

# STATE OF COLORADO

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Colorado Department  
of Public Health  
and Environment

September 12, 2008

Chandler Peter  
NEPA EIS/404(b)(1) Coordinator  
U.S. Army Corps of Engineers, Omaha District  
9307 South Wadsworth Blvd.  
Littleton, CO 80128-6901

RE: Northern Integrated Supply Project, Draft Environmental Impact Statement

Dear Mr. Peter,

The Water Quality Control Division (the Division) appreciates the opportunity to provide comments on the Northern Integrated Supply Project (NISP) Draft Environmental Impact Statement (DEIS). Division staff have reviewed the DEIS documentation and associated technical reports and have formulated the attached comments that pertain to water quality and should be addressed in the final EIS.

If you have questions or concerns about our comments on water quality issues related to the NISP DEIS, please contact Christy Pickens at (303) 692-3584.

Sincerely,

Steven H. Gunderson

Director

Water Quality Control Division

Cc: Martha Rudolph, Director of Environmental Programs, WQCD  
Dick Parachini, WQCD  
Dan Beley, WQCD  
Christy Pickens, WQCD

## General Comments

The Water Quality Control Division has reviewed the Draft Environmental Impact Statement (DEIS) for the NISP project. In this review the Division has identified areas where potential water quality impacts have not been adequately addressed and considered. These concerns relate to impacts to public drinking water, the effect that reduced flows will have on water quality and water quality impairments and impacts to ground water and agriculture uses of the water in the vicinity. The Final EIS should address these concerns.

In general, the DEIS does not adequately quantify water quality impacts. Specifically, Table 4-1, Effects Common to all Action Alternatives, lacks descriptions of water quality impacts. Water quality impacts should be included in this table.

Data references often cite data collected in 2002. One year's data is typically not sufficient to determine and model effects, especially when all basins subject to the project were under severe drought conditions. The data is allowable with reservation to allow for comparison to similar years and more normal years.

Section 4.2.1.1 (Page 4-3) This section discusses changes to the Poudre River flows, but fails to connect any water quality concerns that may result from the reduced flows. Specific examples of this concern, including impacts to temperature and stream morphology, are addressed throughout these comments.

Section 4.5.2 (Page 4-33) The DEIS states that lower Total Organic Carbon (TOC) concentrations are likely to occur in the Poudre River due to diverting high flow water from the river when TOC is highest. Additional information explaining how diverting water reduce the TOC concentrations in the river should be included.

Section 4.5.4 (Page 4-34) The DEIS describes the potential to increase selenium levels in the Poudre with diversions, but there is no similar discussion for the South Platte diversions. High selenium concentrations are a significant water quality concern statewide. There seems to be more discussion on impacts to the Cache La Poudre than the South Platte. Selenium, as well as other discussed impacts, should be addressed in both rivers.

Section 4.5.5 (Page 4-35) describes TOC levels in diverted water coming into Horsetooth being lower than TOC levels in Horsetooth. This statement seems contrary because inflow water is diverted at times of highest TOC levels in the Poudre. Additional information is needed.

Page 3-26 Table 3-9: Numeric Standards for the Cache la Poudre River below Shields Street and South Platte River from the Poudre River to the Weld/Morgan County Line.

Arsenic is incorrectly listed and should have a water supply standard entry of 10 µg/l.

Page 3-27 Table 3-10. Numeric standards for Cache la Poudre River from Munroe Canal to Shields Street.

Arsenic is incorrectly listed and should have a water supply standard entry of 10 µg/l.

Page 3-28 Table 3-11. Numeric standards for Horsetooth Reservoir.

Arsenic is incorrectly listed and should have a water supply standard entry of 10 µg/l.



## Source Water/Drinking Water Concerns

The terms “source water” and “drinking water” appear only two (2) times (in the definitions section) in the entire document. Since the document is focused on supplying additional municipal water supplies, the effects on untreated or raw source water for the drinking water providers needs to be addressed.

The two main diversion structures on the Cache La Poudre are above one of Greeley’s diversion points; however the direct correlation between reduced flows and drinking water quality prior to treatment is not addressed.

The DEIS does not address the reduced instream flows in relationship to downstream discharge permits and the potential impacts to effluent limits.

The potential degradation of the upstream water storage facilities (i.e. Glade) is marginally mentioned, yet the DEIS indicates that downstream effects (i.e. Horsetooth) will be minimal or controlled. A more complete analysis of the upstream potential water quality problems needs to be addressed before this conclusion can be drawn.

Section 2.4.1.3 (Page 120) This section talks about the limited sources of water to fill Glade Reservoir, but the DEIS does not go on to discuss that the low initial lake levels may contribute to excess nutrient loading, potential algal blooms, reduced source water quality, and compliance post- treatment with applicable Safe Drinking Water Act requirements.

Section 4.5.2 (Page 320) This section talks about the reduced TOC concentrations at low flows and then correlates higher flows with higher TOC concentrations. The majority of the water diversions will likely occur at high flows, but the document fails to address the impact of the increased TOC’s in the diverted water. This increase in TOC’s will affect drinking water treatment and production of disinfection by-products for all the public water systems using NISP as a source. Public water systems utilizing this supply may need to install expensive new treatment to meet regulatory requirements for DBPs and/or extensively modify their distribution system operations to meet state and federal standards.

## 303(d) Listing Impacts and Observed Parameters

Poudre River segments below the diversions are currently 303(d) listed as not attaining water quality standards for pH, Cu, Se, and *E.coli*. The following four comments are in regards to these listings:

The Poudre River below the confluence with the North Fork of the Poudre is impaired by copper and pH. It would be expected that with reduced flows in the late summer and fall, the impact would be increased. Additional investigation to determine the impacts that reduced flows would have on the existing impairment is needed. Copper is very toxic to aquatic life and sampling results indicate that the acute copper standard has been exceed near the Hansen canal diversion.

The *E. coli* impairment of the Poudre River from below Eaton Draw to the South Platte River confluence would continue to persist with reduced flows in this area. Additional investigation regarding the impact the reduced flow would have on the *E. coli* impairment is needed.

The Poudre River (COSPCP12) below Box Elder Creek to the confluence with the South Platte River is on the 303(d) List as being impaired for selenium. Reduced flows in this segment of the river may cause the problem to be exacerbated. This effect of reduced flow in this portion of the river needs to be investigated to determine the effect on selenium concentrations.

The development of Galetton Reservoir on soils derived from the Cretaceous shale may mobilize selenium and would most likely cause a selenium impairment of the water released from the system.

Executive Summary ES-17. Reduced flows are predicted for the South Platte, in Segments 10 and 11, and spring flows are expected to be reduced by 71% and fall flows by 26%, page 4-5 Poudre River at Ft. Collins WWTP. The NISP Water Quality Technical Report (7.3.1.3) states that the largest percent decrease in low flow month at the LINGGAGE would be during February, -18% or -2.7 cfs. Portions of these segments currently lack flow during certain times of the year. Low flow periods are periods of stress for aquatic organisms. Additional evaluation is needed.

Dissolved oxygen concentrations will decline with rising water temperatures. There are numerous references to the potential that the temperature standard may be exceeded. Additional investigation needs to be made into maintaining the dissolved oxygen levels in the river during the summer months and fish spawning periods.

(Page 4-8) Reduced flow equals reduced channel forming flows, which leads to greater sedimentation, vegetation encroachment, channel constriction and deeper incision (Page 4-31). This change in river morphology needs to be investigated to determine its impact on the existing species in the Aquatic Life Cold 2 segment.

(Page 4-100) Proposed changes to Halligan and Seaman Reservoirs on the North Fork of the Poudre River will impact flows to the lower section of the Poudre. How these projects will impact flows and impact water quality requires additional evaluation.

(Page 4-102) The Moffat Collection System Project, Chatfield Reallocation, City of Denver Reuse Project, City of Aurora Prairie Waters Project, and Augmentation of Lower South Platte River Wells Project will affect flows in the South Platte. Whether or not these projects will increase or decrease the flows cumulatively along with NISP in the South Platte and the expected impact to water quality requires additional evaluation.

Section 5.8.3 (Page 5-16) Temperature and Dissolved Oxygen. The DEIS states that discharges from Glade Reservoir will be to a coldwater fishery and no modification of the temperature will be required and that the water will be fully aerated by the energy dissipation structures. This implies that the temperature of Glade reservoir releases will not affect the temperature of the Poudre River. It needs to be demonstrated that dissolved oxygen concentrations and the aeration of the releases from Glade Reservoir are at or above stream standards at the point of discharge.

A multiple level release system may also be of assistance in the maintenance of dissolved oxygen in the reservoir to prevent impairment. It is mentioned in Section 5.8.2 Manganese and Nutrients (the previous paragraph in the DEIS) that a multiple outlet withdrawal structure may be required to manage manganese and nutrient concentrations.



## Temperature Concerns

A discussion of the current temperature regimes should be included in the analysis. Decreased flows in the Cache La Poudre and the South Platte will adversely impact temperature regimes in these drainages. The DEIS does not discuss actual instream water temperatures for the various segments and therefore it is difficult to determine what instream temperatures currently are, much less to be able to predict what impacts these decreased flows will have to future temperatures.

(Section 4.3.2.1.1.) Reduction of flow and temperature: NISP will affect flows in the Cache La Poudre downstream of the Monroe Canal (COSPCP10) and the South Platte River downstream of the Cache La Poudre (COSPMS01b). According to the DEIS (4.3.2.1.1), *"the greatest percentage of reductions in average monthly streamflow on the Poudre River would occur in May, June, and July. Percentage reductions in streamflow would be greatest at the Lincoln Street gage in May in an average year (71.3 percent for Alternative 2 and 74.5 percent for Alternative 3) (Table 4-2 and Appendix A). Percentage reductions in streamflows in the South Platte River at the Kersey gage would be greatest in June of average years (14.9 percent for Alternative 2 and 15.4 percent for Alternative 3)."* The EIS should include a discussion of the effects of reduced flow on temperature in these segments.

**New Colorado Temperature Standards:** New temperature standards were adopted by the Water Quality Control Commission (WQCC) in January 2007 to protect aquatic life from excessive temperature pollution and are based on the thermal requirements of the fish species found in Colorado. These standards will be adopted into the South Platte River Basin by the WQCC in June 2009. The DEIS does not address these new standards.

As stated in the DEIS, there are trout present in the Cache la Poudre. The WQCC could adopt more stringent temperature standards than the current 20°C MWAT in June 2009. The aquatic communities present and expected to be present in the South Platte should be considered and an evaluation of the Colorado Temperature Criteria in WQCC Regulation No. 31 should occur when examining potential impacts.

Fish species with similar thermal requirements are grouped into tiers. The cold water tiers of the new temperature standards are shown below.

TEMPERATURE TIER	TIER CODE	SPECIES EXPECTED TO BE PRESENT	APPLICABLE MONTHS	TEMPERATURE STANDARD (°C)	
				MWAT	DM
Cold Stream Tier I	CS-I	brook trout, cutthroat trout	June – Sept.	17.0	21.2
			Oct. – May	9.0	13.0
Cold Stream Tier II	CS-II	brown trout, rainbow trout, mottled sculpin, mountain whitefish, longnose sucker, Arctic grayling	April – Oct.	18.2	23.8
			Nov. – March	9.0	13.0

**Mitigation Strategies:** In Section 4.5.9, the DEIS discusses potential mitigation of adverse temperature effects in the Poudre River. One mitigation strategy would be to increase winter flows by 10 cfs. A discussion of this strategy should be included. The other strategy would be to only divert water at the coolest part of the day

from midnight to mid-morning when the temperatures exceed 20°C at key locations for cold water aquatic life. While this strategy may ameliorate impacts of warming at these exact locations, consideration as to what impacts would result further downstream as daytime temperatures begin to increase should be evaluated. A normal pattern of spatial diversity in temperatures is an important concept that incorporates the importance of a distribution of conditions along the stream reach. Natural aquatic ecosystems have a range of temperatures available to organisms in microhabitats. The impacts downstream could still be substantial even with better management of diversions upstream. This potential impact should be evaluated and also considered for the South Platte River.

Have other habitat restoration practices been considered to manage water temperatures such as, re-establishing trees, restoring stream depth or narrowing stream width to reduce solar heating?

**Spawning/Reproductive Seasons:** Cold water fish are especially sensitive to increased temperatures during spawning season. Are there currently spawning habitats located in the effected reaches of the Cache La Poudre and the South Platte? Have the potential changes in temperature regimes been studied to look at impacts to fish during these critical periods?

Most of the flow to be diverted is being planned for the spring. This is a critical spawning time for rainbow trout which are present in Cache La Poudre Segment 10.

Changes in flow causing substantial changes to the thermal regime and associated adverse impacts on the aquatic life need to be evaluated. The new Colorado temperature standards are designed to maintain a normal pattern of seasonal fluctuation to preserve thermal spawning cues. They also consider normal pattern of summertime diel fluctuation to allow for daily high temperatures in the summer. Interruption of these normal patterns by the diversion of flow should be evaluated, as well as research for alternatives that would be more protective of these patterns.

Concerns with changes in flow and temperature regimes that would result in thermal shock need to be evaluated.

The report states that flow decreases during the spring and summer months could result in stream temperatures exceeding the chronic standard more frequently. The amount of change and frequency of change is not quantified. Without quantification, it is not possible to accurately determine impacts to water quality, loss of cold water fish species and invertebrates (City Ft Collins doc Page 6).

### **Aquatic Life Concerns**

Sedimentation is a pollutant of concern. Excess fine sediments fill in habitat spaces for macroinvertebrates, clog fish gills, causes turbidity which reduces the number of macroinvertebrates, and makes feeding conditions harder for fish. The Poudre River is confined in many areas by armored banks and channelization and the force of the river is concentrated within the channel. A reduction of 50% or greater in peak discharges could change that dynamic. The ground/surface water interaction in the river may also change peak flow. This could affect riparian conditions and cause change in riparian cover, which increases thermal input to the river and causes higher water temperatures, which could cause a shift to a warm water aquatic community and reduce trout numbers (AYERS page 23). The final EIS needs to address this concern.



## Groundwater Concerns

When discussing the potential impacts to groundwater quality associated with all three proposed reservoirs, the EIS concludes that seepage from the reservoirs will be minimal, and thus no impact will occur. However, the EIS fails to provide any data to support this conclusion. Data to support this conclusion should include such information as subcrop geologic mapping of the footprints of the various reservoirs, associated vertical and horizontal hydraulic conductivities of geologic units beneath the reservoir footprints, and any associated mitigation to minimize reservoir losses via seepage.

The EIS should also address the potential for reservoir seepage to increase selenium loading to existing 303(d) listed water quality impaired segments and address the potential of causing non-attainment on other segments. The locations of seleniferous bearing shales and other geologic formations which may impact water quality should be assessed in relation to the footprint of the proposed reservoirs.

The DEIS concludes that the Glade reservoir forebay will have minimal impact on the existing TCE plume without providing supporting data. Plume migration is not solely a function of hydraulic conductivity, but also of the hydraulic gradient. The DEIS does not address impacts resulting from construction dewatering on the direction and movement of the existing TCE plume. Additionally, there is no analysis of the potential long-term impact on the TCE plume resulting from reservoir operations.

The DEIS appears to contradict the technical report regarding TCE in the forebay of the proposed Glade Reservoir. The technical report concludes that groundwater in the northwest corner of the forebay could exceed the Colorado groundwater standard of 5 µg/l for TCE, and specifically states "TCE-contaminated groundwater above the CGWS may exist below the northwest corner of the proposed forebay."

In general, there is a lack of data to sufficiently characterize the existing TCE plume temporally. The DEIS does not address any mitigation measures that would be required to prevent and minimize additional plume migration, either during construction or during reservoir operations.

## Reservoir/Nutrient Concerns

The report lacks information on expected water level fluctuations for both Glade and Horsetooth reservoirs. If we experienced a drought such as the one in 2002/2003, a drawdown could be expected and should be evaluated. Large reservoir water level fluctuations could contribute to increased mercury concentrations in fish, along with increased sediment/nutrient loading due to bank erosion. Low reservoir water levels could increase oxygen depletion/manganese concentrations.

### Section 5.8.2

The report mentions that water would not be moved from Glade Reservoir into Horsetooth Reservoir until Glade reaches its long-term equilibrium. Which parameters would be measured as indicators of the water body reaching equilibrium and acceptable levels should be considered, as well as whether or not this is strictly a matter of water level or does equilibrium include water chemistry. Dissolved/ suspended solids and nutrients need to be considered before the transfer of water to Horsetooth is initiated.

Horsetooth reservoir is listed as impaired for low dissolved oxygen (DO). Modeling results indicated that water in Glade Reservoir will likely have higher TOC compared to water in Horsetooth Reservoir. The Water Quality

technical document states “the total organic carbon and chlorophyll concentrations predicted for Glade Reservoir are slightly higher than in Horsetooth Reservoir.”

Glade inputs into Horsetooth will likely increase the levels of TOC in Horsetooth, resulting in an increase in the oxygen demand in Horsetooth. This will create even greater oxygen depletion in the meta and hypolimnion, which could in turn contribute to increased levels of manganese. Levels of manganese already often exceed drinking water standards (50 µg/l) between August and December in Horsetooth and associated treatment costs need to be considered.

The statement of not needing a multiple depth withdrawal system in the Temperature section is inconsistent with a statement made in the nutrients section of the report. It states that Glade reservoir could be operated to avoid the release of water with higher nutrient/manganese concentrations from deeper waters by using a multiple outlet structure. The feasibility of a multiple outlet structure at Glade Reservoir with one discharging into the Poudre and another discharging into a canal at Horsetooth Reservoir should be evaluated.

### Section 5.8.3

In the temperature section of the report, it is mentioned that a multiple depth withdrawal option is not necessary for releases from Glade Reservoir into the Poudre River because the Poudre is a coldwater stream. The option to release cold water from the bottom of this reservoir throughout the year would not reflect natural seasonal and daily fluctuations in temperature necessary to support aquatic life, regardless of whether or not the river segment is classified as a cold or warm water stream. Moreover, the water released from the bottom of the reservoir could have elevated levels of nutrients and manganese which would impact aquatic life in the segment of the Poudre below Glade reservoir.

## Agriculture Concerns

### Selenium

Selenium references are inadequate. Considering the mounting issues in other state basins, i.e. – the Arkansas, with similar geologic conditions, specifically marine shales, the risk of increasing selenium mobilization when instituting the proposed hydrologic changes needs a more thorough analytic review.

The principle example is placement of Galeton Reservoir over underlying marine shale. Alternatives 2, 3 and 4 that develop the reservoir pose a concern of selenium dissolution. Research continues to support the concept of selenium dissolution in the presence of water and nitrogen.

### Salinity

No numeric state standard is set for salinity but as discussed and proposed, the salinity of the source water from the South Platte will exacerbate existing conditions.

A measurable salinity level in the soil and water exists throughout the area to be served by Galeton Reservoir, when the current source water is from the Poudre River, which is relatively low in salinity. The report seems to conclude that the current conditions would not be altered by the use of South Platte water. The basis for these conclusions seems suspect, as other research does not seem to support the conclusions. Actually, a strong potential exists for limiting the range of irrigated crops due to salinity levels in the irrigation water and accumulation in the irrigated soils. Additional salinity may be realized from the upflux of groundwater recharged by Galeton Reservoir system. These conditions could readily result in a water quality impairment of agricultural use.



*E.coli*

*E. coli* is referenced with a mention of the 303(d) water quality impairment listing of the lower segment of the Poudre River. An additional reference to *E. coli* is made in the NISP Water Quality Tech Report, stating, "*E. coli* concentrations in the Poudre River were not collected or analyzed for this report, but it is expected that during months with reduced flows, *E. coli* concentrations would increase due to less dilution. Both the Galeton forebay and the reservoir have a potential for high *E. coli* populations because of source water quality.

The general discussion of recreation in the other portions of the document does not parallel the "no recreation" approach for Galeton Reservoir. Additional discussion should be included.