impact on private landowners in Northern Fort Collins for forced easements is reprehensible, considering the availability of both water transfers and the use of existing easements for development of this project. The scope of the proposed reservoir, the rerouting of US 287 and associated costs seem out of touch with reality in this current time. The amount of water lost to evaporation will be significant. Data is available from the cooling pond at the Rawhide Power Plant that can easily be extrapolated to this project to demonstrate just how much of the diverted flow would never be realized at the destination. This project is not a "win" for Larimer County or its citizens. I urge you to deny it as it exists. Thank You.
58	7/6/2020 13:30	Pierro	Dennis	dpierro437@gmail.com	I am in favor of the NISP project and their submitted application with one major condition: The route of the pipeline. Please divert the pipeline around the Eagle Lake Subdivision. There is plenty of undeveloped land to the north of this community. it would be an unfair burden on the community if homes are disrupted due to construction and long-term easements if this open land is not used. If diversion to the north is not technically feasible, please force the approval of the NISP pipeline to be conditional on co-location with the Thornton pipeline if their route is ultimately approved through Eagle Lake as well.

61	7/6/2020 14:28	Fankhauser	Terry	terry@coloradocattle.org	On behalf of the beef producing families and businesses throughout Colorado, our 5,000 members have affirmed and then reaffirmed our policy in support for the Northern Integrated Supply Project. Colorado is need of additional water storage in order to meet demands associated with population growth, specifically in north central Colorado. Without increased storage, inevitable harm will come to our business and environmental interested in the region and state. Without said storage, an exacerbated trend toward permanent buy and dry of agriculture irrigation water will become the norm. Agriculture irrigation water returns a broad spectrum of ecosystem services that currently are not reflected as beneficial uses per Colorado Water Law, such as return flows in the fall of the year, stream temperature, wetlands, wildlife habitat, etc. Without agriculture actually irrigating in Colorado, those uses will cease to exist and have a fundamental impact on the naturally function environment and economy in Colorado. In short, there exists a choice. Maintain the viability of water consumers in NE Colorado with smartly planned storage projects like the Northern Integrated Water Supply Project or place Colorado's water resources in direct harm due to the manifestation of concerns that have been adequately debunked by the Northern Colorado Water Conservancy District. In closing, CCA requests that Larimer County illustrate its public support of agriculture, business the environment and our economy by endorsing the Northern Integrated Supply Project. Sincerely Terry R. Fankhauser, EVP Colorado Cattlemen's Association
62	7/6/2020 15:04	Kerig	Daniel	dankerig@yahoo.com	The proposed pipeline path along Greyrock rd. would cut right through the back of our property. Our property is a Designated Wildlife Habitat for migrating birds and butterflies. The proposed area for the pipeline would wipe out the 25 trees that we planted twelve years ago to provide food and shelter for visiting and permanent wildlife. We've spent a lot of time and money to establish this habitat and don't believe NISP have come close to proving that pipeline route is the best option. Please do what's best for our community as well as the Poudre River and have their water taken out down stream. Thank you for your attention.

63	7/6/2020 17:10	Kopp	Charles	charleskop@centurylink.net	Dear Planning Commissioners: I strongly urge you to NOT support the NISP application, because I, like most of the people I know in the county, are staunchly opposed to it. There's really nothing in it that will benefit Larimer County, unless you think we need another big recreational reservoir in such proximity to Horsetooth---which we don't. And I'm sure you've heard enough, and will be reminded more, that maintaining a water level in proposed Glade Reservoir suitable for recreation is very dicey in our semi-arid climate, especially considering the latest patterns; and that Glade would look terrible as a puddled mud hole. If providing recreation is a factor in the whole issue, NISP will degrade the Poudre River to the point that it's recreational uses downstream will greatly suffer----despite claims about "mitigation" of these destructive effects. The potential "mudhole" seems to me like a classic boondoggle of enormous expense pushed by vested outside interests. And please put Larimer County's interests first! I could go on to enumerate many very practical, evidence-based objections to NISP, which I'm sure are very familiar. But instead I'll conclude with what I see as the real driving force behind it, which is pretty obvious. Namely, the excessive development in NOCO that's behind the demand for increasing water supply. Contrary to popular opinion,this high degree of anticipated development is not inevitable, but a choice we make and have control over. Unfortunately, it seems that the big profit-driven development companies who are behind it have found allies with many municipal planning boards, and city and state officials. And I hope that your board will not succumb to their influence and be an enabler of NISP. I"m certainly not against all development, and even think that much that's been happening in NOCO for years has had a lot of very positive results. But I believe that we're reaching a tipping point where if it continues to projected levels, it will ruin not just a lot of our great natural resources in the county---like the Poudre River---but also our quality of life. I came from northern New Jersey, and would absolutely hate to see the over- development and crowding that has plagued that state for so long happen in our still spectacular part of Colorado. So please be good stewards of our environment in your planning. Lastly, if NISP is rejected----like I certainly hope and wish---I believe the outside communities who need more water to continue with their growth plans can still find ways to supply it if they really want it through more innovative ways than 19th and 20th Century projects like dams and reservoirs----starting with simple, sensible, and practical conservation measures, which are also a helluva lot cheaper. Please-------NO TO NISP!! Let's discourage over-development and not encourage it. Sincerely, Charles Kopp Fort Collins

64	7/6/2020 18:27	Webber	Sheila	13sheilaw@gmail.com	Dear Planning Commission, I deeply oppose the NISP project. The Cache La Poudre is a treasure right here is Fort Collins. We are losing our natural treasures at an alarming pace. Please do not allow the Poudre to be drained further and ruined. Real water conservation effort should be made. The Poudre can sustain our communities without the NISP project. Some conservation is being done, I am sure, but not enough. The conservation efforts Northern Water presented in the hearing on June 24th were very feeble. Everywhere I look, thirsty grass is being planted in new subdivisions. Lawns are being watered in rainstorms and there are always some sprinklers spraying utility boxes and the street with abandon. There is not enough effort to put into native, xeric landscapes. We live in an arid climate, not the tropics!! If we would have the wisdom to use our water carefully, we would avoid more devastating harm to the ecosystems on which we rely. The Poudre River is an Important Bird Area. There are birds that do not occur outside this corridor in Larimer County. Birding contributes to the economy of Fort Collins in the tourism it brings. The river is the lifeblood for our wildlife. We have lost 3 billion birds since 1970, and we cannot afford to ruin this IBA. As an Important Bird Area, "The River Corridor sustains some of the most important bird habitat in the region," remarked Joel Hurmence, President of FCAS, the local chapter of the National Audubon Society. "This IBA nomination seeks to preserve this important resource for our children and grandchildren." (FCAS Save the Poudre December 11, 2007) I love the Cache La Poudre River. I enjoy hiking and bird watching along every stretch! The biodiversity along this riparian habitat is breathtaking and life giving. I love the Fort Collins Natural Areas. The river and Natural Areas are the reason I loved moving here. I will be heartbroken if this project moves forward. I would not visit Glade or recreate anywhere near it. It would be the loss of what I love. Respectfully, Sheila Webber
65	7/6/2020 19:30	Lauritzen	Mariah	mariah.lauritzen@gmail.com	This is an ineffective band-aid on the water crisis. Why haven't we looked to things like water recycling, that would actually be a sustainable solutions? A dam is choosing an ecologically destructive solution in the face of a problem which is already exacerbated by the ecological destruction of global warming. We can't keep choosing destruction of natural processes. We should instead work with natural processes and join the reset of the earth in the natural water cycle. Instead we think we are special. Invest in water recycling where we clean the water we have already used. Learn from nature for once and pick a sustainable solution.
67	7/7/2020 4:40	Tornatzky	Jacob	jake.tornatzky@gmail.com	The economic, natural and cultural value of a healthy Poudre river is immense. I would encourage the stakeholders to seek other alternatives to the NISP project.

70	7/7/2020 8:16	McCall	Dale	dale.mccall@rmfu.org	Rocky Mountain Farmers Union (RMFU) supports those water projects that retain water use in the State of Colorado and encourage construction of additional projects which are directly beneficial to agriculture and the economy of our state, such as the Northern Integrated Supply Project (NISP). The Colorado Water Plan identifies the need for 400,000 acre-feet of additional storage. The Northern Integrated Supply Project, with its two new reservoirs, would help meet that demand while also implementing about $60 million in mitigation and enhancement measures for local wildlife and the environment, and creating new recreation opportunities, along with numerous other benefits for northern Colorado. Recreation at Glade Reservoir will provide an estimated $13-$30 million in additional economic activity annually for Larimer County – yet another one of NISP's extensive benefits to Larimer County and rest of the region. The 15 municipalities and water districts participating in NISP have collectively reduced per capita water use by about 30 percent since 2000 and continue exploring ways to be more efficient. But with populations expected to double by mid-century, water-storage projects like NISP will also be vital to meet their demands. Without NISP, the communities participating in the project will most likely be left to purchase more water from existing farms and ranches -- needing to dry up more than 64,000 acres of irrigated farmground to attain the amount of water that NISP would provide. In addition to NISP helping slow the ongoing buy-and-dry trend, we'll also be collaborating with and compensating local farmers who take part in NISP's water exchanges and the project's WaterSecure program, which will help enhance the long-term viability of those ag operations. Because NISP is widely recognized as a project that will provide much-needed water storage, benefit local wildlife and the environment, bring new recreation opportunities to region, and help protect local farms, it's been endorsed by numerous public officials, organizations, publications and others. Northern Water has worked with local, state and federal entities for decades to responsibly supply the vital resource that grows northern Colorado's food, arrives at local residents' taps, offers recreation and more. And we trust them to continue that legacy with NISP – a project our region's future generations desperately need. Dr. Dale McCall President Rocky Mountain Farmers Union
74	7/7/2020 11:00	easton	robert	robert.easton@colorado.edu	I am concerned that the RailTieWind project in combination with the Glade Resevoir project could open Larimer County Colorado to a massive explosion of population and unwelcome development. The Rail Tie Wind project is a proposal to build a massive wind farm in Albany County Wyoming close to the Colorado border. Water and energy are the key ingredients that developers need to build housing. While the developers prosper, the natural environment is destroyed.

76	7/7/2020 12:29	Caswell	Margaret	margiemc214@aol.com	I have been a resident of Larimer County for over 55 years. I have deep concerns about the NISP Project. I am concerned about the effects on the historic Poudre River as it flows through Fort Collins. Peak flow would be taken to fill Glade, thus eliminating the high flow necessary to cleanse the Poudre River. Fort Collins has invested in bike trails, natural areas, and a water park that also requires this flow for recreational, aesthetic, ecological, and historical benefits for it users. Reduced flow levels will decrease the water quality as less water is available to dilute the pollution.. The native trout population would be threatened and more fish kills would occur. It would also impact Public Health as low flows and stagnant water pooling would create habitats in the river and at Glade Reservoir for the Culex mosquito that carry West Nile virus. The dam is proposed along a fault line that will require extra building precautions to protect the dam again movement along the fault. It will require relocating US 287 and cutting through a hog back. I appreciate the time your committee is taking to hear testimony via in-person, Zoom, and written comments.

78	7/7/2020 14:15	Caswell	Larry	lcasbike@aol.com	I am against the Glade Reservoir water project for the following reasons. This project assumes that the current rate of run away growth in the Front Range is inevitable and will continue . More analysis needs to be done on the effects of this type of growth on the economics, quality of life, and environment of the region as a whole. There needs to be a discussion amongst the citizens of the northern Front Range concerning the type and extent of growth and sprawl that we wish to enable with a project of this type and the discussion should be followed by a vote of the citizens. The justification that the project will serve to preserve irrigated agriculture in northern Colorado in the face of continued urban growth is unsubstantiated. There needs to be an analysis of this project on the regional agricultural economy. Specifically, I question whether agriculture will be able to compete for water considering the effect on overall water values resulting from the costs of constructing this project. Due to urban growth in Larimer County and its effect on water prices, for example, farmers can no longer compete for irrigation water on the market, and must instead rely on short term leasing of city of Fort Collins surplus water to keep all the remaining farmland irrigated. It is also important to consider the effect on the agricultural sector of the loss of thousands of acres of farmland to the urban development which will result as the communities realize the projected population growth mentioned in the EIS. There needs to be serious discussion of possible alternatives. We need to evaluate how the alternative of no action would compare to this project . How would the effects on agriculture in Northern Colorado from building the Glade alternative compare to the effects if this project were not built? There are a number of cheaper alternatives that could be combined to meet the needs of this region. In fact there are other mixes of alternatives that haven't even been considered. The EIS only considered alternatives that would individually yield 30% of the needed firm yield of 40,000 acre feet from the project. This left out numerous alternatives, that when aggregated, might also provide the same yield with much smaller negative impacts and costs than other alternatives considered. An example might be some combination of area-wide increased levels of conservation in urban water use, improvements in irrigation efficiency, changes to more appropriate crops that would yield more income per unit of water applied, and gravel mine storage ponds. The far-reaching environmental effects on the ecosystems which depend upon the river below the takeout point need to be given the weight they deserve. We need to give proper emphasis to all of the effects on the riparian and aquatic environments of the Poudre River below the point where the water is extracted. Many of these effects will be gradual, occurring over a long period of time with potential detrimental effects on the very nature of the aquatic ecosystems and the species found there. We are experiencing a change in climate, the effects of which we aren't certain. Climate

79	7/7/2020 14:20	Madsen	Laurel	Laurel2m@comcast.net	It is evident from myriad studies over many years that the NISP plan to dam and drain huge amounts of water from the Poudre River to fill a reservoir will essentially destroy the river as it runs through Fort Collins and northern Colorado. Our beautiful river, useful for many purposes, already suffering from diversion of much of its water, must be protected and preserved, not only for the present population but for future generations as well. Once gone, it cannot be replaced. The need for water can be met by carefully planned conservation methods at a tremendously lower cost. Please do not allow the destruction of the Poudre River, as well as the beautiful valley along Highway 287, where people live, for a massively expensive and unnecessary dam and reservoir.

83	7/7/2020 19:07	McCulough	Ken	k.mcculough1231@gmail.com	Dear Planning Commision, Commissioner Johnson, Commissioner Kefalas, and Commissioner Donnelly, My name is Ken McCullough, I am a life-long resident of Larimer County and a third-generation alfalfa farmer. My 45-acre farm is irrigated with water diverted directly out of the Cache la Poudre River via a canal operated by the Larimer and Weld Irrigation Company. This canal is located just east of Taft Hill Road and is downstream of the diversion point for the proposed Glade Reservoir. As someone with deep ties to the agricultural economy and rural culture of the Fort Collins area, I am opposed to the Northern Integrated Supply Project (NISP) being pushed by the Northern CO. Water District. For many reasons, I urge you as Commissioners and County Staff to oppose this God-awful project. Let me explain why I am so strongly opposed to this project and believe you should be too. My farm diverts about 30-acre feet of water from the river annually, primarily June through September. This is a reliable water right, although my water rights are not senior to many upstream and downstream users, I have never suffered from an inadequate supply when I needed it most. There have been many years when I don't get my full 30-acre feet, but my alfalfa operation has always received enough water, even in the driest years of 2000-2006, to get a reliable crop and stay in the black. After review of the NISP project and discussions with others in the agricultural economy, including leadership Larimer and Weld Irrigation Company, the NISP project will not benefit me at all, in fact, it could make me lose my farm. The NISP project does not supply any new additional water to irrigators, agricultural users, or farmers in Larimer County. However, the water diverted into Glade Reservoir would be water that is already allocated and exists in paper water rights with farms in Larimer and Weld Counties. A major problem with NISP is that the water to be stored in Glade would need to be purchased in order to be allocated to the project, which it isn't, and unless Northern Water and NISP customers purchase thousands of acres of farmland, that water will never make it to Glade except for years with incredibly exceptional runoff. Since most of the water NISP is hoping to capture is already allocated for downstream users, NISP would need to purchase the farmland where the water rights are held in order to divert and eventually sell that water to customers. This issue was pointed out in the 2018 Final Environmental Impact Statement for the NISP project produced by the United States Army Corps of Engineers. Despite this incredibly problematic detail, Northern Water thinks they can purchase these farms eventually over the next 30-40 years. Frankly, that is unrealistic, this is a billion-dollar pipe dream that won't likely operate at full capacity unless billions of more dollars are sourced to purchase farmland. The issue I fear most that could jeopardize my farm is if Northern Water begins purchasing farmland and water rights in Larimer and Weld Counties. If farms are purchased for their water rights, the value of the

84	7/7/2020 19:09	Brown	Preston	pbrown.eco@gmail.com	Dear Commissioner Johnson, Commissioner Kefalas, Commissioner Donnelly, and Planning Commission: I am writing to express my opposition to the Northern Integrated Supply Project NISP and encourage the Larimer County Planning Commission and County Commissioners to reject the 1041 County permit for the project. Let me explain why I do not support this project and encourage you to reject the permit. This annual spring "rise" on the Cache la Poudre River is a sacred event, a living pulse of water that lasts just about a month but refreshes and re-nourishes the entire river ecology. As the Poudre reaches Fort Collins these floodwaters spill the banks, filling secondary channels where frogs, birds, and fish rear and lay eggs. Fresh layers of sediments drop out over the floodplains, nourishing the deep, lush cottonwood forests and marshes. Something unique about the Poudre is that despite roughly 2/3 of the flow already diverted out, there is still enough of a spring "rise" to flood the banks, clean out the river of lingering sediments, redeposit nutrients, and refresh the ecology. This is rare, nearly all of the rivers and creeks along Colorado's Front Range have been dammed or diverted where the natural rhythm of the spring "rise" is gone, turning the echoing drumbeat of the river into a muted whine. The Poudre still has its spring heartbeat, but not for long if the Northern Colorado Water Conservancy District builds their gluttonous Northern Integrated Supply Project (NISP). If this project is built it will take 71% of the water out of the river during the spring "rise", flat-lining the river and putting it on life support. My expertise is in river restoration and geomorphology, it's my job to know how river and stream mechanics respond to changes in flow. A major problem that NISP would have on the river is that by reducing the spring "rise", the river will not be able to redistribute and transport sediments out of the river channel where they can deposit onto floodplains and wetlands. By eliminating the peak flow and eliminating the annual flushing effect, those sediments will stack up in the channel year after year, eventually raising the channel higher and higher to a point that will create regular flooding problems. The annual flush is needed to improve hydraulic conveyance and move sediments downstream. Not allowing this annual pulse will create a clog, similar to a blood clot. Additionally, if NISP were built and the sediments are not annually flushed out with large spring pulses, the water quality will greatly suffer. This will occur because the sediment and nutrients trapped in the channel will decompose and consume oxygen levels within the water, thereby decreasing dissolved oxygen available for fish and other wildlife. The annual spring "rise" is not "extra unused water", it's the force that cleans the river environment, flushing sediments and nutrients out and distributing them on floodplains. Taking the last of the peak flow and storing it behind a dam to feed sprawling suburbs, while turning the river into a putrid algae-filled ditch, is not a good starting point. This is not my vision for the
86	7/7/2020 21:27	Brunswig	Lori	lbrunswig@comcast.net	Please don't allow this project in Larimer County. We have nothing to gain and everything to lose. Thank you, Lori Brunswig

91	7/8/2020 9:25	Fisher	Rich	ben993q@gmail.com	NISP hearing I am Rich Fisher. I have a small irrigated organic farm near Wellington Colorado. I am very strongly opposed to NISP. NISP will encourage additional water usage that we can ill afford. This is an arid region that is getting drier. Every drop of water needs to be reserved for the highest and best use and that includes keeping riparian areas sufficiently watered especially on the public lands. Growth that requires additional water along and near the Front Range should be discouraged. Water intensive growth in this country should instead be placed in relatively water rich areas in the midwest. Better water conservation requirements here in Colorado can be a source of available water to replace a predicted decline in precipitation and earlier and more rapid mountain snow melt. We are destroying dams in other parts of the country because we have discovered just how destructive they are to the entire ecosystem. Creating yet another one here in Colorado is narrowly self-serving, short-sighted and ignores decades of knowledge about dams and stored water. In sum, I urge the County leadership to vote against NISP, a very bad idea.

92	7/8/2020 9:28	Cruse	Pamela	pjody@lpbroadband.net	The NISP idea began almost 2 decades ago adhering to the age old concept of the destruction of nature for an unsustainable growth and development along the Front Range. It is now 2020 and what is happening in Ft. Collins and surrounding communities is beyond normal population growth. When will the leaders in our communities see what they are doing to the livability and quality of life that we once had here in Northern Colorado? Traffic, pollution, and non-stop development of what was once open space is everywhere we look now. Nothing about that is healthy for mind or body. Why are "we" wanting to destroy what we have been given by nature and what brought many of us here to enjoy? When is enough, enough? What good does supplying more precious water to nearby towns for their future growth when all it will do is bring in more traffic, pollution, and ruin of the last open spaces in our towns? I believe we are at a critical point right now where we must stand up to development and unchecked growth and stop the madness! Envision what we want to see in the future for us and our children and ask ourselves if this is really what we want to do to this amazingly beautiful area that we live in. Because what we are doing and considering doing with NISP can never be repaired. The damage to the Poudre River, the valley, wildlife, and residents who call this area home will never be able to be undone. My husband and I live in a home that was built 101 years ago in Pleasant Valley, in Bellvue. The people who built it were obviously appreciative of the natural beauty here and positioned the windows to frame as much of that beauty as possible. They would not have framed the kitchen window to look out at a mile long dam! Nor can we watch that process happen from our window for 5 years. We are in our 60's and have lived in the area for over 49 years. In the 15 years we've lived in our home we have remodeled every room, added gardens, outbuildings and landscaping. Our son and his family live in town. We love them. We love much about Ft. Collins. But the Front Range is on a fast track to ruination. I am hoping that our county commissioners will listen to the science and to the people who are against NISP and what it will do to the environment of Northern Colorado. We will move out of the home we love and away from the Front Range if NISP is allowed to happen. But thousands more will come. It will not be pretty.

93	7/8/2020 9:29	Young-Buckert	Patricia	singingdolphin9@aol.com	My husband and I have owned our home at 4612 North Highway1 for over 32 years. Our property is listed to encompass 2.2 acres of land. To give an overview of easements already on the property, we need to look at the west and north property lines. More than two thirds (2/3) of the west property dimension gives a twenty (20) foot easement for a water supply ditch line. The entire length of the north property line gives a thirty (30) foot easement for CR56E as well as the actual space for power lines down this road. The pipeline project would impact the entire length of the eastern property line. This seems to be a burden on our civic duty to allow easements on a limited acreage. The thirty (30) foot proposed removal of land use land use has a number of impacts which I will list from north to south. 1) Windbreak trees planted along property line. 2) An existing leach field. 3) A storage building. 4) A two (2) stall garage. 5) A 36' x 12 1/4' horse or equipment metal structure. 6) A twenty (20) foot shipping container for hay storage. 7) An existing well used for irrigation.

95	7/8/2020 10:09	Desheart	Ann	ann11desheart@gmail.com	Dear County Commissioners, I am writing to strongly urge your board to REJECT the NISP Permit. The Cache la Poudre river is a unique gem, and the peak spring flows are the most important element of the river. Removing the peak flows would negatively affect the river environment. Smaller peak flows would not transport sediments out and distribute them on the floodplains, harm fish including at least two threatened species, and negatively affect water quality by leading to warmer temperatures and excessive nutrients.NISP would also reduce peak flows in the Platte River, where endangered sandhill cranes depend on the high flows to create sandbars. NISP would also be to be more expensive than other reasonable water supply alternatives, such as water sharing agreements between farms and cities, efficiency upgrades, lawn removal, water conservation, recycling, and re-use. NISP would cost upwards of one billion dollars, burdening participant community ratepayers, stimulating the need for cities to grow more and grow faster to pay off utility debts. This would lead to urban sprawl and conversion of farmland to subdivisions. Additionally, NISP is opposed by the City of Fort Collins and highly questioned by the City of Greeley for a variety of reasons, including water and wastewater treatment costs, water contamination issues, increased flooding rise, and many others mentioned above. River recreation is a critical component of the Larimer County economy and way of life. The Poudre River is regarded for fantastic boating, floating, rafting and kayaking. NISP would reduce the length and magnitude of the recreational; boating/floating season through Fort Collins, Windsor, and Greeley, as well as degrade water quality for body contact sports during that season Lastly, NISP would ultimately harm our region's agricultural community through accelerated salinization, more rapid suburban development, and most of NISP's water would benefit people outside the Poudre basin, while most of the impacts would be left for people inside the basin to deal with. The Poudre River is a treasure and should be maintained in its current state to benefit the ecological, economic, and social conditions of Larimer County. Sincerely, Ann Desheart

96	7/8/2020 10:26	Lipstrue	Jeff	j.lipstrue49@gmail.com	Hello Commissioners, Please consider these comments when making the decision regarding NISP. I am urging you as Larimer County Commissioners, to reject the NISP Permit! The Cache la Poudre river is a unique gem, and the peak spring flows are the most important element of the river. Removing the peak flows would negatively affect the river environment. Smaller peak flows would not transport sediments out and distribute them on the floodplains, harm fish including at least two threatened species, and negatively affect water quality by leading to warmer temperatures and excessive nutrients.NISP would also reduce peak flows in the Platte River, where endangered sandhill cranes depend on the high flows to create sandbars. NISP would also be to be more expensive than other reasonable water supply alternatives, such as water sharing agreements between farms and cities, efficiency upgrades, lawn removal, water conservation, recyclung, and re-use. NISP would cost upwards of one billion dollars, burdening participant community ratepayers, stimulating the need for cities to grow more and grow faster to pay off utility debts. This would lead to urban sprawl and conversion of farmland to subdivisions. Additionally, NISP is opposed by the City of Fort Collins and highly questioned by the City of Greeley for a variety of reasons, including water and wastewater treatment costs, water contamination issues, increased flooding rise, and many others mentioned above. Free-flowing River Recreation is a critical component of the Larimer County economy and way of life. The Poudre River is regarded for fantastic boating, floating, rafting and kayaking. NISP would reduce the length and magnitude of the recreational; boating/floating season through Fort Collins, Windsor, and Greeley, as well as degrade water quality for body contact sports during that season Lasly, NISP would ultimately harm our region's agricultural community through accelerated salinization, more rapid suburban development, and most of NISP's water would benefit people outside the Poudre basin, while most of the impacts would be left for people inside the basin to deal with. The Poudre River is a treasure and should be maintained in its current state to benefit the ecological, economic, and social conditions of Larimer County. Thank you, Jeff

97	7/8/2020 10:53	Terry	Nancy	nterry@pmglending.com	The County should decline NISP's 1041 application for the same reason Thornton's 1041 was denied: County Commissioners first sent Thornton back to the drawing board because they (the County) said Thornton had not sufficiently researched other routes. The County denied the final 1041 application citing "the project's anticipated impact on private lands." Thornton's preferred route along Douglas Rd. was largely in the public right-of-way or road easements. NISP's 1041 application is primarily through private land: Hood Lane, owned by Hauan, Tips and Miserlian, Eagle Lake, owned by our neighborhood, through the Bieritz and Helgeson lots, across Tips' land, impacting his three new lots, just north of Belcher's lot, etc. And the planned route presented by NISP now is the same route they identified 3 or 4 years ago when we first learned of NISP's plans. Where is their serious vetting of alternative routes?
98	7/8/2020 11:37	Madsen Rubilar	Lisa	lisa.m.rubilar@gmail.com	I am writing as a citizen who has loved the Poudre River, as well as and the land along the Highway 287 corridor, for over fifty years. Our family has a small cabin in the Crystal Lakes area, so we travel frequently through the corridor that will be under water if NISP is allowed to go forward. We never tire of the pristine beauty of the landscape. We also frequently enjoy the beauty and tranquility of the Poudre River in various locations in and near Fort Collins. It breaks my heart to think of the river withering, wetlands turning to desert, wildlife disappearing, and natural habitats lost forever. And for what? So that Denver suburbs can continue to expand without consideration for water resources? If Thornton needs more water, the place to look is water conservation. Population growth in the area MUST depend on decreased water use through water-saving technologies, watering restrictions and xeriscaping using native plants. These are sustainable, realistic alternatives to a plan that would decimate natural areas in Northern Colorado. There is absolutely NO NEED and NO JUSTIFICATION for NISP, which will have a direct, negative impact on the quality of life of those living in its path.

LARIMER COUNTY | Community Development

P.O. Box 1190, Fort Collins, Colorado 80522-1190, Planning (970) 498-7683 Building (970) 498-7700, Larimer.org

MEMO

To: Larimer County Planning Commission

From: Community Development Staff

Date: July 15, 2020

RE: 3rd Addendum to Staff Report for NISP 1041
File #20-ZONE2657

Attached to this memo please find the following information which has been received by the staff since the packet for the July 8th meeting:

- Updated Citizen comments – 4.
- Several handouts from NISP WAE.
- JPEG map of the power line to be relocated.

3928

Rob Helmick <helmicrp@co.larimer.co.us>

Planning Commission

1 message

Larimer.org <noreply@larimer.org> Tue, Jul 14, 2020 at 12:30 PM
Reply-To: Tom Sale <tsale@engr.colostate.edu>
To: pcboard@larimer.org

Submitted on Tuesday, July 14, 2020 - 12:30pm

Submitted by user: Anonymous

Submitted values are:

Emailing (to) pcboard@larimer.org
Subject Planning Commission
Your Name Tom Sale
Phone
Your Email tsale@engr.colostate.edu
Confirm Email tsale@engr.colo.edu
Message
Hello Planning Commission

1) Thanks for your effort with the NISP 1041 hearing

2) I pulled the following questions from my comments of 4.29.20(provided to Rob Helmick and the County Commissioners) that you may want to consider in meeting with Northern on 7.15.20

Best Regards, Tom Sale

Regarding: Comments on Northern Integrated Supply Project (NISP) 1041 Permit

Siting

Fault Questions:
- Why is it that neither the North Fork or Bellvue Faults have ever been mentioned in public NISP documents to date?
- What contingency plans are available to address fault-controlled leakage under the dams, what are the associated costs (e.g. following work on the North Dam on Horsetooth), and are the related costs being shared with participants and lending agencies?
- In your recent multiple year (undocumented?) drilling programs were “subsurface voids” encountered that could lead to severe seepage losses and/or washout under the Glade Dam? Have the results from recent subsurface investigations been shared with the public?

Seepage Loss Questions:
- Given up to 400 feet of water over the conductive sandstone beds, and the likelihood of large seepage losses, how can you advocate that Glade is a suitable site for a reservoir?
- The county requires groundwater models for projects where groundwater issues exist. What types of groundwater modeling has been conducted for Glade and have the results been shared with the public?
- Per Northern’s recent public open house on NISP, there are NO plans to place a seepage control liner in Glade (as was ultimately required at the North Dam on Horsetooth). If a liner were required how would it effect the costs for NISP and are the parties that will cover the cost aware of the associated risks?
- Given effective subsurface water storage alternatives, how much money could be saved by eliminating seepage losses?

Munroe Ditch Questions:
• The proposed steel pipeline in cement will see dynamic vertical stresses. What kind of foundations are required, what are the costs for the submerged conveyance, are the costs currently included in the estimates provided to the participants?
• How do you plan on dealing with large volumes of water flowing into the submerged tunnels when they become submerged drains?

• Given prior experience with collapsing formations due to exposure to fresh water in the vicinity of Glade, why would the Munroe Ditch Tunnels not collapse when they become submerged drains?
• Are there any successful engineering precedents for the proposed submerged conveyance of the Munroe Ditch through Glade?
• How will you safely remove sediments that will inevitably fill the submerged pipeline?
• What are the anticipated costs of the submerged conveyance, its maintenance, and its periodic replacement?
• Are the costs for the submerged Munroe Ditch conveyance through Glade included in current estimates of the cost for NISP and are the related cost/concerns being shared with participants and lending agencies?
• What is Northern's contingency plan given the likelihood of the Munroe Ditch conveyance failing?

Pushing the Missile Site Chlorinated Solvent Plume into Domestic Drinking Water Wells Fault Questions:
- Why did Northern install 20 plus monitor wells in the missile site plume?

- Were water samples collected from the wells?
o If yes, when will the data be made available? One might think that if the news was good, we would already know the results.
o If no, isn't it in the best interest of protection to human health and to the environment, to accurately sample the wells and share the results prior to any approval of the NISP 1041 Permit?

- What are the contingency plans for adverse impact to domestic water supplies?

- Is it appropriate to proceed with a decision on the NISP 1041 Permit absent public documentation of the water quality in Northern's 20+ monitoring wells in the vicinity of the missile plume?

Off the Main Stem of the Cache La Poudre Questions:
• How will NISP capture peak flows if the diversion from the Cache La Poudre River is constrained by the hydraulic capacity of the diversion?
• Why should NISP be approved if there are lower cost/less harmful alternatives for surface water storage projects that the project proponents can participate in?
• How will NISP get the required electrical power to the pumps at the forebay?
• Has Northern provided the required information for approval of an 80 MW power line?
• How will required power lines impact the aesthetic of the views in Pleasant Valley and the new recreational facilities?

Alternatives

Mining Water Losses from Antiquated Water Storage and Transmission Infrastructure Question:
• Given a viable alternative that is less damaging, low risk and suited to uncertain times – why should the (NISP) 1041 Permit be approved if it is, in contrast, severe in its impacts, more costly, and poorly suited to the State's current conditions?

Subsurface Water Storage Question:
• Given all that is happening with Subsurface Water Storage in Colorado, and Dr. Sale's comments, why would you dismiss Subsurface Water Storage?

Conservation Questions:
• How can Northern justify requesting further surface water diversions, billions of dollars from Colorado's residents, and destruction of Larimer's County's limited wild lands when so much can still be done with conservation?

Privacy Setting

This form was submitted from a /contact email link on larimer.org.

June 01, 2020
Larimer County Board of County Commissioners
Larimer County Planning Staff
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521

RE: NISP 1041 Permit Application; Project No. 20-ZONE 2657

Dear Commissioner Johnson, Commissioner Kefalas, Commissioner Donnelly, and Planning Commission:

I am writing to express my opposition to the Northern Integrated Supply Project NISP and encourage the Larimer County Planning Commission and County Commissioners to reject the 1041 County permit for the project. Let me explain why I do not support this project and encourage you to reject the permit.

This annual spring "rise" on the Cache la Poudre River is a sacred event, a living pulse of water that lasts just about a month but refreshes and re-nourishes the entire river ecology. As the Poudre reaches Fort Collins these floodwaters spill the banks, filling secondary channels where frogs, birds, and fish rear and lay eggs. Fresh layers of sediments drop out over the floodplains, nourishing the deep, lush cottonwood forests and marshes.

Something unique about the Poudre is that despite roughly 2/3 of the flow already diverted out, there is still enough of a spring "rise" to flood the banks, clean out the river of lingering sediments, redeposit nutrients, and refresh the ecology. This is rare, nearly all of the rivers and creeks along Colorado's Front Range have been dammed or diverted where the natural rhythm of the spring "rise" is gone, turning the echoing drumbeat of the river into a muted whine.

The Poudre still has its spring heartbeat, but not for long if the Northern Colorado Water Conservancy District builds their gluttonous Northern Integrated Supply Project (NISP). If this project is built it will take 71% of the water out of the river during the spring "rise", flat-lining the river and putting it on life support.

My expertise is in river restoration and geomorphology, it's my job to know how river and stream mechanics respond to changes in flow. A major problem that NISP would have on the river is that by reducing the spring "rise", the river will not be able to redistribute and transport sediments out of the river channel where they can deposit onto floodplains and wetlands. By functionally limiting the peak flow and eliminating the annual flushing effect, those sediments will stack up in the channel year after year, eventually raising the channel higher and higher to a point that will create regular flooding problems. The annual flush is needed to improve hydraulic conveyance and move sediments downstream. Not allowing this annual pulse will create a clog, similar to a blood clot.

Additionally, if NISP were built and the sediments are not annually flushed out with large spring pulses, the water quality will greatly suffer. This will occur because the sediment and nutrients trapped in the channel will decompose and consume oxygen levels within the water, thereby decreasing dissolved oxygen available for fish and other wildlife. The annual spring "rise" is not "extra unused water", it's the force that cleans the river environment, flushing sediments and nutrients out and distributing them on floodplains.

Taking the last of the peak flow and storing it behind a dam to feed sprawling suburbs, while turning the river into a putrid algae-filled ditch, is not a good starting point.

This is not my vision for the Poudre River or the Northern Colorado region. Instead, my vision is to keep the wild character of the river, meet growing water needs, and retain the farmland and rustic character of the region. We don't need another river-destroying boondoggle like NISP that creates more urban sprawl. We need intelligent planning, water conservation, recycling, water sharing agreements between cities and farms, and water efficiency upgrades. These solutions have been done in places like Las Vegas where water use has gone down even through growth has skyrocketed. These methods are common and would be significantly cheaper than a billion-dollar dam, paid for by ratepayers.

Only 35 years ago, a 415 ft tall dam was proposed along highway 14 near the mouth of the Poudre Canyon. The Grey Mountain Reservoir proposal was pushed by Northern Water, the same agency pushing NISP. Thankfully Grey Mountain Dam was rejected by Larimer County, and I hope that NISP will be defeated too, but only with your help in rejecting the 1041 County Permit.

Please stand with the river and all the constituents in Larimer County that do not want to see our beloved river put on life support to feed the growth of cities in other Counties.

Thank you,

Preston Brown

Fort Collins, CO.

May 22, 2020
Larimer County Board of County Commissioners
Larimer County Planning Staff
200 West Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80521

RE: NISP 1041 Permit Application; Project No. 20-ZONE 2657

Dear Planning Commision, Commissioner Johnson, Commissioner Kefalas, Commissioner Donnelly, and Planning Staff:

My name is Ken McCullough, I am a life-long resident of Larimer County and a third-generation alfalfa farmer. My 45-acre farm is irrigated with water diverted directly out of the Cache la Poudre River via a canal operated by the Larimer and Weld Irrigation Company. This canal is located just east of Taft Hill Road and is downstream of the diversion point for the proposed Glade Reservoir. As someone with deep ties to the agricultural economy and rural culture of the Fort Collins area, I am opposed to the Northern Integrated Supply Project (NISP) being pushed by the Northern CO. Water District. For many reasons, I urge you as Commissioners and County Staff to oppose this God-awful project. Let me explain why I am so strongly opposed to this project and believe you should be too.

My farm diverts about 30-acre feet of water from the river annually, primarily June through September. This is a reliable water right, although my water rights are not senior to many upstream and down-stream users, I have never suffered from an inadequate supply when I needed it most. There have been many years when I don't get my full 30-acre feet, but my alfalfa operation has always received enough water, even in the driest years of 2000-2006, to get a reliable crop and stay in the black. After review of the NISP project and discussions with others in the agricultural economy, including leadership Larimer and Weld Irrigation Company, the NISP project will not benefit me at all, in fact, it could make me lose my farm.

The NISP project does not supply any new additional water to irrigators, agricultural users, or farmers in Larimer County. However, the water diverted into Glade Reservoir would be water that is *already* allo-cated and exists in paper water rights with farms in Larimer and Weld Counties. A major problem with NISP is that the water to be stored in Glade would need to be purchased in order to be allocated to the project, which it isn't, and unless Northern Water and NISP customers purchase thousands of acres of farmland, that water will never make it to Glade except for years with incredibly exceptional runoff. Since most of the water NISP is hoping to capture is already allocated for downstream users, NISP would need to purchase the farmland where the water rights are held in order to divert and eventually sell that water to customers. This issue was pointed out in the 2018 Final Environmental Impact Statement for the NISP project produced by the United States Army Corps of Engineers. Despite this incredibly prob-lematic detail, Northern Water thinks they can purchase these farms eventually over the next 30-40 years. Frankly, that is unrealistic, this is a billion-dollar pipe dream that won't likely operate at full capac-ity unless billions of more dollars are sourced to purchase farmland.

The issue I fear most that could jeopardize my farm is if Northern Water begins purchasing farmland and water rights in Larimer and Weld Counties. If farms are purchased for their water rights, the value of the

farmland will skyrocket because the water rights associated with the land will be “developed” and stored behind a dam and made available for urban users instead of kept in the river. This would result in a major *negative* economic incentive for farmers to sell their land and water rights to NISP in order to “cash out”. Farmers would of course have to sell their land willingly but imagine if a big fat “green carrot” was dangled in front of a working-class family? We all know what will happen, the pressure to sell the land for cash would be too overwhelming for most, and the multi-generation farms will be turned over for a quick buck.

Developers would then be able to buy the land from NISP and turn the land into homes and subdivisions, knowing that the farmland being paved over and has fed the Country for generations and will forever be lost.

My biggest fear about NISP is that if it were successful, which is unlikely, it would incentivize the development of Larimer and Weld Counties rich farmlands and rural charters, resulting in appalling urban sprawl and will contribute to the loss of a stable and reliable agricultural economy. At best NISP would waste billions of dollars and never become operational, but at worst, it would turn our beautiful rich agricultural lands into cement cul-de-sacs and parking lots.

My family and I have weathered through many years of drought, lost revenue, pest diseases, broken equipment, labor disputes, and market swings, but we’ve always kept our heads above water. However, I see NISP as the grim reaper, a sign of danger coming to turn my farm and our neighbors’ farms into lawns and asphalt driveways, forever destroying the traditions we have established in Larimer County.

This is not the future I want to leave my daughter, who will inherit the farm and be the first woman in the family to run it. I want her to have the same lifestyle and traditions that my grandfather had when he came to Larimer County in 1910 to farm alfalfa and corn. As someone who is trying to find their way in this chaotic world and walk tall as a steady and honorable person, I find myself feeling helpless and in utter despair if NISP were built. That’s why I am writing, to urge you to hear my story and see my perspective as a farmer who wishes the best for his home. Please stand with me and do not issue a 1041 permit for the Northern Integrated Supply Project.

Sincerely,

Ken McCullough

Laporte, Colorado

With boom in visitation comes safety concerns for recreators at Horsetooth Reservoir

Kevin Duggan, Fort Collins Coloradoan Published 7:00 a.m. MT July 3, 2020 | **Updated 4:08 p.m. MT July 3, 2020**

Fans of Horsetooth Reservoir have taken to heart the message that it's OK to enjoy the great outdoors during the coronavirus pandemic.

Crowds flocked to the reservoir west of Fort Collins as well as other sites managed by Larimer County Natural Resources as they reopened in spring to boating, camping and hiking. The surge in visitation has carried over to summer.

And with the people have come problems with safety and parking, county officials say.

Parking issues in the Horsetooth area came to a head in mid-June as hundreds of vehicles pulled over along sections of Centennial Drive and county roads 38E and 23 during weekends because the reservoir's parking lots were full.

Any spot that wasn't signed "no parking" had a parked car, said Senior Ranger Luke Brough during a recent meeting with the county commissioners.

Pay up: State wildlife areas require licenses for all users (/story/sports/outdoors/2020/06/30/new-rule-requires-colorado-hunting-fishing-license-on-larimer-public-lands-watson-lake-poudre-river/5349078002/)

Vehicles lined both sides of the narrow-shouldered roads, and cars sped through even as cyclists rode along and paddleboarders and kayakers hauled gear across the roads to reach the water.

Given the dangerous circumstances, Brough said "it was a miracle" no one was seriously injured.

"It was a blessing at the end of the day to say no one got ran over," he said.

Placing 40 temporary no-parking signs along the county roads plus stepped up traffic enforcement by Larimer County sheriff's deputies and the Colorado State Patrol helped calm the situation.

But the crowding is a sign of things to come as the region grows and more people seek outdoor recreation spots.

Visitation is booming

Cars fill a pullout along Centennial Drive near Horsetooth Reservoir over Memorial Day weekend in Fort Collins, Colo. on Saturday, May 23, 2020. *(Photo: Bethany Baker / The Coloradoan)*

A visitor count conducted two years ago found 1.2 million people visited the Horsetooth area, which covers the reservoir and Horsetooth Mountain Open Space, said Mark Caughlan, manager of the Horsetooth District, in an interview.

“That’s a tremendous amount of people to run through a fairly small park area,” Caughlan said.

The number seems to have increased. As of mid-June, visitation to the reservoir and open space was up 40% from a year ago, Caughlan said.

On weekends, parking lots at the reservoir are full by 9 a.m. Latecomers might have to wait in line more than an hour to launch their boats. Some weekdays can be as busy as Saturdays and Sundays.

A sign that reads "No Parking" is located along Shore Access Road beside Horsetooth Reservoir in Fort Collins, Colo. on Wednesday, July 1, 2020. *(Photo: Bethany Baker / The Coloradoan)*

Through mid-June, boat inspectors checking for invasive aquatic species had conducted 8,300 inspections. By that time a year ago, they had done 3,500 inspections.

About half of the visitors have come from outside the county, Caughlan said. Many visitors come from Weld County.

Guide: Summer fun in Larimer County during a pandemic (/story/life/2020/06/23/coronavirus-summer-things-to-do-fort-collins-colorado-covid-19/3235464001/)

Carter Lake near Loveland has seen a similar boom in visitation, as have other recreation facilities along the Front Range.

At Boyd Lake State Park in Loveland, waits to get in the park and launch a boat can exceed two hours, Park Manager Eric Grey told the commissioners.

The park has 1,200 parking spaces. When those spaces fill, traffic is stacked at entry points, where variable message boards advise drivers on the potential lengths of wait times.

Traffic coming in from the south backs up along Boise Avenue toward McKee Medical Center. The backup can hamper emergency vehicle access and the ability of residents to park in front of their houses.

“In the past four years, we only had that happen five times,” Grey said. “We had it happen six times this spring.”

Safety issues a concern

In anticipation of the crowding, Larimer County Natural Resources hired its full contingent of 15 seasonal rangers even though the potential impact of the pandemic was not clear. The department has four year-round rangers.

Caughlan said he’s grateful to have the help. On busy days, rangers run from service call to service call, often focusing on traffic mitigation rather than “doing real ranger work.”

“We’re doing the best job we can to address public safety, to address visitor needs, to make sure to protect the resources,” he said. “As you can imagine, it’s difficult at best with these visitation numbers to manage those.”

During major events, such as a June 20 medical emergency at Satanka Bay in which a 36-year-old man suffered a heart attack and died, park resources get spread thin, Brough told the commissioners.

Without rangers keeping track of things, parking lots, boat ramps and other facilities at the reservoir can become chaotic.

Accident: Climber seriously injured in Horsetooth fall (/story/news/2020/06/29/colorado-climber-airlifted-after-fall-near-fort-collins/3279557001/)

“Once that bottle is open, it’s a continuous flow and we can’t contain it,” he said.

Water safety is a major concern at the reservoir, Caughlan said.

Visitors should heed regulations limit swimming to designated areas. Inflatable tubes, mattresses and other toys are not allowed outside swim areas.

In 2019, a record 18 people drowned in Colorado lakes. This year, the state has already seen 15 drownings, he said.

“We just want people to make good decisions and wear life jackets,” he said.

Cliff diving is prohibited at Horsetooth Reservoir, but it still happens. People risk serious injuries from hitting rocks hidden beneath the surface.

The reservoir’s elevation can go down 6 inches in a day as water is pulled from the reservoir for irrigation. People may not realize that a location where they dived before might be 3 to 4 feet shallower a week later, Caughlan said.

Options for crowd management

Satanka Bay at Horsetooth Reservoir is crowded with boats and paddleboards in mid-June 2020. *(Photo: Mark Caughlan)*

With so many people vying to get on the water at Horsetooth Reservoir, officials are looking into options for managing crowds. That could include hiring additional rangers.

Potential remedies include setting up a reservation system for boat launching for entering the park.

“Imagine what it’s going to be like 10 years from now,” Caughlan said. “We’re going to have to start implementing some of the entry processes other agencies are trying.”

Caughlan said Horsetooth hit its capacity about 10 years ago. There is little room for expansion.

Officials plan to “harden” the park’s infrastructure, such as paving roads and parking facilities, to keep up with the impact of having so many visitors.

At the same time, they want to preserve the area’s natural resources to provide good visitor experiences.

Opinion: Ease up on Estes Park tourists (/story/news/2020/06/27/opinion-estes-park-rejects-message-targeting-out-state-tourists/3260113001/)

The demand for recreational facilities has been growing for several years, Grey told the commissioners. The surge this spring and summer continues that trend.

“I think this is kind of a wake-up call,” Grey said. “Our population is not shrinking, and if we don’t have places to send people, we’re going to be seeing these problems moving forward in the next several years.”

Kevin Duggan is a senior columnist and reporter. Contact him at kevinduggan@coloradoan.com (mailto:kevinduggan@coloradoan.com). Support his work and that of other Coloradoan journalists by purchasing a digital subscription today (https://offers.coloradoan.com/specialoffer?gps-source=CPNEWS&utm_medium=onsite&utm_source=news&utm_campaign=NEWSROOM&utm_content=KEVINDUGGAN).

Read or Share this story: https://www.coloradoan.com/story/news/2020/07/03/colorado-fort-collins-horsetooth-reservoir-rise-visitation-boaters-camping/3254523001/

3939

Rob Helmick <helmicrp@co.larimer.co.us>

NISP

1 message

David Marvin <dmarvin55@gmail.com> Tue, Jul 14, 2020 at 11:10 AM
To: Helmicrp@larimer.org

Mr. Helmic,

The NISP pipeline may be routed through Cooperslew Open Space, immediately adjacent to Boxelder Estates in Larimer County. I have attached a letter that addresses our concerns. I have also sent an email with the letter to the Planning Commission Board.

Let me know if you have any questions.

--
Dave Marvin

letter to planning commission on NISP.pdf
45K

To: Larimer County Planning Commission and Larimer County Commissioners
From: Cooperslew Open Space Association
Regarding: NISP Pipeline
Date: July 14, 2020

Dear Planning Commission Board and Commissioners,

Cooperslew Open Space Association is a Colorado non-profit entity that was formed for the purpose of acquiring and maintaining as Open Space a narrow five-acre strip of land immediately adjacent to the east side of Boxelder Estates, Larimer County, Colorado. The Association recently received notice that a portion of the pipeline for NISP could be placed within Cooperslew Open Space along its entire length from north to south.

The construction of the pipeline within Cooperslew Open Space is of particular concern, as follows:

1. When you consider the surface disturbance that will result from installing a 54-inch pipeline, most of Cooperslew Open Space will be impacted. Consequently, the enjoyable use of Cooperslew by its current members (pedestrian use and riding horses) will cease, both during construction and potentially for a long time after reclamation.

2. Reestablishing grasses on areas disturbed by construction will be a slow process, particularly since Cooperslew Open Space is not irrigated. This will further hinder/delay use of the area by members and may also impose an extraordinary expense on Cooperslew Open Space Association to control weeds until revegetation is successful, and to amend and reseed areas where it is not.

3. Drainage tiles underlay the entire Boxelder Estates subdivision, and from what we know, Cooperslew Open Space. Pipeline construction has the potential to damage a portion of these tiles and thereby negatively affect drainage and potentially the groundwater irrigation wells in the area.

4. Construction noise and dust will impact Boxelder Estates, especially the Boxelder properties immediately adjacent to Cooperslew Open Space.

5. Until revegetation efforts are successful, the aesthetics of Cooperslew Open Space will change dramatically because the current healthy grassland will be substantially disturbed by construction activity. This will be of major consequence to Boxelder homeowners immediately adjacent to the Open Space and could negatively affect property values.

6. The roads within Boxelder Estates are private and maintained by the Boxelder Estates Homeowners Association. If NISP plans to use these roads for access to the pipeline ROW during construction, the impact to traffic flow and road surfaces in the subdivision would be substantial and unacceptable.

Thank you for considering our concerns.

Respectfully,

David W. Marvin
President, Cooperslew Open Space Association

Documents Outlining Project Mitigation

APPENDIX A – FISH AND WILDLIFE MITIGATION AND ENHANCEMENT PLAN SUMMARY TABLES

Table A1. Mitigation and Enhancement Plan Summary Table - By Mitigation Action Item

Measure No.	Mitigation and/or Enhancement Measure [1]	Mitigation and/or Enhancement Commitment [2]	Resource Considerations (see Table A.2 for complete list of mitigated effects; see text for description of enhanced resources)	Capitalized Cost [3]	Cost Note [4]	Mitigation			Enhancement [1]	Resources Involved								
						Avoidance	Minimization	Compensation		Aquatic Life	Recreation	Riparian Veg/Wetlands	Special Status Species	Stream Morphology	Terrestrial Wildlife	Water Quality	Wetlands	Other
Aquatic Life and Stream Morphology																		
AG-01	Stream Channel and Habitat Improvement Plan	Fund stream channel and habitat improvement plan	Compensation for accelerated degradation of channel geomorphology, increased flooding risk downstream of I-25, reduced Poudre River flows, reduced aquatic habitat, reduced water availability for riparian vegetation, reduced habitat for riverine special status species, increased water temperature and DO concentrations; Enhanced and accelerated channel restoration, aquatic habitat, riparian vegetation, riverine special status species, temperature and DO concentrations	$1,000,000	a			X	X	X	X	X	X	X		X		
AG-02	Stream Channel and Habitat Improvements	Construct stream channel improvements (2.4 miles)		$1,800,000	b			X	X	X		X	X	X		X		
AG-03	Poudre River Adaptive Management Program	Implement and fund Poudre River Adaptive Management Program in coordination with other Poudre River stakeholders	Enhanced and accelerated channel restoration, aquatic habitat, riparian vegetation, riverine special status species, temperature and DO concentrations	$5,930,000	a				X	X	X	X	X	X		X		
AG-04	Poudre Valley Canal Diversion Structure Reconstruction	Reconstruct Poudre Valley Canal with improvements in sediment diversion, fish passage, and boating safety	Minimization of reduced sediment transport capabilities; enhance Poudre River connectivity for aquatic migration, enhance boater safety	$300,000	b		X		X	X	X			X				

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AG-05	Multi-Objective Diversion Structure Retrofits	Construct multi-objective diversion structure retrofits that include fish passage, low flow conveyance and flow monitoring capabilities (4 sites)	Enhance Poudre River connectivity for aquatic migration, monitor and administer flow releases	$1,200,000	b				X	X			X					
AG-06	Glade Reservoir Fishery	Establish and maintain recreational cool water fishery at Glade Resevoir	Enhance regional recreational opportunities	$4,070,000	a				X	X	X							
AG-07	SPWCP Diversion Construction	Construct SPWCP diversion to avoid fish entrainment and allow fish passage	Avoidance and minimization of entrainment of fish in SPWCP diversion structure and decreased fish migration past diversion	$300,000	b	X	X			X								
AG-08	Galeton Reservoir Native Fish Rearing	Make Galeton Reservoir available to CPW for raising native warmwater fish for reintroduction	Compensation for reduced habitat availability and quality for native warmwater fish	$100,000	a				X	X								
AG-09	Galeton Reservoir Fish Screening	N/A [6]																
Streamflow Commitments																		
FW-01	Avoid Munroe Canal Diversions	Avoid NISP-related diversions through Munroe Canal	Avoidance of reduced Poudre River flows, reduced aquatic habitat, reduced river-based boating days, increased water quality concentrations	[5]	c	X				X	X	X	X			X		

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FW-02	Curtail Diversions for Non-Consumptive Water Rights	Curtail NISP diversions for existing Poudre River non-consumptive water rights (5-50 cfs), including those for Bellvue Fish Hatchery at Watson Lake	Avoidance and minimization of reduced Poudre River flows below Poudre Valley Canal diversion, reduced aquatic habitat, reduced water availability for riparian vegetation, reduced habitat for riverine special status species, increased water quality concentrations and DO, reduced river recreational value, nonuse value impacts; enhancement of low flows in conveyance refinement reach	[5]	c	X	X			X	X	X	X			X		
FW-03	Summer and Winter Diversion Curtailments	Curtail diversions when flow is less than 50 cfs during the summer, and 25 cfs during the winter		[5]	c	X				X		X				X		
FW-04	Conveyance Refinement - Poudre River Intake	Convey 18 cfs (winter) to 25 cfs (summer) of deliveries to NISP participants by releasing from Glade Reservoir to the Poudre River, and rediverting at Timnath Inlet; prior to full buildout, convey a minimum of 35% of NISP deliveries through Poudre River Intake		$24,520,000	b	X	X		X	X		X	X			X		
FW-05	Poudre River Flow Augmentation Program	Assist with securing Flow Augmentation Protection for the Poudre River		[5]	c	X	X		X	X	X	X	X					

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FW-06	Glade Reservoir Enlargement for Water Quality Purposes	N/A [6]																
FW-07	Ramp Hansen Supply Canal Releases	Work with CPW and water commissioner to ramp Hansen Supply Canal releases	Enhancement of aquatic habitat	[5]	c				X	X			X			X		
FW-08	Peak Flow Operations Program	Curtail SPWCP exchanges for peak 3 days each year. Bypass Grey Mountain water rights based on Tier (see text for details): • Tier 1 (>76% full and likely to fill) - bypass during peak 3 days each year • Tier 2 (>76% full, not likely to fill; >50% full) - bypass during peak 2 days to meet 2,800 cfs for Tier 2a; bypass up to 1,200 ac-ft for Tier 2b • Tier 3 (<50% full) - no bypass, except bypass for peak 1 day if 2,800 cfs flow trigger has not been met in previous 3 years (see text for detailed tier classifications and actions)	Avoidance and minimization of reduced sediment transport capability, reduced aquatic habitat	[5]	c	X	X			X			X			X		
FW-09	Ramp NISP Diversions at PVC	Limit changes in NISP diversions at the PVC headgate to no more than 500 cfs in 24 hours.	Avoidance and miniminzation of impacts on aquatic species.	[5]	c	X	X			X								

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						Avoidance	Minimization	Compensation		Aquatic Life	Recreation	Riparian Veg/Wetlands	Special Status Species	Stream Morphology	Terrestrial Wildlife	Water Quality	Wetlands	Other
Noxious Weeds																		
NW-01	Noxious and Invasive Weed Control Plan	Develop and implement noxious weed control plan during construction	Avoidance and minimization of potential spread of noxious weeds during construction activities.	[5]	c	X	X											X
Recreation																		
RC-01	Glade Reservoir Recreation	Allow public access to Glade Reservoir fishery; investigate opportunities for recreation management and develop management plan that may include motorized boating, fishing and camping	Enhanced regional recreational opportunities	$200,000	a				X		X							X
RC-02	Glade Reservoir and State Land Hunting Access	Provide replacement access to State Trust Lands near Glade Reservoir and allow hunting access adjacent to Glade Reservoir	Compensation for inundation of existing access to State Trust Lands west of Glade Reservoir, reduced hunter access and game harvest near Glade Reservoir	[5]	c			X			X				X			X
RC-03	Glade Reservoir Recreation and Wildlife Adaptive Management Plan	Provide habitat for affected wildlife species while allowing the public to have reasonable access for recreation throughout the area	Enhanced regional recreational opportunities	[5]	c				X		X				X			X
RC-04	Mitani-Tokuyasu State Wildlife Area	Replace facilities at Mitani-Tokuyasu State Wildlife Area	Compensation for loss of land and impact on facilities at Mitani-Tokuyasu State Wildlife Area due to construction of SPWCP infrastructure, wildlife impacts at Galeton Reservoir	$50,000	b			X			X							X
RC-05	Land Acquisition in Confluence Area	Provide partial funding for land acquisition in Poudre - South Platte confluence area		$500,000	a			X			X							X

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RC-06	Glade Reservoir Poudre River Recreator Parking	Construct parking lot at Glade Reservoir complex for use by Poudre River recreators	Compensation for drive-by traffic at Ted's Place; enhanced regional recreational opportunities	$40,000	b			X	X		X							X
RC-07	Glade Reservoir Visitor's Center	Construct Visitor's Center at Glade Reservoir	Compensation for loss of prime farmland, geologic construction disturbance, other general minor environmental effects	$940,000	a			X		X	X	X	X	X	X	X	X	X
Riparian Vegetation																		
RV-01	Riparian Vegetation - Cottonwood Regeneration Areas	Develop cottonwood regeneration areas in 3 specific reaches (58 acres) and adjacent to channel and habitat improvement reaches (2.4 miles)	Compensation for accelerated decline of plains cottonwood, increased water temperatures	$130,000	b			X				X	X			X		
RV-02	Riparian Vegetation - Channel Improvements	Reconnect channel to floodplain in channel and habitat improvement reaches, re-establish connection with backwater sloughs in Windsor area	Compensation for adverse effects on plant communities sensitive to alluvial groundwater levels	$280,000	b			X		X		X	X	X		X		
Special Status Species																		
SS-01	Preble's	N/A [7]																
SS-02	Bald Eagle	Conduct surveys for bald eagles and nests; meet CPW buffer requirements; take actions according to Bald Eagle and Golden Eagle Protection Act and Migratory Bird Treaty Act (MTBA)	Avoidance and minimization of, and compensation for, potential effects to bald eagle	[5]	c	X	X	X					X					
SS-03	Colorado Butterfly Plant	Conduct surveys of Colorado butteryfly plant for 2 years prior to construction, implement conservation measures if needed	Avoidance of and compensation for potential effects to Colorado butterfly plant	[5]	c	X		X					X					

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SS-04	Ute Ladies'-Tresses Orchid	Conduct surveys for Ute ladies'-tresses orchid for 2 years prior to construction, implement conservation measures if needed	Avoidance of and compensation for potential effects to Ute ladies'-tresses orchid	[5]	c	X		X					X					
SS-05	Platte River Target Species	Offset depletions through membership in SPWRAP	Compensation for effects to Platte River target species	$1,550,000	b			X					X					
SS-06	Black-Footed Ferret	Reevaluate and resurvey prairie dog colonies potentially impacted during construction	Avoidance and minimization of, and compensation for, potential impacts to black-footed ferret	[5]	c	X	X	X					X					
SS-07	Black-Tailed Prairie Dog	Relocate black-tailed prairie dogs prior to construction, follow CDOT guidelines	Avoidance and minimization of potential impacts to black-tailed prairie dog	[5]	c	X	X						X					
SS-08	Swift Fox	Survey for swift fox den sites, coordinate conservation measures with CPW	Avoidance and minimization of, and compensation for, potential impacts to swift fox	[5]	c	X	X	X					X					
SS-09	Burrowing Owl	Resurvey prairie dog colonies for proposed disturbances, coordinate with CPW for any burrowing owls found	Avoidance and minimization of, and compensation for, potential impacts to burrowing owl	[5]	c	X	X	X					X					
SS-10	Other Riparian Species	Implement proposed mitigation for wetlands and riparian habitat to benefit these species.	Compensation for potential impacts to common gartersnake, northern leopard frog, smokey-eyed brown butterfly, two-spotted skipper, American currant	[5]	c			X				X	X				X	
SS-11	Bell's Twinpod	Conduct surveys in potential habitat prior to construction, reestablish populations where impacts are unavoidable	Avoidance and minimization of, and compensation for, potential impacts to Bell's twinpod	[5]	c	X	X	X					X					
SS-12	Townsend's Big-Eared Bat	Protect entrance to exisiting cave	Avoidance of potential impacts to Townsend's Big-Eared Bat	[5]	c	X							X					

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						Avoidance	Minimization	Compensation		Aquatic Life	Recreation	Riparian Veg/Wetlands	Special Status Species	Stream Morphology	Terrestrial Wildlife	Water Quality	Wetlands	Other
Terrestrial and Avian Wildlife																		
TW-01	U.S. 287 - Big Game Underpass and Fencing	Construct one big-game underpass, and identify other crossings that could potential be designed to accommodate wildlife movement	Compensation for potential impacts to big game migration in the area inundated by Glade Reservoir and affected by U.S. 287 realignment; enhanced opportunities for big-game migration across U.S. 287 corridor, enhanced habitat protection west of Glade Reservoir	$500,000	b			X	X						X			
TW-02	U.S. 287 - Big Game Movement Adaptive Management Plan	Monitor road kills for 10 years and implement adaptive management actions as needed		$280,000	a			X	X						X			
TW-03	Migrating Birds and Raptors - Surveys and No Work Zones	Survey and mark active nests to establish no-work zones during breading seasons in accordance with MBTA	Avoidance and minimization of, and compensation for, potential effects on migrating birds, raptors, amphibians, reptiles and other wildlife	[5]	c	X	X	X							X			
TW-04	Migrating Birds and Raptors - Vegetation Clearing	Conduct vegetation clearing during nonbreeding season, when possible in accordance with MBTA		[5]	c	X	X	X							X			
TW-05	Migrating Birds and Raptors - Buffer Zones	Follow CPW recommended buffer zones and seasonal restrictions within certain distances of nest sites for raptors in accordance with MBTA. Follow MBTA regulations and permits for incidental or unavoidable takes		[5]	c	X	X	X							X			

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TW-06	Wildlife Habitat - Glade Reservoir Conservation Mitigation	Conserve approximately 1,080 acres of land owned or required for purchase surrounding Glade Reservoir as wildlife habitat using a conservation easement or other legal instrument; see TW-07 for additional commitments	Compensation for loss of winter range big-game habitat at Glade Reservoir	$2,920,000	b			X			X				X			
TW-07	Wildlife Habitat - Glade Reservoir Conservation Enhancement	Acquire and conserve approximately 300 acres of additional land surrounding Glade Reservoir as wildlife habitat using a conservation easement or other legal instrument; engage in conserving additional land west of Glade for big-game habitat, allow use of Glade conserved land for GOCO match, and consent to GOCO requirements	Enhancement of regional big-game habitat at Glade Reservoir	$810,000	a				X		X				X			
Water Quality																		
WQ-01	Glade Reservoir - Multi-Level Outlet Tower	Construct multi-level outlet tower at Glade Reservoir to convey Poudre River releases	Avoidance and minimization of potential increases in temperature, DO, copper, manganese, nutrients and selenium, and other conservative constituents especially during times of reduced flows; enhancement of temperature and DO (through introduction of cooler water) in Poudre River	$1,000,000	b	X	X		X	X						X		
WQ-02	Glade Reservoir - Release Structure Aeration	Construct Glade Reservoir release structures with baffling to provide aeration		$200,000	b	X				X						X		

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						Avoidance	Minimization	Compensation		Aquatic Life	Recreation	Riparian Veg/Wetlands	Special Status Species	Stream Morphology	Terrestrial Wildlife	Water Quality	Wetlands	Other
WQ-03	Eaton Draw Water Quality Wetlands	Construct approximately 10 acres of wetlands in Eaton Draw to reduce ambient water quality concentrations in Lower Poudre River	Compensation for potential increased WQ concentrations in Poudre River near Greeley , increased sedimentation in lower Poudre, direct impacts to 0.3 acres of wetlands at Galeton Reservoir; enhancement of WQ concentrations in Poudre River near Greeley	$1,340,000	b			X	X							X	X	
WQ-04	Streamflow and Water Quality Monitoring	Establish/enhance streamflow and water quality monitoring network	Compensation for general water quality effects, monitoring required to implement provisions of this mitigation plan	$2,310,000	b			X		X	X			X		X		X
WQ-05	Coalition for the Poudre River Watershed	Provide funding and participate in Coalition for the Poudre River Watershed	Enhancement of general water quality, aquatics, vegetation, noxious weeds, recreation, riparian resources	$750,000	b				X	X	X	X				X		X
WQ-06	Stream Temperature Mitigation	Reduce or curtail NISP diversions if and as necessary to prevent new or exacerbated temperature standard exceedances	Avoidance and minimzation of potential increases in stream temperature, DO	[5]	c	X	X			X						X		
WQ-07	Mercury Bioaccumulation Mitigation	Support monitoring and management by CPW, provide Fish Consumption Advisory Signage as needed	Mitigation for potential bioaccumulation of mercury in fish tissue in Glade Reservoir and Glade Reservoir forebay	$220,000	a	X	X	X		X						X		
				Total	$53,240,000													

Notes:

[1] Green shaded rows indicate that the measure is entirely an enhancement mesaure. Green shading in Enhancement column only indicates the mitigation measure has an enhancment component.

Table A1. Mitigation and Enhancement Plan Summary Table - By Mitigation Action Item

Measure No.	Mitigation and/or Enhancement Measure [1]	Mitigation and/or Enhancement Commitment [2]	Resource Considerations (see Table A.2 for complete list of mitigated effects; see text for description of enhanced resources)	Capitalized Cost [3]	Cost Note [4]	Mitigation			Enhancement [1]	Resources Involved								
						Avoidance	Minimization	Compensation		Aquatic Life	Recreation	Riparian Veg/Wetlands	Special Status Species	Stream Morphology	Terrestrial Wildlife	Water Quality	Wetlands	Other

[2] The description of mitigation commitments is at a summary level - see text for details of the commitment. The text shall take precedent over any discrepancies between this table and the text.

[3] Capitalized cost is the sum of the capital cost plus any annual operations and maintenance costs capitalized over the life of the commitment, or 50 years for those commitments that are perpetual.

[4] Cost notes: a = cost is a firm not-to-exceed monetary commitment in this amount, see text for details.
b = approximate implementation or construction cost of this commitment
c = implementation cost has not been quantified.

[5] Implementation cost has not been quantified.

[6] AC-09 and FW-06 were not carried forward to final mitigation plans - see text for explanation.

[7] Because Preble's Meadow Jumping Mouse habitat mitigation is covered under federal statute with specific jurisdictional requirements, these mitigation activities are not further covered under this State FWMEP.

Table A2. Mitigation and Enhancement Plan Summary Table - By SDEIS Resource Effect [1]

Row	Resource	Summary of Effects Alternative 2 (Proposed Action Glade and SPWCP – Reclamation Action Option) [2]	Mitigation Measure No.
Surface Water			
1	*Surface Water*	**Poudre River** - Average diversion of **35,100** AFY at Poudre Valley Canal (Poudre Valley Canal) to Glade Reservoir. - Flows in 1.48 mile river reach between Poudre Valley Canal and Hansen Supply Canal would be greater (average 8,200 AFY) than No Reclamation Action Option. - Due to exchanges with CB-T, average reduction of 7,700 AFY in releases to Poudre River at Hansen Supply Canal. - Flows in Poudre River downstream of Hansen Supply Canal essentially same for Reclamation Action and No Reclamation Action Options due to releases from Glade Reservoir for Reclamation Action Option. - Diversions would primarily reduce peak flows during May and June in years with average to above average flows. - Reduced flows between Poudre Valley Canal and Larimer-Weld and New Cache headgates due to direct flow and storage exchanges during April-October (irrigation season). - Flow augmentation program would release water from Glade Reservoir to maintain flow of 10 cfs at downstream side of Larimer-Weld Canal headgate from November 1 through April 30 and September 1 through September 30. **South Platte River** - Average diversion of **28,400** AFY just downstream of confluence of Poudre and South Platte Rivers. - Diversions would be limited to a maximum of 200 cfs and could occur in all months when water rights are in priority. - Change in flow would be less than 10% of average monthly flows at Kersey Gage. **Horsetooth Reservoir** Variations in water levels would be similar to existing conditions. **Carter Lake** Variations in water levels would be similar to existing conditions.	FW-01; FW-02; FW-03; FW-04; FW-05; FW-08
Surface Water Quality			
Poudre and South Platte River Constituents			
2	*Nutrients*	Ammonia and total phosphorus increases may be measurable below WWTPs due to reduced river flows, may exceed standard at some locations in Segment 12 of Poudre River and 1b on South Platte River (standards are exceeded under Current Conditions for these nutrients).	WQ-03; WQ-04
3	*Metals*	Increases and decreases in metal concentrations due to flow changes may not be measurable. Medium chance of copper and dissolved manganese standard exceedance in Segment 10 of Poudre River. Medium chance of exceeding total phosphorus standard and a high potential for continued exceedance of selenium standard in Segment 11 of Poudre River. Iron, ammonia, total phosphorus, and selenium concentrations currently exceed standards in Segment 12 of Poudre River and likely to remain above standards. Iron, total phosphorus, and sulfate concentrations remain above standard in Segment 1b of South Platte River. Ammonia and dissolved manganese have a medium chance of exceeding standard in Segment 1b of South Platte River.	FW-03; WQ-01; WQ-04; WQ-07

Table A2. Mitigation and Enhancement Plan Summary Table - By SDEIS Resource Effect [1]

Row	Resource	Summary of Effects Alternative 2 (Proposed Action Glade and SPWCP – Reclamation Action Option) [2]	Mitigation Measure No.
4	*Temperature*	Adverse effects on stream temperature possible in sensitive reaches of Segment 10 and Segment 11 including key months of July and August. Flow augmentation program would provide net benefit in parts of Segments 10 and 11 (from 0.37 miles upstream of Larimer County Canal to Timnath Inlet headgate) in key months of March and September.	AG-01; AG-02; FW-04; WQ-01; WQ-02; WQ-04; WQ-06
5	*Dissolved Oxygen*	Diversions at Poudre Valley Canal could exacerbate occasionally observed DO issues in July and August in Segment 11. Flow augmentation would likely provide DO benefit November through April and in September. Aeration of releases from Glade Reservoir should also help maintain DO concentrations within standards.	WQ-02; WQ-04
Larimer-Weld and New Cache Canal			
6	*Crop Yield*	Elevated salinity and selenium concentrations in Galeton Reservoir releases to canals would result in decrease in crop yields where water used for irrigation.	SE-01; SE-02
Channel Morphology and Sediment Transport			
7	*Change in flow regime*	Mean flow reduced **20-30%** mid-April to mid-July. Duration of flows at or above 1,000 cfs reduced **30-35%**. 2% flow reduced 10-30%. 10-year flood peak reduced up to **21%**. *Laporte Reach:* 1, 2, and 5% exceedance flows reduced **11-26%**. Lower flows (10 and 25% flows) reduced **16-28%**. *Fort Collins Reach:* Winter low flows increased up to 35% from flow augmentation. 1, 2, and 5% flows reduced **13-47%**. Lower flows (10 and 25% flows) reduced **12-41%**. 2-year flood reduced **19-36%** in Fort Collins and upper Timnath reaches. 25-year flood reduced up to **10%** in Fort Collins. *Timnath, Windsor, Greeley Upstream, Greeley Channelized, and Greeley Reaches:* Impact greatest on 5% exceedance flows, reduced **25-42%**. Impact on floods up to 25-year flood reasonably uniform, with 2, 10, and 25-year flood peaks all reduced **16-21%**.	AG-01; AG-02; FW-08

Table A2. Mitigation and Enhancement Plan Summary Table - By SDEIS Resource Effect [1]

Row	Resource	Summary of Effects Alternative 2 (Proposed Action Glade and SPWCP – Reclamation Action Option) [2]	Mitigation Measure No.
8	*Fining of surficial material*	At 55% of cross sections duration of flows that flush river bed fines reduced **5-50%**. For remaining 45% of cross sections no flushing or no change in duration of flushing flows. *Laporte Reach:* 15 flushing events under Current Conditions lasting 132 days total reduced to **10** flushing events lasting **94** days total (26-year period of record) *Fort Collins Reach:* 23 flushing events under Current Conditions lasting 325 days total reduced to **16** flushing events lasting **222** days total (26-year period of record) *Timnath, Windsor, Greeley Upstream, Greeley Channelized, and Greeley Reaches:* 18 flushing events under Current Conditions lasting 292 days total for Windsor reach reduced to **19** flushing events lasting **218** days total (26-year period of record)	AG-01; AG-02; AG-04; FW-08
9	*Loss of morphologic complexity*	Duration of bed material movement reduced on average **21%** and up to **40%** in some locations. Temporal variability of habitats reduced throughout. Spatial variability reduced downstream of I-25. *Laporte Reach:* Channel has barely responded to historical changes in flow regime over last two centuries. Any change predicted to be similarly constrained by lack of sediment supply. *Fort Collins Reach:* Effective discharge of 2,000 cfs remains unchanged from Current Conditions hydrology. Channel capacity similar unless quantity or size distribution of available sediment changes. Current channel still undergoing slow adjustment in response to historical changes in flow regime. Any change would be incremental to that existing response. *Timnath, Windsor, Greeley Upstream, Greeley Channelized, and Greeley Reaches:* Complexity of in-channel morphologic features already low in reaches downstream of I-25 from sand deposition smothering bed and reducing magnitude and frequency of pool and riffle sequences. Further channel contraction would exacerbate this condition.	AG-01; AG-02; FW-08

Table A2. Mitigation and Enhancement Plan Summary Table - By SDEIS Resource Effect [1]

Row	Resource	Summary of Effects Alternative 2 (Proposed Action Glade and SPWCP – Reclamation Action Option) [2]	Mitigation Measure No.
10	*Channel contraction*	Sediment transport potential reduced throughout river. Capability of river to move bed material reduced **12-31%** (upstream of I-25) and **8-18%** (downstream of I-25). Propensity toward channel contraction throughout system but mainly downstream of I-25 where material of relevant size fraction available for deposition and bio-geomorphic feedback loops would prevail. Likely acceleration of channel contraction would lead to increased frequency of flooding downstream of 1-25. *Laporte Reach:* Channel capacity similar to Current Conditions unless quantity or size distribution of available sediment changes. *Fort Collins Reach:* Channel capacity similar under Current Conditions unless quantity or size distribution of available sediment changes. *Timnath Reach:* Channel contraction would occur as extension of processes already underway by deposition on bars, islands, riffles, and channel margins.	AG-01; RV-02; FW-08
11	*South Platte River*	Minor effects to river morphology and sediment transport. Channel-forming flows (1.5-year peak flows of 3,858 cfs) would be reduced from ~ 3% to less than 1% of the time. Scouring flows equivalent to 25-year peak flows would continue to occur.	N/A
Ground Water			
12	*Ground Water*	Minimal effects to ground water from reduced river flows and associated changes in river stage. Greatest changes would be within 50 feet of Poudre River. Minimal seepage from reservoir to alluvium could increase water availability to vegetation. No impacts on ground water quality.	
Geology			
13	*Geology*	Disturbance from construction activities and excavation of sand, gravel, and bedrock for Glade Dam and Galeton Dam embankments, foundation, and rip rap. Excavation and removal of Paleozoic and Mesozoic sedimentary rocks associated with the U.S. 287 realignment. excavation of sand, gravel, and bedrock for Glade Dam and Galeton Dam embankments, foundation, and rip rap. Excavation and removal of Paleozoic and Mesozoic sedimentary rocks associated with the U.S. 287 realignment.	GC-04; RC-07
Prime Farmland if Irrigated (acres lost)			
14	*Prime Farmland if Irrigated (acres lost)*	686	RC-07
Vegetation			
15	*Permanent impacts on all vegetation (acres)*	3,895	N/A

Table A2. Mitigation and Enhancement Plan Summary Table - By SDEIS Resource Effect [1]

Row	Resource	Summary of Effects Alternative 2 (Proposed Action Glade and SPWCP – Reclamation Action Option) [2]	Mitigation Measure No.
16	*Permanent impacts on native plant communities (acres)*	2,857	N/A
17	*Irrigated agricultural lands dry up (acres)*	0	N/A
Noxious Weeds			
18	*Noxious Weeds*	Increased distribution and cover by noxious weeds due to construction disturbance. Periods of prolonged low water levels at Glade and Galeton Reservoirs would allow for noxious weeds to colonize the drawdown area to construction disturbance. Periods of prolonged low water levels at Glade and Galeton Reservoirs would allow for noxious weeds to colonize the drawdown area.	NW-01
Wetlands and Other Waters			
19	*Wetlands (permanent direct effects) (acres)*	44	WL-01; WL-02; WQ-03
20	*Wetlands (temporary direct effects) (acres)*	8	GC-01
21	*Wetlands from Irrigation Dry-up (permanent indirect effects) (acres)*	0	N/A
22	*Wetlands from Poudre Valley Canal lining (permanent indirect effects) (acres)*	0	N/A
23	*Wetlands from Poudre River flow changes (indirect effects) (acres)*	9	RV-01; RV-02
24	*Waters (permanent direct effects) (acres)*	12	GC-01
25	*Waters (temporary direct effects) (acres)*	3	GC-01
Riparian Resources			
26	*Riparian shrubland and woodland (permanent direct effects) (acres)*	112 (inundation and construction)	AG-01; RV-01
27	*Riparian shrubland and woodland(temporary direct effects) (acres)*	8	AG-01; RV-01; GC-01

Table A2. Mitigation and Enhancement Plan Summary Table - By SDEIS Resource Effect [1]

Row	Resource	Summary of Effects Alternative 2 (Proposed Action Glade and SPWCP – Reclamation Action Option) [2]	Mitigation Measure No.
Wildlife			
Mule Deer			
28	Overall Range (acres)	Permanent – 3,995	TW-01; TW-02; TW-06
29		Temporary – 782	
30	Winter Range (acres)	Permanent – 3,789	
31		Temporary – 647	
32	Winter Range Permanent Local Effect (%)	**16**	
33	Severe Winter Range (acres)	Permanent – 228	
34		Temporary – 173	
35	Winter Concentration Area (acres)	Permanent – 70	
36		Temporary – 152	
White-Tailed Deer			
37	Overall Range (acres)	Permanent – 2,057	RC-05
38		Temporary – 582	
39	Winter Range (acres)	Permanent – 416	
40		Temporary – 192	
41	Winter Range Permanent Local Effect (%)	**8**	
42	Concentration Area (acres)	Permanent – 421	
43		Temporary – 203	
Pronghorn			
44	Overall Range (acres)	Permanent – 2,256	RC-05
45		Temporary – 335	
46	Winter Range (acres)	Permanent – 2,256	
47		Temporary – 295	
48	Winter Range Permanent Local Effect (%)	**25**	
49	Severe Winter Range (acres)	Permanent – 2,254	
50		Temporary – 256	
51	Winter Concentration Area (acres)	Permanent – 1,928	
52		Temporary – 204	
53	Winter Concentration Area Permanent Local Effect (%)	**31**	

Table A2. Mitigation and Enhancement Plan Summary Table - By SDEIS Resource Effect [1]

Row	Resource	Summary of Effects Alternative 2 (Proposed Action Glade and SPWCP – Reclamation Action Option) [2]	Mitigation Measure No.
Elk			
54	Overall Range (acres)	Permanent – 2,043	TW-01; TW-02; TW-06
55		Temporary – 386	
56	Overall Range Permanent Local Effect (%)	18	
57			
58	Winter Range (acres)	Permanent – 186	
59		Temporary – 101	
60	Severe Winter Range (acres)	Permanent – 2	
61		Temporary – 8	
62	Winter Concentration Area (acres)	Permanent – 124	
63		Temporary – 75	
64	Winter Concentration Area Permanent Local Effect (%)	**13**	
Migratory birds and raptors, amphibians and reptiles, and other wildlife			
65	*Migratory birds and raptors, amphibians and reptiles, and other wildlife (acres)*	Loss of **44** acres of wetlands, **12** acres of aquatic habitat, **537** acres of shrublands, **29** acres of riparian woodlands, and **2,929** acres of grassland habitat. Mortality and nest destruction could occur during construction. Temporary impacts include disturbance of vegetation and increased noise and human presence. Reductions in streamflows on Poudre and South Platte Rivers not anticipated to cause loss of riparian and/or wetland habitat. **9** acres of wetland habitat along banks could experience change in species composition.	TW-03; TW-04; TW-05
Aquatic Biological Resources			
Poudre River Fish, Macroinvertebrates, Periphyton, and Plants			
66	Segment A	Fish: Minor adverse impact to adult trout due to reduced runoff flows, negligible impacts to other species/life stages Macroinvertebrates: Minor adverse impact with changes in species composition due to reduced peak flows Periphyton and Plants: Minor adverse impact with increases in filamentous green algae due to reduced peak flows	AG-01; AG-02; AG-04; FW-02; FW-03; FW-04; FW-08; FW-09

Table A2. Mitigation and Enhancement Plan Summary Table - By SDEIS Resource Effect [1]

Row	Resource	Summary of Effects Alternative 2 (Proposed Action Glade and SPWCP – Reclamation Action Option)[2]	Mitigation Measure No.
67	Segment B	Fish: Minor to moderate beneficial impact to most species of fish with augmented low flows Macroinvertebrates: Beneficial impact to abundance, minor adverse impact with changes in species composition due to reduced peak flows Periphyton and Plants: Minor adverse impact with increases in filamentous green algae due to reduced peak flows	AG-01; FW-03; FW-04; FW-05; RV-01; RV-02; FW-08; FW-09
68	Segment C	Fish: Negligible impact to most species, moderate adverse impact to trout with reduced runoff flows and higher temperatures Macroinvertebrates: Minor adverse impact with changes in species composition due to reduced peak flows Periphyton and Plants: Minor adverse impact with increases in filamentous green algae due to reduced peak flows	AG-01; FW-02; FW-03; FW-08; FW-09
69	Segment D	Fish: Minor adverse impact for some species with reductions in runoff flows, negligible impact for others Macroinvertebrates: Minor adverse impact with changes in species composition due to reduced peak flows Periphyton and Plants: Minor adverse impact with increases in filamentous green algae due to reduced peak flows	AG-01; FW-03; RV-01; RV-02; FW-08; FW-09
70	Segment E	Fish: Minor adverse impact for most species with reduced runoff flows Macroinvertebrates: Minor adverse impact with changes in species composition due to reduced peak flows Periphyton and Plants: Minor adverse impact with increases in filamentous green algae due to reduced peak flows	AG-01; FW-03; FW-08; FW-09
71	Segment F	Fish: Minor adverse impact for most species with reduced runoff flows Macroinvertebrates: Minor adverse impact with changes in species composition due to reduced peak flows Periphyton and Plants: Minor adverse impact with increases in filamentous green algae due to reduced peak flows	AG-01; FW-03; FW-08; FW-09
South Platte River Fish, Macroinvertebrates, Periphyton, and Plants			
72		Negligible	AG-07

Table A2. Mitigation and Enhancement Plan Summary Table - By SDEIS Resource Effect [1]

Row	Resource	Summary of Effects Alternative 2 (Proposed Action Glade and SPWCP – Reclamation Action Option)[2]	Mitigation Measure No.
Special Status Species			
73	*Preble's meadow jumping mouse*	Permanent loss of **53** acres of known Preble's habitat. Temporary disturbance to **24** acres of Preble's habitat. Potential disturbance of Preble's behavior due to increased noise and human presence and physical harm to individual Preble's from construction machinery and future recreational activities at Glade. Changes in flows in Poudre River unlikely to affect Preble's habitat.	SS-01
74	*Bald eagle*	Permanent impacts of **21** acres and temporary impacts of **13** acres of winter concentration area. **Less than 1** acre of nest buffer permanently affected and **8** acres temporarily affected. Pipeline construction impacts could result in nest abandonment or decreased nesting success if conducted during sensitive breeding and nesting periods. Glade Reservoir could provide additional summer foraging habitat, especially if stocked with fish. Galeton Reservoir could provide additional summer foraging habitat.	SS-02
75	*Colorado butterfly plant (CBP)*	**No effect.** No known populations occur in study area and is unlikely to occur in study area. Changes in flows in Poudre River unlikely to affect CBP.	SS-03
76	*Ute ladies'-tresses orchid (ULTO)*	**No effect.** None found during surveys of study area. No known populations occur in study areas and is unlikely to occur in SPWCP pipeline study area. Glade to Horsetooth pipeline route less than 1 mile from currently known populations of ULTO. Prior to construction, ULTO habitat assessments and/or final surveys would be conducted for potentially impacted suitable habitat not previously evaluated. Changes in flows in Poudre River unlikely to affect ULTO.	SS-04
77	*Black-tailed prairie dog and burrowing owl*	Permanent impacts on **367** acres of prairie dog habitat, mostly from construction of Galeton Reservoir.	SS-07; SS-09
78	*Swift fox*	Permanent impacts on **1,928** acres of overall swift fox range (**0.3 to 1.0** home ranges/pair).	SS-08
79	*Common gartersnake and northern leopard frog*	Permanent loss of **44** acres of wetland habitat, **11** acres of aquatic habitat, and **28** acres of riparian woodland habitat (gartersnake only). Temporary impacts on **8** acres of wetland habitat, **3** acres of aquatic habitat, and **8** acres of riparian woodland (gartersnake only).	SS-10
80	*Smokey-eyed brown butterfly, two-spotted skipper, and American currant*	No effect.	SS-10
81	*Bell's twinpod*	Permanent loss of **29** acres and temporary impacts on **45** acres from western realignment of U.S. 287.	SS-11
82	*Brassy minnow and common shiner*	No effect	N/A
83	*Iowa darter*	Negligible except Segment B, which would be moderate beneficial	FW-03; FW-04

Table A2. Mitigation and Enhancement Plan Summary Table - By SDEIS Resource Effect [1]

Row	Resource	Summary of Effects Alternative 2 (Proposed Action Glade and SPWCP – Reclamation Action Option) [2]	Mitigation Measure No.
Recreation Resources			
84	*Boating (kayaking and canoeing)*	If Glade is managed for recreation, new flat water boating opportunities would exist, a major beneficial effect. No public access planned at Galeton Reservoir. Poudre River Segment A: Negligible effects. Poudre River Segment B: Moderate to major effects with 3 to 7 fewer boating days per month (total of 19 fewer days over May-August period) based on target flows of 150 cfs or greater. Poudre River Segments C, D, E, and F: No effects.	FW-02; FW-03; FW-04; RC-06; FW-08
85	*Fishing*	If Glade is managed for recreation, would provide a new fishery, a major beneficial effect. No public access planned at Galeton Reservoir. Poudre River Segment A: Reductions in habitat for brown and rainbow trout would be a minor adverse effect on fishing. Poudre River Segment B: Augmented winter flows would result in minor beneficial effects on recreational fishing. Poudre River Segments C, D, E, and F: Negligible effects.	AG-02; FW-02; FW-03; FW-04; RC-06; FW-08
86	*Hunting*	Loss of **340** acres of Poudre River State Trust Land, which is managed for hunting and fishing by CPW. Construction of Glade Reservoir may improve habitat, therefore improving hunting opportunities. Loss of **21** acres of Mitani-Tokuyasu SWA. Mule deer and white-tailed deer winter range may be affected at SPWCP forebay, thus affecting nearby big game hunting. Pronghorn winter and severe winter range and mule deer winter range affected at Galeton Reservoir and may have an effect on nearby big game hunting. Construction of Galeton Reservoir may improve waterfowl habitat in area, which may improve nearby hunting opportunities.	RC-02; RC-04; RC-05
87	*Other Recreational Activities*	Construction of Glade to Horsetooth pipeline would temporarily disrupt dispersed recreational uses along its alignment. Reductions in flows on Poudre River not expected to affect aesthetic qualities of riparian habitat of Poudre River, Poudre River Trail, or natural areas. Construction of Galeton Reservoir may improve habitat in area, which may improve nearby wildlife viewing or photography opportunities. Construction of SPWCP pipelines is not expected to affect recreation resources.	N/A

Table A2. Mitigation and Enhancement Plan Summary Table - By SDEIS Resource Effect [1]

Row	Resource	Summary of Effects Alternative 2 (Proposed Action Glade and SPWCP – Reclamation Action Option) [2]	Mitigation Measure No.
Cultural Resources			
88	*Cultural Resources*	**2** known cultural resources and an estimated **35** NRHP eligible sites affected by construction of Glade Dam and Reservoir and associated facilities or would be inundated by reservoir. **7** known cultural resources and **7** unrecorded cultural resources would be affected by western realignment of U.S. 287. Of the known cultural sites, 3 of these are eligible sites, 1 is not eligible, and 3 have not been assessed. **15** known cultural resources occur within areas that would be disturbed by construction of Galeton Dam and Reservoir and associated facilities or would be inundated by reservoir. Of these 15 sites, 13 have not had an official determination and may be eligible for listing in NRHP and two are not eligible.	CR-01; CR-02; CR-03
Paleontological Resources			
89	*Paleontological Resources - U.S. 287*	Adverse impacts on subsurface fossils in areas underlain by Class 5 geologic units (Morrison Formation). Adverse impacts on potentially substantial vertebrate, invertebrate, plant, and trace fossils possible in Class 3 geologic units (Niobrara Formation, Benton Group, Dakota Group, Undivided Jelm, and Sundance Formations). Adverse impacts on potentially substantial vertebrate, invertebrate, plant, and trace fossils unlikely but possible in Class 2 geologic units (Lykins Formation). Adverse impacts consist of destruction of fossils by breakage and crushing during construction-related ground disturbance.	CR-04; CR-05
Aesthetics and Visual Resources			
90	*Aesthetics and Visual Resources*	Change in landscape from terrestrial to open water for Glade and Galeton Reservoirs. Reservoir dams would change current visual character of sites. One-third of Mitani-Tokuyasu SWA would be replaced by Galeton forebay resulting in substantial reduction in scenic quality. Realignment of U.S. 287 would create contrast in scenic quality elements where it cuts through hogback formation.	VS-01
Traffic and Transportation			
91	*Traffic Volumes*	Existing traffic patterns not expected to change so reduced traffic volumes along SH 14 between Overland Trail and Ted's Place. If recreation provided at Glade Reservoir minor seasonal fluctuations in vehicle volumes can be anticipated. reduced traffic volumes along SH 14 between Overland Trail and Ted's Place. If recreation provided at Glade Reservoir minor seasonal fluctuations in vehicle volumes can be anticipated.	GC-03
92	*Existing Roadways*	7-mile portion of U.S. 287 relocated. New alignment 2.3 miles shorter. Location of Galeton Reservoir would not infringe on or disturb any existing roadways. 2.3 miles shorter. Location of Galeton Reservoir would not infringe on or disturb any existing roadways.	GC-05

Table A2. Mitigation and Enhancement Plan Summary Table - By SDEIS Resource Effect [1]

Row	Resource	Summary of Effects Alternative 2 (Proposed Action Glade and SPWCP – Reclamation Action Option) [2]	Mitigation Measure No.
93	*Current Travel Patterns*	New U.S. 287 alignment would be about 2.3 miles shorter. Access to Bonner Spring Ranch Road may be affected by realignment and new access would be provided. Pipeline construction would potentially temporarily disrupt some transportation, depending upon alignment.	GC-01; GC-03
94	*Site Access*	Construction of Galeton Reservoir would require extension an existing roadway or construction of a private drive for purposes of accessing and maintaining facility.	GC-01
Land Use			
95	*Agriculture*	Portion of Munroe Canal inundated by Glade Reservoir. Canal would be realigned with Poudre Valley Canal or routed under Glade Reservoir.	GC-01
96	*Grazing*	Grazing permittee would lose use of District lands at Glade Reservoir. 26 acres of BLM land used for grazing inundated by Glade Reservoir. About 36 acres of grazing lease affected on State Land Board lands at Galeton Reservoir site.	GC-01
97	*Access*	CSU and Poudre School District access road into State Trust Land inundated. Existing access to Bonner Springs Ranch residential area from south altered by U.S. 287 realignment. Construction of SPWCP forebay would inundate a portion of access road and parking area of Mitani- Tokuyasu SWA.	RC-02; GC-03; RC-04
98	*Utilities*	Two towers on Platte River Power Authority 230-kV transmission line relocated. Realignment of four H- frame structures and 0.6 miles of a 69-kV electric transmission line owned by Poudre Valley REA. Proposed Cheyenne-Totem gas pipeline is shown to partially parallel SPWCP pipelines and cross proposed Galeton Reservoir forebay. Thirty-one producing oil and gas wells are within Galeton Reservoir footprint. District would relocate any well that would interfere with reservoir operations. District anticipates all wells would be abandoned by operator before Galeton Reservoir was built.	GC-01; HZ-02
99	*Natural Areas*	Reservoir Ridge Natural Area temporarily affected during construction of Glade to Horsetooth pipeline.	GC-01
100	*Urban/Residential*	2 residences inundated during construction of Glade Reservoir and 1 residence located within 500 feet of the reservoir. Construction of Glade to Horsetooth pipeline and other pipelines could potentially temporarily affect some urban and residential uses, depending upon final alignments.	LU-01; GC-01

Table A2. Mitigation and Enhancement Plan Summary Table - By SDEIS Resource Effect [1]

Row	Resource	Summary of Effects Alternative 2 (Proposed Action Glade and SPWCP – Reclamation Action Option)[2]	Mitigation Measure No.
101	*Industry*	No impact to industry.	N/A
Socioeconomic Resources			
Study area			
102	Water Rates/Affordability	Minor impact on rates and affordability for some Participants.	RC-07
103	Population growth	No effect.	N/A
Poudre River Communities			
104	Recreation Resources	Major impact on boating recreational value in Fort Collins. Moderate impact on recreational value of Poudre River Trail in Fort Collins. No effect on fishing recreation values.	FW-02; FW-03; FW-04
105	Property Values	No effect in Fort Collins. Potential minor effects downstream of I-25 due to changes in flood risks.	AG-01
106	Water/Wastewater Treatment Costs	No effect.	N/A
107	Other Socioeconomic Effects	Likely no additional effect on Fort Collins economy/economic development. Potential major impact on nonuse values associated with Poudre River for Fort Collins residents.	FW-03; FW-04
Broader Study Area			
108	Regional Recreation Resources	Major benefit from recreation at Glade Reservoir.	N/A
109	Irrigated Agriculture-Related Economy	No effect under average conditions. Minor effect under potential worst-case conditions due to increased salinity associated with the SPWCP ditch exchange.	SE-02
110	Road Relocation Effects	Moderate to major impact on gasoline station and campground at Ted's Place. No net effect on value of residential properties.	RC-06
111	Construction Effects	Construction stimulus paid for by regional residents over future years. No net effect.	N/A
112	Agricultural-related economy	Estimated annual impact on agricultural-related economic output in the study area of approximately $34 million and an estimated reduction in agriculture- related employment of about 291 jobs associated with growth onto agricultural lands and their conversion to municipal uses.	N/A
Hazardous Sites			
113	*Hazardous Sites*	Proposed Glade Reservoir forebay located near Atlas "E" Missile Site 13 and known TCE plume associated with missile site. Currently no detectable TCE within footprint of proposed forebay. Soil containing TCE not expected within proposed footprint of forebay. As contaminant mass continues to naturally attenuate TCE plume will continue to decrease in size.	HZ-01

Table A2. Mitigation and Enhancement Plan Summary Table - By SDEIS Resource Effect [1]

Row	Resource	Summary of Effects Alternative 2 (Proposed Action Glade and SPWCP – Reclamation Action Option) [2]	Mitigation Measure No.
Noise			
114	*Noise*	Increased noise associated with reservoir and pipeline construction and realignment of U.S. 287 would occur in localized areas temporarily.	GC-01
Air Quality			
115	*Air Quality*	Same as Alternative 1.	AQ-01; GC-01
Energy Use/Greenhouse Gases			
116	*Energy Use/Greenhouse Gases*	Electrical energy used to pump water up to reservoirs and for conveyance of water and for SPWCP exchange; includes additional pumping of water to Carter Lake. Projected annual electricity requirements at full utilization = 48,135,987 KwH Projected annual carbon dioxide emissions at full utilization (English tons) = 37,259	EG-01
Construction Duration			
117	*Construction Duration*	6 years.	GC-01; GC-02; GC-03; GC-04
Other CPW Effects [3]			
118	*Townsend's big-eared bat*	The inundation by Glade Reservoir of approximately seven miles of U.S. Highway 287, includes the 'loss' by flooding of the State Land Board parcel (T9N, R70W, S36) which contains a known roost site for the Townsend's big-eared bat (Corynorhinus townsendii), a State Species of Special Concern. CPW suggests that further ground surveys for additional roost sites should be conducted across the area to be inundated, and compensatory mitigation for loss of these sites should be considered if the project is approved.	SS-12

Notes:

1 Source of table is SDEIS Table 4-109 for Alternative 2 (Northern Water's Preferred Alternative)

2 Dark gray shading indicates those effects from SDEIS 4-109 that are not covered under this Fish and Wildlife Mitigation and Enhancement Plan. See Conceptual Mitigation Plan (SDEIS Appendix F) for mitigation information on these items.

3 Effects were not included in the SDEIS, but were comments and/or proposed mitigation measures by CDNR.

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NISP Mitigation Plan Summary Map

Streamflow Comittments - Reaches
- Avoid NISP related diversions (FW-01)
- Low Flow diversion curtailments (FW-03)
- Conveyance Refinement (FW-04)

Streamflow Commitments - Points
- Non-Consumptive Water Rights (FW-02)
- Ramp Hansen Supply Canal Outlet (FW-07)

Other Aquatic and Wetland Commitments - Reaches
- Stream Channel and Habitat Improvement Plan, Adaptive Management (AG-01, AG-03)
- Stream Channel Improvements (AG-02)
- Riparian Improvements (RV-01, RV-02)

Other Aquatic and Wetland Commitments - Points
- Poudre Valley Canal Diversion Reconstruction (AG-04)
- Multi-Objective Diversion Structure Retrofits (AG-05)
- Recreational Fishery (AG-06)
- Fish Screens (AG-07)
- Native Fish Rearing (AG-08)
- Glade Outlet Tower (WQ-01)
- Glade Release Structure (WQ-02)
- Wetlands-Eaton Draw (WQ-03)

Other Non-Aquatic Commitments - Points
- Air Quality Mitigation (AQ-01)
- Cultural Resources Mitigation (CR-01, CR-02, CR-03)
- Paleontological Resource Mitigation (CR-04, CR-05)
- Small HydroPower (EG-01)
- General Construction (GC-01, GC-02)
- General Construction (GC-03, GC-04, GC-05)
- TCE Plume Avoidance (HZ-01)
- Oil & Gas Well Abandonment (HZ-02)
- Residence Relocation (LU-01)
- Noxious Weed Plan (NW-01)
- Recreation/Public Acess (RC-01, RC-02, RC-03, RC-04, RC-05, RC-06, RC-07)
- CropYield Monitoring/Compensation (SE-01, SE-02)
- Preble's Habitat (SS-01)
- Other On-Site Sensitive Species (SS-02,SS-03,SS-04,SS-05,SS-06, SS-07,SS-08,SS-09,SS-10,SS-11)
- Big Game Migration Protection (TW-01, TW-02)
- Bird, Amphibian, Reptile Protection (TW-03, TW-04, TW-05)
- Big Game Habitat Preservation (TW-06, TW-07)
- Native Plant Revegetion Screening (VS-01)

* Mitigation Item Number in parenthesis corresponds to Mitigation Item Number in Mitigation Plan

Construction Related
U.S. 287 Realignment

Construction Related
Glade Reservoir Complex

Construction Related
SPWCP

Glade Reservoir (Proposed)

Galeton Reservoir (Proposed)

US 287 Realignment

Seaman Reservoir

Poudre Park

Watson Lake

Horsetooth Reservoir

Fort Collins

Poudre Valley Canal

Larimer County

Weld County

Larimer & Weld Canal

Pierce

Ault

Timnath

Severance

Eaton

New Cache Canal

Windsor

Lucerne

Gill

Masonville

Loveland

Greeley

Cache la Poudre River

South Platte River

Big Thompson River

Kersey

25 1 14 85 257 287 392 34

NISP Northern Water
Northern Integrated Supply Project

N

0 2.5 5 10 Miles

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Handouts from NISPWAE

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NISP

Northern Water and the NISP participants are also exploring various options to keep supplies in the ditch systems and available for these exchanges, to help ensure a **WaterSecure** future for Northern Colorado.

To avoid water permanently leaving farms in the New Cache and Larimer & Weld systems, **Northern Water and the NISP participants are exploring purchases of land and water from willing sellers** in the two systems, as well as looking at various other avenues to keep water on the farms. This will help ensure those supplies remain available for the NISP exchanges.

Rather than "buy-and-dry," this is an **outside-the-box, "buy-and-*supply*" approach** to address tightening supplies.

Farms in the New Cache and Larimer & Weld systems purchased by Northern Water and the NISP participants will remain in production through:

- **Limited land-use easements on the property**
- **Lease-back agreements**
- **Other arrangements that will require continued irrigation on those farms**

Furthermore, the purchase of any irrigated lands will be done with the goal to eventually **return the operations to private ownership**.

We are also exploring agreements in which New Cache and Larimer & Weld shareholders could be compensated for giving Northern Water and the NISP participants first priority in buying their land and water assets if they are planning to sell them in the future.

Water quality questions addressed

Water quality and agronomy experts have examined the water quality issues, and with proper water blending, no impacts on crop yields would occur in nearly all anticipated operating conditions, and only minor impacts on specific crops in some instances. NISP participants would certainly factor any such impacts on crops into mitigation and compensation packages, and Northern Water will also continue monitoring water quality long into the future to address any potential issues.

We encourage anyone who wants to learn more to go to **www.gladereservoir.org**, or contact **Greg Dewey** at Northern Water at **970-622-2300** or **gdewey@northernwater.org**.

NISP: Striving to develop a **WaterSecure** future for Northern Colorado's communities and farms

Northern Water
Northern Integrated Supply Project

Collaborating in a shift away from the 'buy-and-dry' approach that has stressed our agriculture communities

As part of a long-term strategy that's consistent with the goals and principles established in the Colorado Water Plan, Northern Water and the NISP participants are working to implement various measures – including a collaborative effort with the New Cache and Larimer & Weld ditch systems – that will provide supplemental water to approximately 500,000 residents in Northern Colorado while also helping preserve tens of thousands of irrigated farm acres.

Without these innovative approaches, the region is on pace to see hundreds of thousands of irrigated acres dried up by mid-century.

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NISP at a glance

Once constructed, the **Northern Integrated Supply Project** will consist of:

- **Glade Reservoir** northwest of Fort Collins, which will divert water from the Poudre River
- **Galeton Reservoir** east of Ault, which will store water piped from the South Platte River
- Pipelines, pump plants and other infrastructure needed for operations

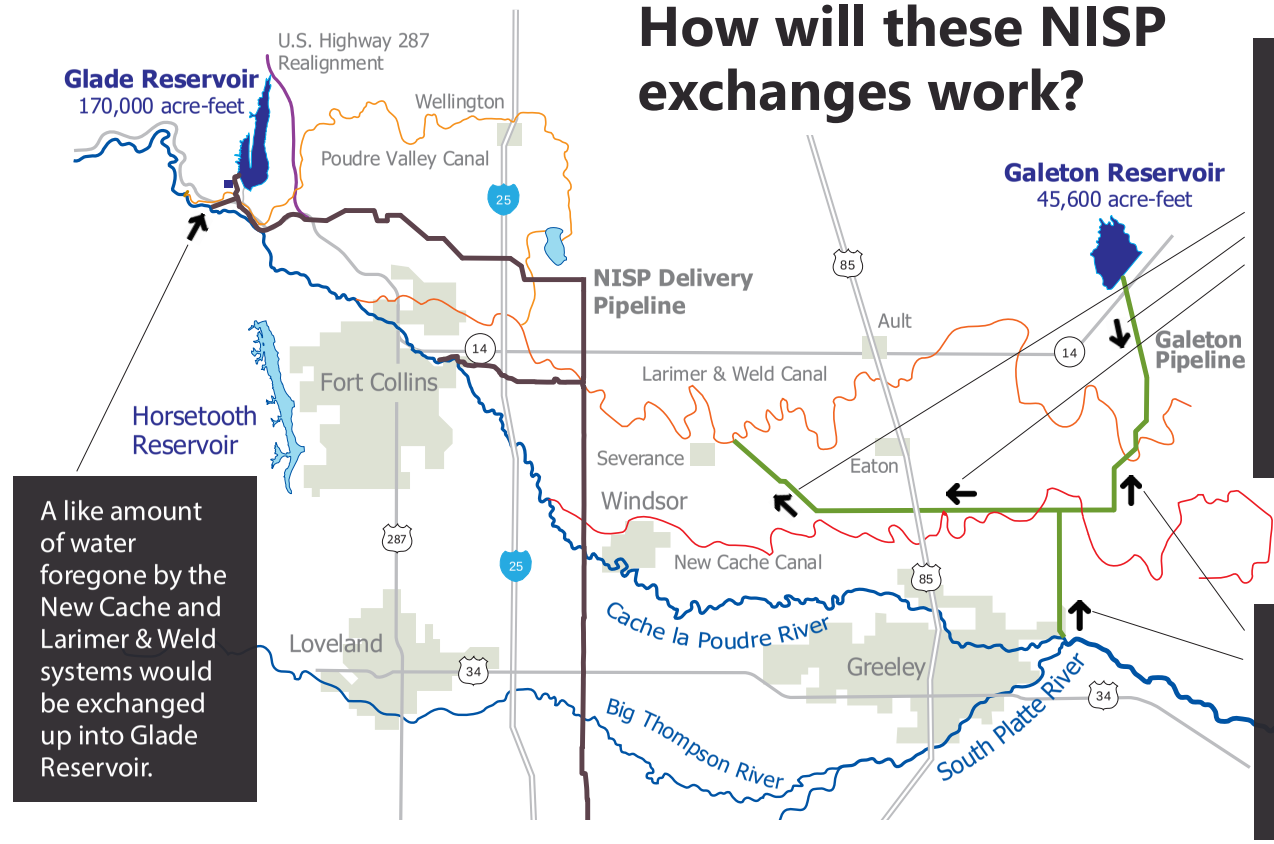
40,000 acre-feet
of additional water will be made available annually for
15 rapidly growing communities and water districts
across northern Colorado

A key component of NISP will be **water substitutions and exchanges,** in which Northern Water and the NISP participants will work with the New Cache and Larimer & Weld ditch systems. NISP will provide new water supplies to the ditch systems in order to allow Glade Reservoir to store water, by exchange, for the communities in need of those supplies.

In return, the NISP participants will provide **compensation for the two participating ditch systems, including:**

- **Monetary payments**
- **Additional water supplies from Galeton Reservoir**
- **Ditch-system improvements**

How will these NISP exchanges work?



A like amount of water foregone by the New Cache and Larimer & Weld systems would be exchanged up into Glade Reservoir.

In addition to filling Galeton Reservoir, a new pipeline system will also deliver Galeton water to the New Cache and Larimer & Weld canals, to compensate the farms in those systems.

Water will be diverted via pipeline from the South Platte River to fill Galeton Reservoir.

The NISP exchanges: A **win-win** for the farms

The NISP water exchanges are designed to be a win-win for the farms in the two ditch systems, in that:

- **Shareholders maintain control of their water, and water will continue flowing to the farms**
- Compensation from the NISP participants will **enhance the long-term viability of those ag operations**
- The ditch systems will receive additional **water later in the growing season**
- These exchanges **will not reduce the value of their water shares**
- These exchanges have been adjudicated and approved by the water court, and **will not subject the two systems' water rights to a change case**

About 25,000 acre-feet would be exchanged annually between the ditch companies and NISP participants.

This is NOT an alternative transfer method, or ATM, as they're often called. **Farms participating in the NISP exchanges will receive water each and every year**.

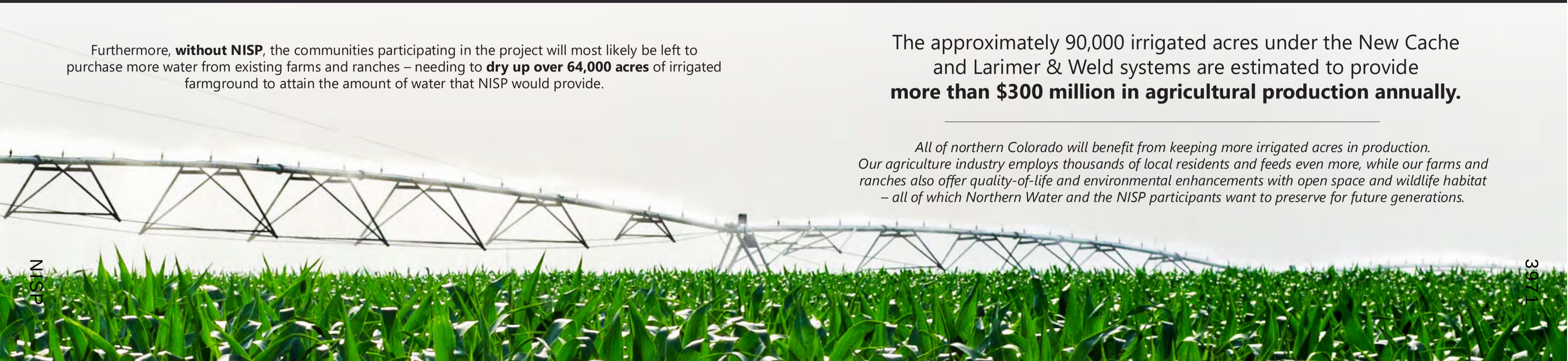
With this arrangement, the New Cache and Larimer & Weld shareholders **could receive more water for irrigation than they currently receive**.

NISP is expected to receive its Record of Decision from the Army Corps of Engineers in 2020, and following final design and construction, **the exchanges could be operational by about 2027**.

Furthermore, **without NISP**, the communities participating in the project will most likely be left to purchase more water from existing farms and ranches – needing to **dry up over 64,000 acres** of irrigated farmground to attain the amount of water that NISP would provide.

The approximately 90,000 irrigated acres under the New Cache and Larimer & Weld systems are estimated to provide **more than $300 million in agricultural production annually.**

All of northern Colorado will benefit from keeping more irrigated acres in production. Our agriculture industry employs thousands of local residents and feeds even more, while our farms and ranches also offer quality-of-life and environmental enhancements with open space and wildlife habitat – all of which Northern Water and the NISP participants want to preserve for future generations.



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NISP's **401 Water Quality Certification**

As part of NISP's approval process, the State of Colorado granted a 401 Water Quality Certification to the project in January 2020. The state concluded that no significant water quality degradation is expected because of NISP, and **"the commitments for mitigation and water quality improvement measures are sufficient to result in positive net effects."**

Northern Water
Northern Integrated Supply Project

The 401 Water Quality Certification was issued following the State's year-long review of an extensive NISP application, which considered public comments.

The certification outlines 30 conditions in which Northern Water and the NISP participants will implement a wide array of measures and processes to ensure, for years to come, that the project's operations won't negatively affect the Poudre River's health, and that any potential impacts can be mitigated.

The commitments outlined in the NISP 401 Certification include long-term **MONITORING, REPORTING and MODELING**, to help maintain and even enhance the health of the Poudre River.

We'll collaborate with local and regional partners to implement **MITIGATION and ADAPTIVE MANAGEMENT** measures that will further enhance the Poudre River – an ecologically vibrant stream – for local residents and wildlife.

The NISP participants are committed to contributing millions of dollars in **FUNDING** to implement these efforts, as well as others, so the Poudre River can continue serving as a reliable and safe water supply for years to come.

Learn more at gladerereservoir.org

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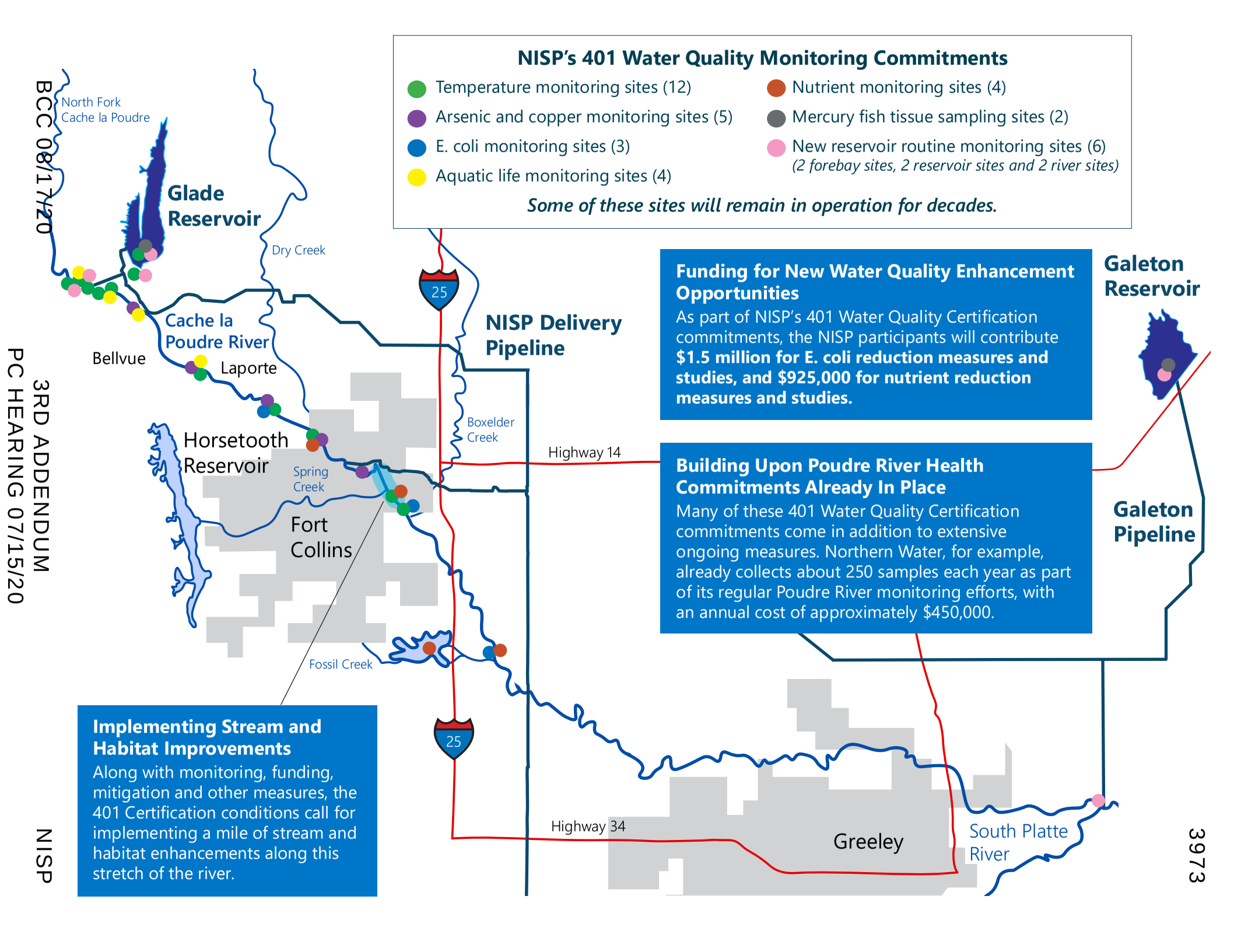

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NISP's Adaptive Management Program

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As part of measures outlined in NISP's 401 Water Quality Certification and its Fish and Wildlife Mitigation and Enhancement Plan, an Adaptive Management program will be implemented, in which Northern Water will collaborate on river health initiatives with Colorado Parks and Wildlife, the Colorado Water Quality Control Division, and other partners.

An unprecedented opportunity for collaboration focused on the health of the Poudre River

Learn more at gladereservoir.org

The Northern Integrated Supply Project is a water-storage endeavor that will help rapidly growing Front Range communities meet their future water needs, while also implementing protections for the environment and wildlife, creating new recreation opportunities, and helping preserve our local farms. Additionally, through this Adaptive Management program, NISP will also implement an array of components that will help further develop an ecologically vibrant and resilient Poudre River corridor, by utilizing existing and new partnerships in a holistic approach to the river's health.

Improved Water Quality • Enhanced Poudre River Recreation • Better Aquatic Health
Increased Flood Resilience • Improved Wildlife Habitat

NISP

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The Adaptive Management program's various monitoring, funding, mitigation and enhancement measures will be **implemented across a 42-mile stretch of the Poudre River**, from its mouth at the canyon to its confluence with the South Platte River.

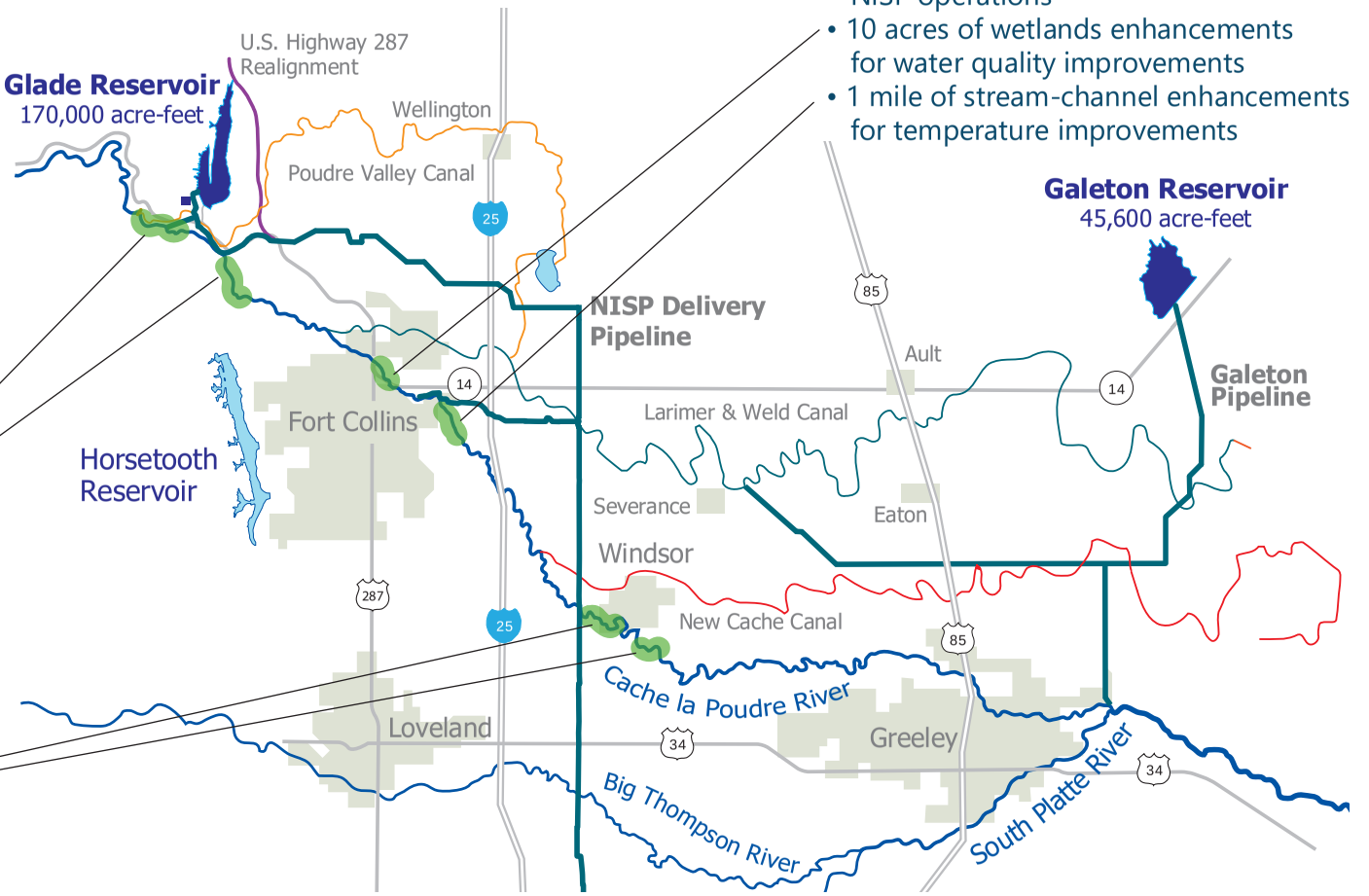
Fish Ladders • Cottonwood Regeneration • Creation of Wetlands to Improve Water Quality
Stormwater System Upgrades • Channel Reconfiguration for Habitat Enhancements
Sediment Management • Development of a Temperature Refuge

Key Adaptive Management Commitments from NISP's Fish and Wildlife Mitigation and Enhancement Plan

- $1 million for River Master Plan development
- $5.9 million in total costs to implement various Adaptive Management measures
- Monitoring of potential impacts from Adaptive Management measures and NISP operations
- 2.4 miles of stream-channel improvement projects (two 1.2-mile stretches), where flood plain-channel connectivity restoration will take place, as well as 54 total acres of riparian vegetation improvements in the surrounding area, including cottonwood regeneration
- 48 total acres across two sites of riparian vegetation improvements

Key Adaptive Management Commitments from NISP's 401 Water Quality Certification

- $1.5 million for E.Coli reduction measures and studies
- $925,000 for nutrient reduction measures and studies
- Monitoring of potential impacts from Adaptive Management measures and NISP operations
- 10 acres of wetlands enhancements for water quality improvements
- 1 mile of stream-channel enhancements for temperature improvements



The measures identified in the Adaptive Management program only account for a portion of the NISP components that will benefit the region's watershed and ecosystem. Through all of its various programs, NISP is all together committing nearly $60 million toward mitigation and enhancement for the local environment and wildlife.

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Two reservoirs that will help Northern Colorado meet its future water needs

NISP will supply 15 water providers with **40,000 acre-feet of new, reliable water supplies**. Northern Water is pursuing permitting, design and construction of this estimated **$1.2 billion project** on behalf of the participants, who will be providing water to nearly half a million residents by 2050.

The project's main components include:
- Two new reservoirs (Glade Reservoir northwest of Fort Collins, and Galeton Reservoir northeast of Greeley)
- Pipelines to deliver water to the participants and for water exchanges with two irrigation companies
- Five pump plants

Growing communities taking diverse steps to meet future demands

Central Weld County Water District • Dacono • Eaton • Erie
Evans • Firestone • Fort Collins-Loveland Water District • Fort Lupton
Fort Morgan • Frederick • Lafayette • Left Hand Water District
Morgan County Quality Water District • Severance • Windsor

These 11 fast-growing communities and four water districts **currently serve water to about 250,000 residents, with that expected to double by 2050.** In addition to NISP, they are embracing conservation efforts, reuse and other opportunities to meet their future water demands, **having already collectively reduced their per capita water consumption by nearly 30 percent** since 2000.

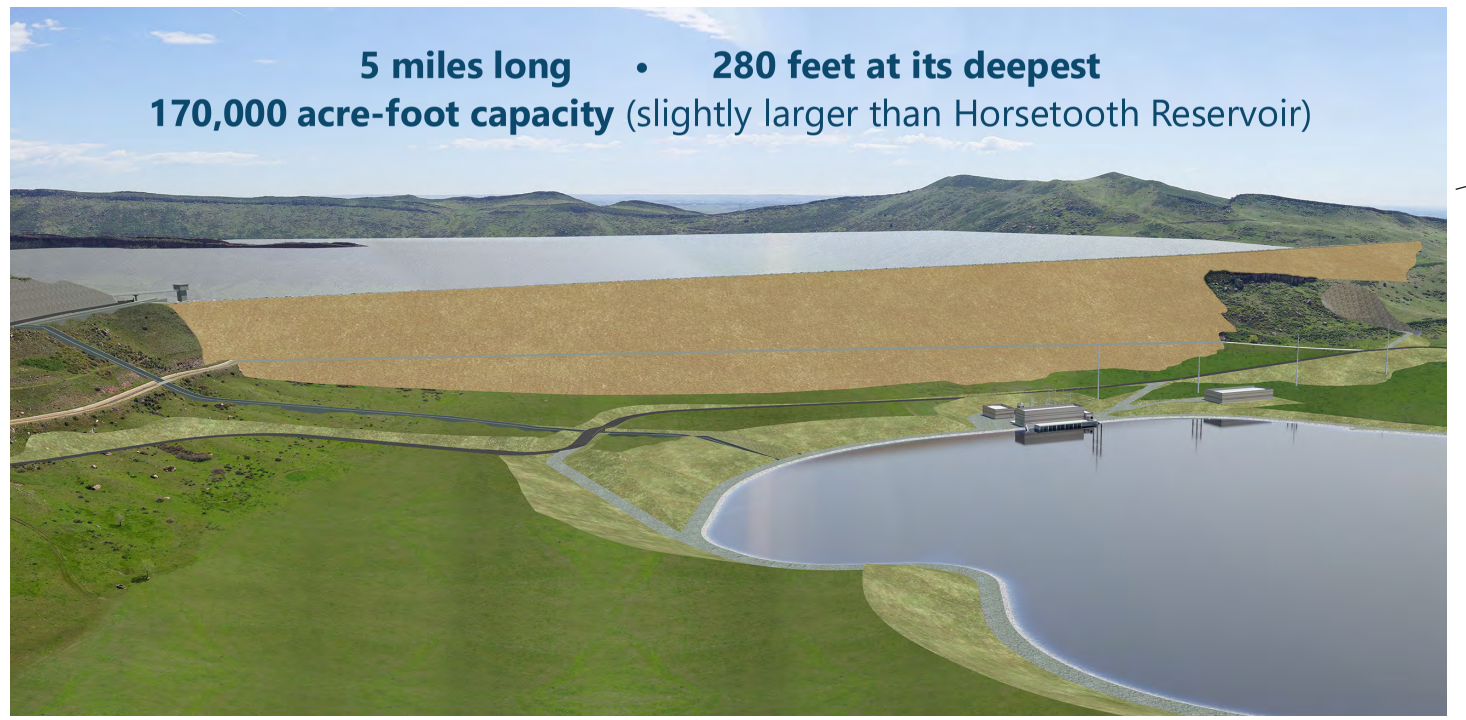
A project that aligns with the goals of the Colorado Water Plan

The Colorado Water Plan reinforced the necessity of additional water storage to help meet the state's future water gap. The gap is the difference between the estimated future water demands and existing supplies by the year 2060.

The Colorado Water Plan identifies the need for 400,000 acre-feet of additional storage statewide. NISP can play a role in meeting a portion of the impending water gap in Colorado.

The plan also identifies water conservation and increased water transfers between the agricultural and municipal sectors as additional solutions to help meet the impending gap.

Glade Reservoir



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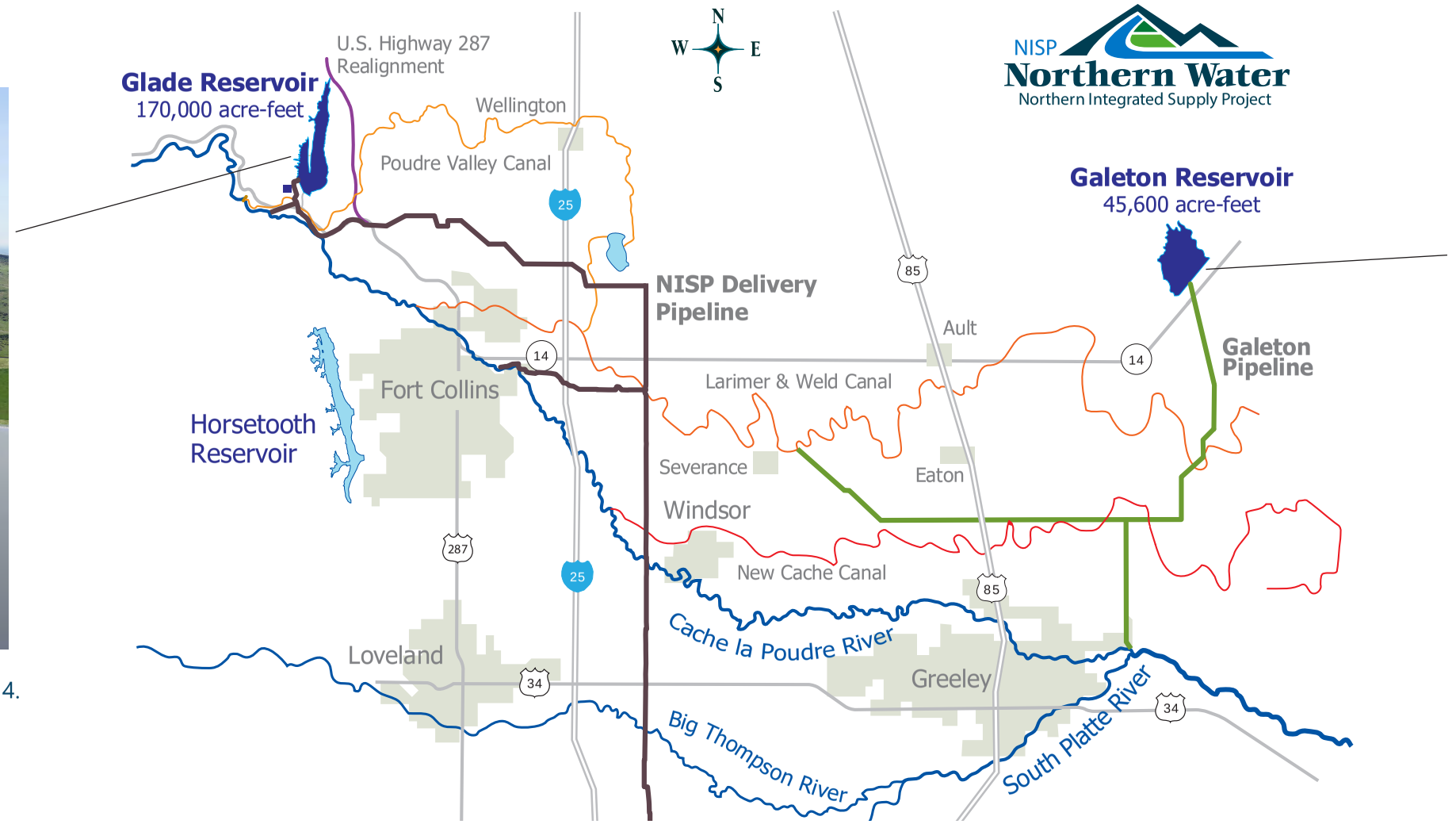
- Glade will be located northwest of Fort Collins near the intersection of U.S. Highway 287 and State Highway 14.
- The reservoir will divert water from the Poudre River during mostly high-flow times.
- The project will use the already existing Poudre Valley Canal near the canyon mouth to divert water from the river to the Glade Reservoir forebay. As part of NISP, the PVC's diversion structure will be upgraded.
- The reservoir site is divided by U.S. Highway 287, and therefore, about seven miles of the highway will be relocated to the east.

Bringing new recreation opportunities to the region

In addition to needed water storage and environmental-protection measures, NISP will bring new recreation opportunities to Northern Colorado, with a recreation concept plan that calls for **motorized and non-motorized boating, fishing, camping, hiking and biking at Glade Reservoir.**

NISP



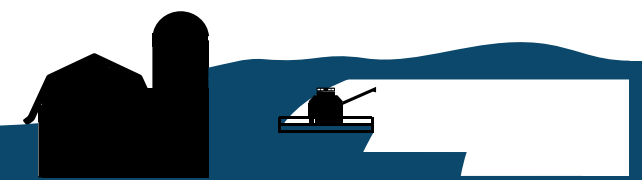
You can learn more about NISP at **www.gladereservoir.org**.

Current status and upcoming timeline

2017 – Approval of Fish and Wildlife Mitigation and Enhancement Plan
2018 – Final Environmental Impact Statement released
2020 – Anticipated 401 Water Quality Certification Permit from the State of Colorado
2020 – Anticipated Record of Decision and 404 Permit from the U.S. Army Corps of Engineers
2019-2022 – Project design to be finalized
2023-2027 – Anticipated construction dates
2028 – First water stored in Glade Reservoir

Galeton Reservoir

- This reservoir will be located east of Ault and northeast of Greeley.
- Water will be diverted from the South Platte River downstream from Greeley at high flow times.
- Galeton Reservoir water will be delivered to the Larimer-Weld and New Cache ditch companies in exchange for a portion of the Poudre River water they currently use. (About half of NISP's planned diversion from the Poudre River includes water that's already been diverted for decades by these two ditch companies.)



A project that will also help protect local farms

In order to fill Glade Reservoir, NISP will strategically utilize water exchanges with the Larimer-Weld and New Cache ditch companies in Weld County, both of which have senior rights on the Poudre River. In return, the NISP participants will provide compensation for the two participating ditch companies, including:
- **Monetary payments**
- **Additional water supplies from Galeton Reservoir**
- **Ditch-system improvements**

Additionally, the ditch-company shareholders will maintain control of their water and water will continue flowing to their farms and ranches, while the compensation from the NISP participants will enhance the long-term viability of those ag operations.

Furthermore, without NISP, the communities participating in the project will most likely be left to purchase more water from existing farms and ranches — needing to dry up more than 64,000 acres of irrigated farmground to attain the amount of water that NISP would provide.

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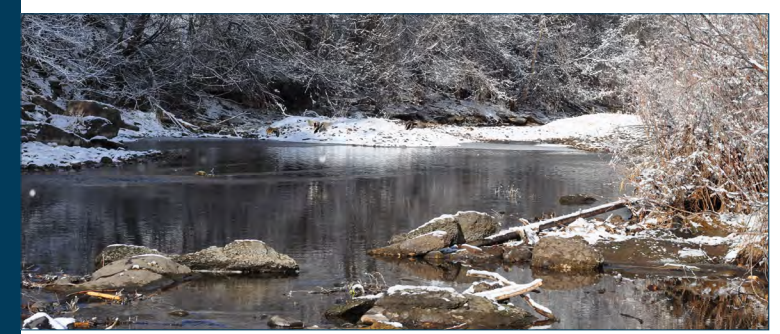
A project that will help maintain the Poudre River's streamflows and protect our environment and wildlife

The NISP Fish and Wildlife Mitigation and Enhancement Plan – approved by the Colorado Parks and Wildlife Commission, Colorado Water Conservation Board and Gov. John Hickenlooper in 2017 – includes an array of components that will benefit our environment and local wildlife. Northern Water has also made additional environmental commitments in its Conceptual Mitigation Plan that are included in the Final Environmental Impact Statement.

Overall, NISP is committing nearly $60 million toward mitigation and enhancement for the local environment and wildlife. These measures include:

Streamflow Commitments

- Water releases from Glade Reservoir of 18 cubic feet per second in the winter and 25 cfs in the summer, which will eliminate existing dry-up points in the river through downtown Fort Collins and improve streamflows year-round.
- Curtailing diversions when Poudre River flows are less than 50 cfs in the summer and less than 25 cfs in the winter.

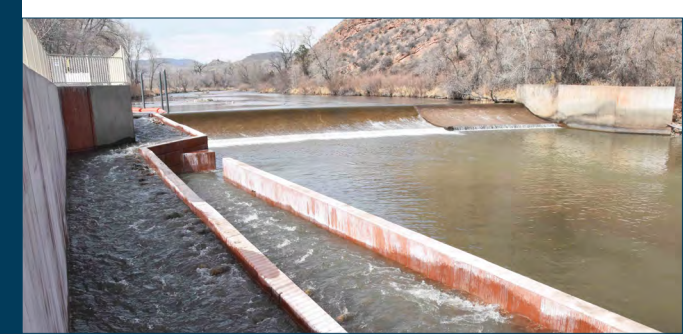


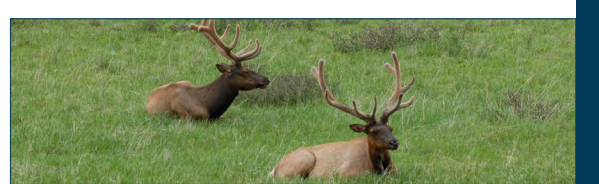
Flushing Flow Commitments

- Commitments in which Glade Reservoir won't divert Poudre River water during peak flows in 2/3 of years, and will bypass diversions for up to three days – equivalent to as much as 6,000 acre-feet in most years.
- The project's streamflow commitments will result in little to no diversions during peak flow conditions in 90 percent of years.

Stream Channel Commitments

- Building bypass/fish passage structures at four diversion dams through Fort Collins and at the Poudre Valley Canal diversion at the canyon mouth.
- Stream channel improvements on two reaches that cover 2.4 miles.
- Commitments of nearly $8 million for channel and riparian vegetation improvements.





Other Commitments

- Wildlife habitat conservation covering about 1,400 acres around Glade Reservoir.
- Wetlands and endangered species mitigation.
- Recreation/fishery benefits at Glade Reservoir.

NISP Endorsements

With NISP bringing so many benefits to the region, the project has earned support from numerous entities and individuals.

PUBLIC OFFICIALS

U.S. Sen. Cory Gardner • U.S. Rep. Ken Buck • State Sen. Randy Baumgardner
State Sen. John Cooke • State Sen. Don Coram • State Sen. Kevin Grantham • State Sen. Cheri Jahn
State Sen. Kevin Lundberg • State Sen. Vicki Marble • State Sen. Kevin Priola • State Sen. Jerry Sonnenberg
State Rep. Jon Becker • State Rep. Perry Buck • State Rep. Steve Humphrey • State Rep. Hugh McKean
State Rep. Bob Rankin • State Rep. Lori Saine • State Rep. Yeulin Willett
Former U.S. Sen. Hank Brown • Don Ament, former state agriculture commissioner

LOCAL PUBLICATIONS

Erie Review • Fort Collins Coloradoan • Fort Morgan Times • Greeley Tribune
Lafayette News • Longmont Times-Call • Lost Creek Guide • Louisville Times
Loveland Reporter-Herald • Windsor Beacon

CHAMBERS OF COMMERCE

Berthoud Area Chamber • Carbon Valley Chamber • Erie Chamber • Evans Area Chamber
Fort Collins Chamber • Fort Lupton Chamber • Fort Morgan Chamber • Greeley Chamber
Lafayette Chamber • Longmont Area Chamber • Mead Area Chamber • Windsor Chamber

BUSINESS ORGANIZATIONS

Accelerate Colorado • Action 22 • Associated General Contractors of Colorado
Colorado Association of Commerce & Industry • Colorado Contractors Association
Fort Collins Board of REALTORS • Front Range District, Colorado Counties, Inc.
Morgan County Economic Development Corporation • Northern Colorado Home Builders Association
Northern Colorado Legislative Alliance • Poudre Valley REA • Progressive 15 • United Power
Upstate Colorado Economic Development • Weld Community Development Group
Weld County Builders Association Inc. • Weld County Council

COUNTY COMMISSIONS

Morgan County Commissioners • Weld County Commissioners

AGRICULTURE ORGANIZATIONS

Colorado Farm Bureau • Rocky Mountain Farmers Union • Colorado Livestock Association
Colorado Corn Growers Association • Colorado Cattlemen's Association
Rocky Mountain Agribusiness Association • Western Sugar Cooperative
Colorado Sugarbeet Growers Association • Boulder-St. Vrain Valley County Farm Bureau
Colorado Association of Wheat Growers • Colorado Egg Producers Association
Colorado Pork Producers Council • Larimer County Farm Bureau • Weld County Farm Bureau

WEST SLOPE ORGANIZATIONS

Colorado River District • Club 20 • Southwestern Water Conservation District • Ute Water Conservancy District

CONSERVATION DISTRICTS

Boulder Valley Conservation District • Longmont Conservation District • West Greeley Conservation District
Big Thompson Conservation District • Fort Collins Conservation District

WATER DISTRICTS

Central Colorado Water Conservancy District • Lower South Platte Water Conservancy District
Northern Colorado Water Conservancy District • St. Vrain & Left Hand Water Conservancy District

Northern Water
Northern Integrated Supply Project

The Northern Integrated Supply Project:

A water-storage project that will help rapidly growing Front Range communities meet their future water needs, while also implementing protections for the environment and wildlife, creating new recreation opportunities, and helping preserve our local farms and ranches.

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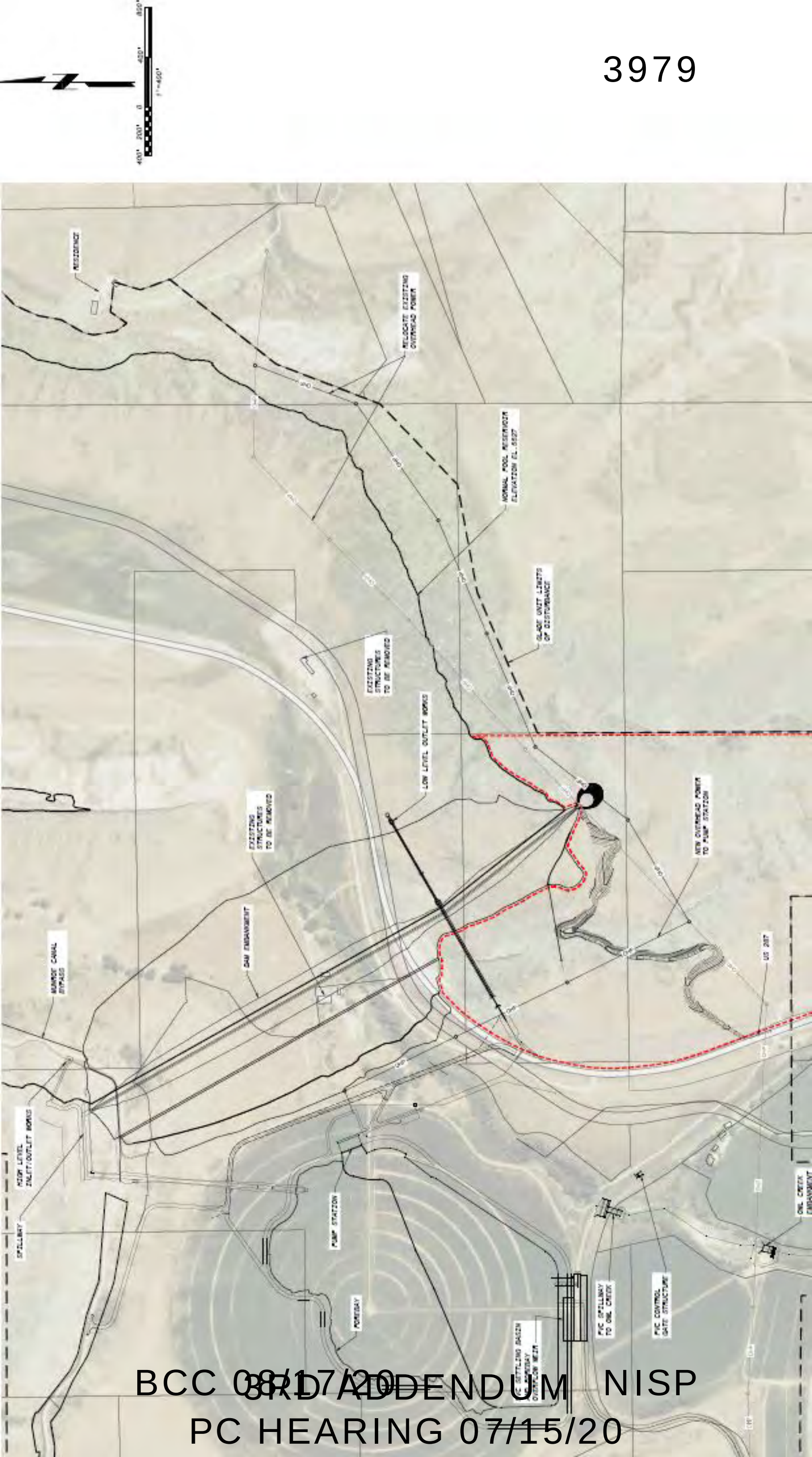
Picture of the Power Line Area


RESIDENCE
RELOCATE EXISTING OVERHEAD POWER
GRADE UNIT LIMITS OF DISTURBANCE
EXISTING STRUCTURES TO BE REMOVED
LOW LEVEL OUTLET WORKS
NEW OVERHEAD POWER TO PUMP STATION
EXISTING STRUCTURES TO BE REMOVED
DAM EMBANKMENT
MUNROE CANAL BYPASS
HIGH LEVEL INLET/OUTLET WORKS
SPILLWAY
PUMP STATION
FOREBAY
US 287
P/C SPILLWAY TO OWL CREEK
P/C CONTROL GATE STRUCTURE