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

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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).

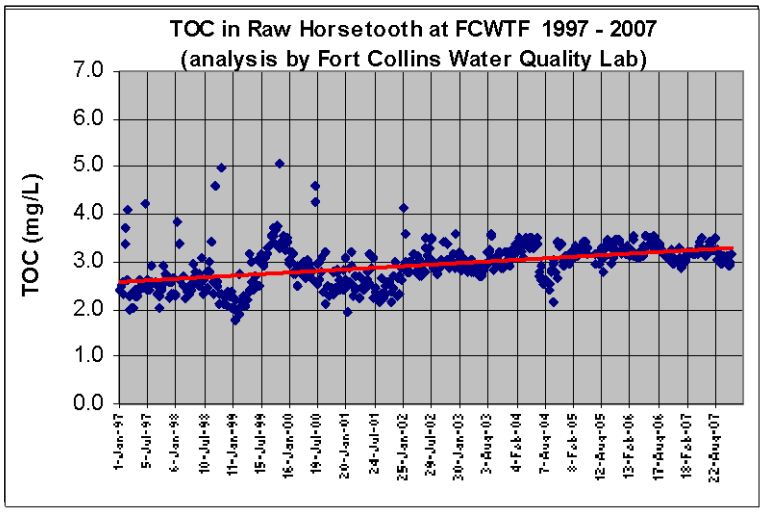
Also, the taste and odor compound, geosmin, has been detected in the North Fork reservoirs (Seaman Reservoir and Halligan Reservoir) at very high concentrations. Geosmin is one of the most difficult taste and odor compounds to remove during water treatment. It is a naturally occurring organic compound 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. 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 <u>can</u> 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."*

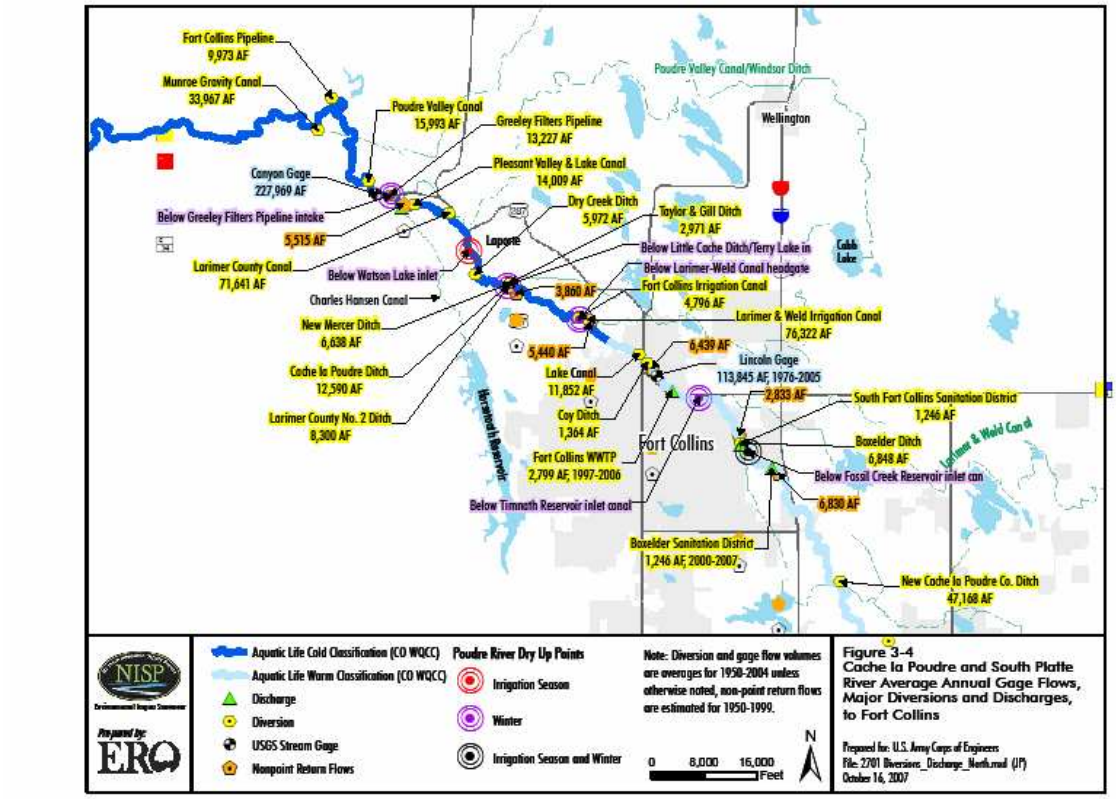
Comment: Bacterial pathogens in river water can cause a variety of intestinal infections including dysentery, hepatitis, typhoid fever, and cholera. Water-borne pathogens are difficult to quickly recover and identify in the laboratory. However, *E. coli* is abundant in human and animal fecal material 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 increased 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.

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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."*

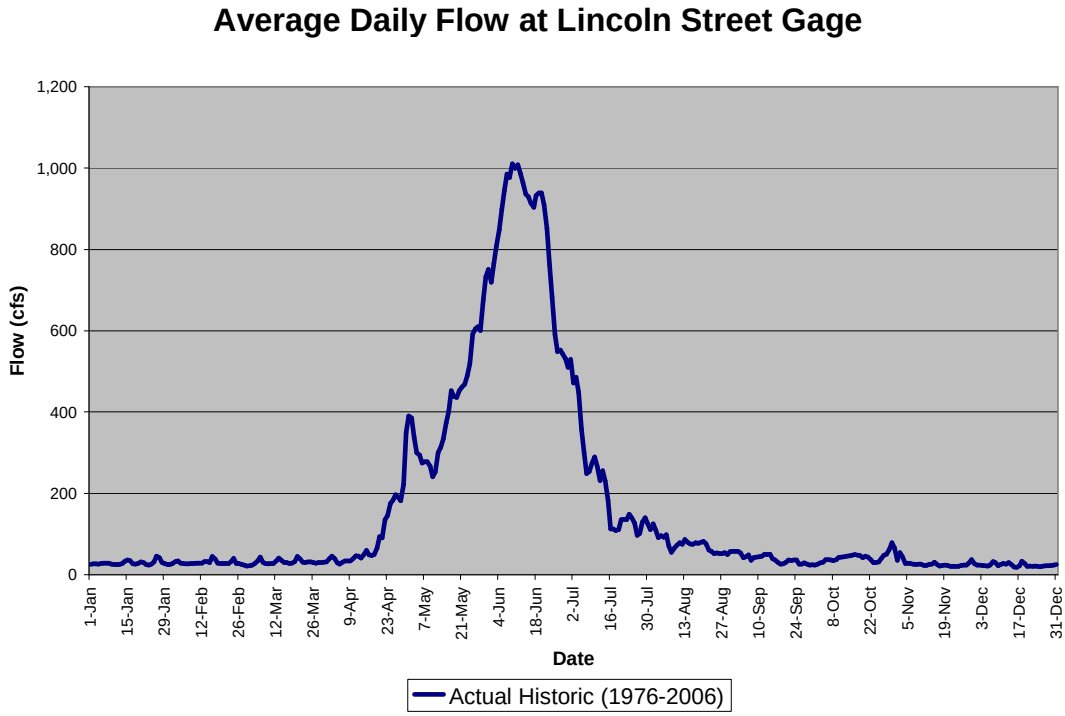
And;

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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[17] 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 streamflows 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.

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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

City of Fort Collins, 2008. Characterizing the Poudre River: Past, Present and Future. A summary of key findings by the Poudre Technical Advisory Group. Technical Report.

City of Fort Collins, Business, Quality of Life (website reference). Available at http://fcgov.com/business/qol.php.

City of Fort Collins, Department of Advance Planning. May 7, 2004. City Comprehensive Plan. Available at http://www.fcgov.com/advanceplanning/city-plan.php.

City of Fort Collins, Department of Advance Planning. 1989. Fort Collins Downtown Plan. Contact the Department of Advance Planning for access to this document at 970-221-6601, aplanning@fcgov.com.

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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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