

# **NORTHERN INTEGRATED SUPPLY PROJECT**

**Applicant: Northern Colorado Water Conservancy District**

## **Draft Environmental Impact Statement**

April 2008



**U.S. Army Corps of Engineers  
Omaha District**

**DRAFT ENVIRONMENTAL IMPACT STATEMENT**

**NORTHERN INTEGRATED SUPPLY PROJECT**

**Applicant:**  
**Northern Colorado Water Conservancy District**

**U.S. Army Corps of Engineers**  
**Omaha District**  
**12565 West Center Road**  
**Omaha, Nebraska**

**April 2008**

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Martha S. Chieply, Chief  
REGULATORY BRANCH  
ARMY CORPS OF ENGINEERS, OMAHA DISTRICT

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Date

This Draft Environmental Impact Statement was prepared by ERO Resources Corporation, an environmental consulting firm, with the guidance, participation, and independent evaluation of the U.S. Army Corps of Engineers (Corps). The Corps, in accordance with 40 CFR 1506.5(a) and (c), is in agreement with the findings of the analysis, and approves and takes responsibility for the scope and content of this document.

**COVER SHEET**  
**ENVIRONMENTAL IMPACT STATEMENT**  
**NORTHERN INTEGRATED SUPPLY PROJECT**

**Lead Agency:** Department of the Army  
Corps of Engineers, Omaha District

**Cooperating Agencies:** Bureau of Reclamation  
Colorado Department of Transportation  
Larimer County  
U.S. Environmental Protection Agency  
U.S. Fish and Wildlife Service

**Jurisdictions in Colorado That Could Be Directly Affected:** Larimer and Weld Counties

**Abstract:** The Northern Integrated Supply Project Draft Environmental Impact Statement (Draft EIS) evaluates the effects of constructing and operating the proposed Northern Integrated Supply Project (NISP) located in Larimer and Weld counties in northeastern Colorado. The U.S. Army Corps of Engineers (Corps), Bureau of Reclamation, and Colorado Department of Transportation will use this information to determine whether to approve permits and contracts necessary for construction and operation of NISP. As proposed by the Northern Colorado Water Conservancy District (District), NISP would consist of a proposed Glade Reservoir with a capacity of approximately 170,000 acre-feet (AF). Associated with Glade Reservoir would be a forebay, pump station, and diversion structure and canal upgrade to convey water diverted from the Cache la Poudre River to the proposed reservoir. A pipeline connecting the proposed Glade Reservoir to the existing Horsetooth Reservoir also would be constructed. Glade Reservoir would inundate a section of U.S. 287 and require the relocation of the highway. The proposed Project also would include a proposed Galeton Reservoir with a capacity of about 40,000 AF. Associated with Galeton Reservoir would be a forebay, pump station, and pipeline to deliver water diverted from the South Platte River to Galeton Reservoir. Water exchanges between the Galeton Reservoir and Glade Reservoir diversion locations are proposed.

The proposed Project is a collaborative effort among 12 water providers (Participants) facilitated and coordinated by the District. The proposed Project would provide approximately 40,000 AF of new reliable water supply, which would meet a portion of the Participants' estimated 2025 and 2050 water supply needs.

The Draft EIS evaluates four alternatives for NISP: 1) No Action; 2) Proposed Action Glade Reservoir at 170,000 AF and Galeton Reservoir at 40,000 AF; 3) Cactus Hill Reservoir at 180,000 AF and Galeton Reservoir at 40,000 AF; and 4) Glade Reservoir or Cactus Hill Reservoir and Galeton Reservoir at 20,000 AF and 12,000 AF of Agricultural Transfers. Two alternative realignments for U.S. 287 were evaluated as part of the Proposed Action. The District has submitted a Department of the Army permit application to the Corps for the Proposed Action.

Reviewers should provide the Corps with their comments during the review period for the Draft EIS. This will enable the Corps and cooperating agencies to analyze and respond to comments at one time and use the information acquired in the preparation of the Final Environmental Impact Statement. Comments on the Draft EIS should be specific and should address the adequacy of the statement and the merits of the alternatives discussed (40 CFR 1503.3). The Corps will conduct a public hearing on the Draft EIS.

**EIS Contact for Comments and Additional Information:**

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**Date Comments Must Be Received:** July 30, 2008

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## Acronyms and Abbreviations Used in this Document

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ADT	Average daily traffic
AF	Acre-feet
APE	Area of potential effect
Applicant	Northern Colorado Water Conservancy District
bgs	Below ground surface
BLM	Bureau of Land Management
BMPs	Best management practices
CAA	Clean Air Act
CBGWS	Colorado Basic Ground Water Standards
CBP	Colorado butterfly plant
C-BT	Colorado-Big Thompson Project
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
cfs	Cubic feet per second
CNHP	Colorado Natural Heritage Program
CO	Carbon monoxide
Corps	U.S. Army Corps of Engineers
CPA	Cooperative planning area
CR	County Road
CRP	Conservation Reserve Program
CRRP	Colorado River Return Project (also known as Big Straw Project)
CSA	Community Service Area
CSU	Colorado State University
CU	Consumptive use
CWA	Clean Water Act
CWCB	Colorado Water Conservation Board
CWCWD	Central Weld County Water District
dB	Decibel scale
dba	A-weighted levels
District	Northern Colorado Water Conservancy District
DOE	Determination of eligibility
DOLA	Department of Local Affairs
Draft EIS	Draft Environmental Impact Statement
EIS team	The U.S. Army Corps of Engineers and its consultants: ERO Resources Corporation, HDR Engineering, BBC Consulting, Chadwick Ecological Consultants Division of GEI, Western Cultural Resource Management
EIS	Environmental Impact Statement
ELC	Environmental Learning Center
ELCO	East Larimer County
EOM	End of month
EPA	U.S. Environmental Protection Agency
EPT	Ephemeroptera, Plecoptera, and Trichoptera (mayflies, stoneflies, and caddisflies)

ERO	ERO Resources Corporation
ESA	Endangered Species Act
EX	Expressway
FCLWD	Fort Collins-Loveland Water District
GIS	Geographic information system
GMA	Growth Management Area
GMU	Game Management Unit
gpcd	Gallons per capita per day
gpm	Gallons per minute
GRM	Growth management area
HSWMPs	Halligan and Seaman Water Management Projects
Hansen Canal	Charles Hansen Supply Canal
HGM	Hydrogeomorphic Method
IFIM	Instream Flow Incremental Methodology
IGA	Intergovernmental Agreement
IY	Irrigation year
LCPOL	Larimer County Parks and Open Lands
LCR	Larimer County Road
LEDPA	Least environmentally damaging practicable alternative
LHWD	Lefthand Water District
LOS	Level of service
LTWD	Little Thompson Water District
M&I	Municipal and industrial
MBTA	Migratory Bird Treaty Act
MCQWD	Morgan County Quality Water District
mg	Million gallons
MP	Milepoint
MPWCD	Middle Park Water Conservancy District
NAAQS	National Ambient Air Quality Standards
NAWQA	National Water Quality Assessment Program
NCWA	Northern Colorado Water Association
NCWCD	Northern Colorado Water Conservancy District
NEPA	National Environmental Policy Act
NFR	North Front Range
NHPA	National Historic Preservation Act
NHS	National Highway System
NISP	Northern Integrated Supply Project
NOI	Notice of Intent
NPIC	North Poudre Irrigation Company
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
NWCWD	North Weld County Water District
NWI	National Wetland Inventory
O&M	Operations and maintenance
OHWM	Ordinary high water mark
OP	Observation point
PA	Programmatic Agreement

Participants	The 12 communities and domestic water districts located throughout the Northern Colorado Water Conservancy District participating in NISP: Central Weld County Water District, Town of Eaton, Town of Erie, City of Evans, Fort Collins-Loveland Water District, City of Fort Lupton, City of Fort Morgan, City of Lafayette, Lefthand Water District, Morgan County Quality Water District, Town of Severance, and the Town of Windsor
PFYC	Probable Fossil Yield Classification system
PHABSIM	Physical Habitat Simulation
Phase II report	Phase II Alternative Evaluation Report
PM <sub>10</sub>	Particulate Matters less than 10 micron
Project	Northern Integrated Supply Project or NISP
Proposed Action	Participants' and District's preferred configuration of the proposed Project
PRPA	Platte River Power Authority
PVPL	Pleasant Valley pipeline
RCRA	Resource Conservation and Recovery Act
Reclamation	U.S. Bureau of Reclamation
RO	Reverse osmosis
ROD	Record of decision
ROW	Right-of-way
RTE	Residential tap equivalents
SB40	Senate Bill 40
SDWA	Safe Drinking Water Act
SEO	Colorado State Engineers Office
Service	U.S. Fish and Wildlife Service
SH	State Highway
SHPO	State Historic Preservation Office
SPWCP	South Platte Water Conservation Project
Subdistrict	Municipal Subdistrict of the Northern Colorado Water Conservancy District
SWA	State Wildlife Area
SWMP	Stormwater Management Plan
SWSP	Southern Water Supply Project
TCE	Trichloroethene
TCP	Traditional Cultural Property
TDS	Total dissolved solids
TE	Tap equivalent
TNM	Traffic Noise Model
TOC	Total organic carbon
U.S.	United States
UFR	Upper Front Range Regional Planning Commission
ULTO	Ute ladies'-tresses orchid
USGS	United States Geological Service
vpd	Vehicles per day
WAPA	Western Area Platte River Power Authority
WCR	Weld County Road
WGFP	Windy Gap Firming Project
WQCD	Water Quality Control Division
WSSC	Water Supply and Storage Company
WWTP	Wastewater treatment plant

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# Executive Summary

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## Introduction

The proposed Northern Integrated Supply Project (NISP) is a regional water supply project designed to serve the current and future water needs of 12 towns and water districts (the Participants) in Larimer, Weld, Morgan, and Boulder counties. The Participants are a group of rapidly growing communities and domestic water districts located throughout the Northern Colorado Water Conservancy District (District). The Participants are Central Weld County Water District, Town of Eaton, Town of Erie, City of Evans, Fort Collins-Loveland Water District, City of Fort Lupton, City of Fort Morgan, City of Lafayette, Lefthand Water District, Morgan County Quality Water District, Town of Severance, and the Town of Windsor. The proposed Project would be constructed and owned by the District. While the District would retain ownership and operational responsibility of the Project, the Participants would own a perpetual contractual right to a defined portion of the Project facilities and a defined portion of the water diverted by the project.

The Proposed Action is construction of Glade Reservoir with a capacity of approximately 170,000 acre-feet (AF). Associated with Glade Reservoir would be a forebay, pump station, and diversion structure and canal upgrade to convey water diverted from the Cache la Poudre River to the proposed reservoir. A pipeline connecting the proposed Glade Reservoir to the existing Horsetooth Reservoir is proposed to be constructed if needed.

As proposed, Glade Reservoir would inundate a section of U.S. 287 and require the relocation of about 7 miles of the highway. Additionally, Glade Reservoir would inundate a section of the Munroe Canal (also known as the North Poudre Supply Canal) requiring a portion of the canal to be rerouted. The Proposed Action also would include a proposed Galeton Reservoir with a capacity of about 40,000 AF. Associated with Galeton Reservoir would be a new diversion structure on the South Platte River, forebay, pump station, and pipeline to deliver water diverted from the South Platte River to Galeton Reservoir. Water exchanges between the Galeton Reservoir and Glade Reservoir diversion locations are proposed.

## Cooperating Agencies

This Draft Environmental Impact Statement (EIS) has been prepared in compliance with the U.S. Army Corps of Engineers (Corps) National Environmental Policy Act (NEPA) implementation procedures for its regulatory program (Appendix B of 33 CFR Part 325), and the 404(b)(1) guidelines (40 CFR Part 230), and applicable public interest review factors identified at 33 CFR Part 320.4.

Based on a review of the Project, the Corps determined that the Project is likely to significantly affect the quality of the human environment. Because the proposed Project will involve the discharge of dredge and fill material into wetlands or other waters of the U.S., the District will seek a permit under Section 404 of the Clean Water Act (CWA). The Corps is the lead federal agency for compliance with the NEPA and will use the EIS in rendering a final permit decision.

U.S. Bureau of Reclamation (Reclamation) is a cooperating agency because authorization to connect the pipeline and/or enter into a contract would be a federal action on the part of Reclamation. If Reclamation adopts the Final EIS as its NEPA compliance for federal action under its jurisdiction, Reclamation's decision on the Proposed Action and EIS will be documented in a separate record of decision (ROD).

The Colorado Department of Transportation (CDOT) will adopt the ROD upon completion of the EIS.

The U.S. Environmental Protection Agency (EPA), a federal cooperating agency, is responsible for cooperating on issues for which the agency has expertise, review of the Section 404 permit application that the District will submit to the Corps, and review of the EIS.

The NISP EIS will meet NEPA requirements for Reclamation. Reclamation will not prepare NEPA documents separate from the NISP EIS, but will prepare a ROD that addresses its action.

The U.S. Fish and Wildlife Service (Service) is a cooperating agency, and is responsible for consultation with the Corps and the District under the Endangered Species Act (ESA) and the Fish and Wildlife Coordination Act. The Service will consult regarding potential impacts to federally listed threatened or endangered species and their designated critical habitat based on the Biological Assessment prepared by the Corps and submitted to the Service.

Larimer County is a cooperating agency and must render a decision about the portions of the project located in Larimer County and the consistency of these portions with the County's Master Plan. Additionally, implementation of any of the action alternatives will require compliance with applicable state and local regulatory agency reviews, approvals, and permitting requirements.

## **Purpose and Need for the Project**

The purpose of NISP is to provide the Participants with approximately 40,000 AF of new reliable municipal water supply annually through a regional project coordinated by the District. The Participants have requested new firm yield of water supply to meet a portion of their projected demand until 2050. The requests for new firm yield are based on the Participants' analyses of their projected needs, the potential future demands as modeled by the District and scrutinized by the Corps, plus a 10 percent safety factor to account for uncertainty about future demand. Some Participants face immediate water shortages; for others, shortages of firm water supply are expected over the next 10 to 20 years.

## **Public Agency and Participation**

As required by NEPA, the Corps provided an early and open process to determine the scope of significant issues to be addressed in this Draft EIS. A Notice of Intent (NOI) to prepare an EIS initiated the 60-day scoping period and was published in the Federal Register on August 20, 2004. Notification consisted of paid advertisements announcing public scoping meetings in local newspapers, a scoping announcement, and publication of Project information on the District web site and Corps web site.

On September 21, 2004, an agency scoping meeting was held at the District's offices in Berthoud to review the project purpose and need, preliminary alternatives, and key environmental issues and agency concerns. The agency scoping meeting also included a field trip to several of the project elements for the Proposed Action.

Three public scoping meetings were held to present the project to the public and solicit public comments. The meetings were held on September 20, 2004 at the Eaton Country Club, September 21, 2004 at the Lincoln Center in Fort Collins, and September 22, 2004 at the American Legion in Laporte, Colorado. Public comments were accepted until November 24, 2004. Additionally, a public open house meeting was held on March 30, 2005 in Laporte to present alternative realignments under consideration for U.S. 287. A scoping report was prepared and posted on the Corps website on March 30, 2005 (<https://www.nwo.usace.army.mil/html/od-tl/eis-info.htm>).

## Alternatives Analysis

In addition to satisfying NEPA requirements, projects subject to permitting by the Corps under the CWA also must comply with the Section 404(b)(1) guidelines (40 CFR Part 230) for discharge of dredge and fill material into waters of the U.S. The Section 404(b)(1) guidelines require that the Corps permits the least environmentally damaging practicable alternative. The alternatives analysis required for Section 404(b)(1) guidelines can be conducted either as a separate analysis for 404 permitting or incorporated into the NEPA process. The Corps integrated NEPA and 404(b)(1) guidelines into the alternatives analysis. Integration of both NEPA and 404(b)(1) guidelines ensures that the alternatives selected for evaluation in the EIS provide a reasonable range of alternatives and that the alternatives are practical.

In 2003, prior to the NISP EIS and as part of the development of a reliable future regional water supply for the Participants, the District studied potential Project alternatives. Subsequent to the District's study of potential alternatives, the Corps conducted an independent alternatives analysis that included three levels of screening (purpose and need, environmental, and practicability). Those concepts and elements that passed the multi-tiered screening were used to develop a reasonable range of alternatives to be evaluated in the EIS.

See Section 2.1 for a full explanation of the screening process used to develop alternatives for more detailed evaluation in this Draft EIS.

## Alternatives

Four alternatives were selected for evaluation in this Draft EIS. The alternatives are:

- 1) No Action alternative—Participants would develop independent water supplies by purchasing water rights and pursuing independent storage and conveyance systems in the absence of NISP;
- 2) Proposed Action—Glade Reservoir (170,000 AF) and the South Platte Water Conservation Project (SPWCP), which includes a 40,000 AF Galeton Reservoir;
- 3) Cactus Hill Reservoir (180,000 AF) and the SPWCP, which includes a 40,000 AF Galeton Reservoir; and
- 4) Glade Reservoir (170,000 AF) or a Cactus Hill Reservoir (180,000 AF) subalternative and SPWCP, which includes a 20,000 AF Galeton Reservoir, with the transfer of agricultural water rights for 12,000 AF of firm yield.

The No Action alternative considers what the Participants would do to meet their water supply needs in the absence of NISP. In the absence of NISP, obtaining new water supplies in the region likely would become more challenging because the demand for a finite supply of water sources would increase. It is not possible to determine the specific mix of future water development approaches that would be pursued by the individual Participants because the process of acquiring water supplies would be driven by complex social, economic, environmental, and political factors. Therefore, the No Action alternative is conceptual, and is intended to represent the possible water supplies that each Participant could obtain.

The Corps identified three action alternatives—Alternatives 2, 3, and 4. Alternative 2, the Proposed Action, is a proposed Glade Reservoir with a capacity of approximately 170,000 AF. Associated with Glade Reservoir would be a forebay, pump station, improvements to the Poudre Valley Canal and diversion to convey water diverted from existing diversions on the Cache la Poudre River to the proposed reservoir, and temporary access roads to be used during construction. Glade Reservoir would inundate about 7 miles of U.S. 287, which would require the relocation of the inundated segment of the highway. Additionally, Glade Reservoir would inundate a section of

the Munroe Canal (North Poudre Supply Canal); therefore, a portion of the canal also would need to be rerouted. Water from Glade Reservoir would be conveyed to or exchanged with Horsetooth Reservoir for distribution to the Participants.

Alternative 3 is similar to the Proposed Action except that water diverted from the Poudre River would be stored in the proposed Cactus Hill Reservoir instead of the proposed Glade Reservoir. Cactus Hill Reservoir would have a capacity of approximately 180,000 AF. Construction of Cactus Hill Reservoir would include a forebay, improvements to the Poudre Valley Canal and intake headgate, and construction of temporary access roads. Construction would necessitate realignment of three Weld County Roads and two power lines.

Alternative 4 would utilize either Glade Reservoir or Cactus Hill Reservoir; therefore, Alternative 4 is similar to the Proposed Action or Alternative 3 except that about 12,000 AF of the Participants' requested yield would come from the purchase and transfer of agricultural water rights to municipal and industrial (M&I) use. This alternative likely would reduce the amount of water that would need to be diverted from the South Platte River through the SPWCP when compared to the Proposed Action and Alternative 3. The size of the proposed Glade Reservoir under Alternative 4 would be 170,000 AF (the same size as under the Proposed Action), Cactus Hill Reservoir would be 180,000 AF (the same as Alternative 3), and Galeton Reservoir would be constructed to store 20,000 AF of water to reflect the contribution of the transferred water (a reduction of 20,000 AF relative to the Proposed Action or Alternative 3).

## Existing Conditions

The NISP Participants' water supplies are composed of: direct flow from the Cache la Poudre, St. Vrain, and Big Thompson rivers; transbasin supplies from the Colorado River Basin; reservoir storage; and mutual ditch, irrigation, and reservoir company shares within the Poudre, St. Vrain, and Big Thompson River basins. The common water supply among all the Participants is the Colorado-Big Thompson (C-BT) project. Annual yields from the NISP Participant supplies vary depending on available water each year and system losses.

The Participants serve residential, agri-business, agricultural, M&I, and recreational users. From 1990 to 2000, Colorado added 1 million residents to its population. A large part of the growth between 1990 and 2002 occurred in the region where the NISP Participants are located. This growth is projected to continue, although it may vary widely from year to year over the next 50 years.

The annual combined gallons per capita per day (gpcd) for potable deliveries for the Participants from 1998 to 2003 indicated usage rates that fluctuate largely with weather and water use restrictions. Although each Participant's water use pattern is unique because the mix of customer types varies, for the 1998 to 2003 period, the average potable water use of the NISP Participants was 164 gpcd. If nonpotable deliveries are included, total water use by NISP Participants is about 189 gpcd.

## Future Water Needs

The Participants' projected future water demands were calculated based on existing firm yield, which is the yield that would be available to a Participant during a drought. Between 2005 and 2010, the combined total future water demand for the NISP Participants will exceed their existing, combined annual firm yield (50,005 AF). By the year 2025, the projected demand is 90,700 AF. The NISP Participants have requested 40,000 AF in combined new firm yield from NISP. From a combined standpoint, the NISP Participants are projected to need the full yield

and storage from NISP no later than 2020. The NISP Participants will need additional supplies from that point forward (Table ES-1). Participant water supply and demand is fully described in Section 1.8.

NISP will supply a portion of the Participants' future water supply needs, but will not fully meet the Participants' estimated future water supply needs. Because all of the Participants face water shortages that would only partly be met by the new firm yield they have requested from NISP, it is likely that all of the Participants would pursue additional water sources no matter if NISP is implemented.

**Table ES-1. Projected Shortages in Firm Yield (AF).**

Participant	Firm Yield <sup>1</sup>	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	Year of Projected Shortage
CWCWD	8,465	2,000	-840	-3,200	-5,300	-7,100	-8,700	-10,400	-11,700	-12,900	-14,120	2010
Eaton	1,616	180	-30	-230	-430	-630	-830	-1,000	-1,200	-1,400	-1,600	2010
Erie	2,145	-360	-2,300	-3,800	-5,300	-6,800	-6,800	-6,800	-6,800	-6,800	-6,800	2005
Evans <sup>2</sup>	6,932	2,300	1,000	-100	-1,500	-2,800	-4,200	-5,900	-6,400	-6,400	-6,400	2015
FCLWD	8,156	-1,100	-3,300	-5,400	-7,600	-7,800	-7,800	-7,800	-7,800	-7,800	-7,800	2005
Fort Lupton	3,538	-560	-660	-860	-1,160	-1,500	-1,700	-2,100	-2,400	-2,800	-3,300	2005
Fort Morgan	4,481	-900	-1,700	-2,100	-2,400	-2,800	-3,200	-3,600	-4,100	-4,600	-5,100	2005
Lafayette	4,534	30	-1,000	-2,000	-3,000	-4,000	-4,100	-4,100	-4,100	-4,100	-4,100	2010
LHWD	4,712	510	-190	-990	-1,900	-2,900	-4,100	-5,100	-5,100	-5,100	-5,100	2010
MCQWD	2,512	310	310	10	-190	-490	-690	-900	-1,100	-1,300	-1,500	2020
Severance	422	120	-80	-280	-580	-1,100	-1,600	-2,300	-2,900	-2,900	-2,900	2010
Windsor	2,492	-210	-1,000	-1,800	-2,700	-3,500	-4,300	-5,200	-6,000	-6,900	-7,200	2005
<b>Total</b>	<b>50,005</b>	<b>2,320</b>	<b>-9,790</b>	<b>-20,750</b>	<b>-32,060</b>	<b>-40,420</b>	<b>-48,020</b>	<b>-55,200</b>	<b>-59,600</b>	<b>-63,000</b>	<b>-65,920</b>	<b>2010</b>

<sup>1</sup>Does not include a 10 percent safety factor for demand projections.

<sup>2</sup>It is possible that Evans projected shortage in 2035 and beyond could range from 4,000 AF to 6,200 AF if Evans is able to change the water right for the Evans Ditch, either by changing the diversion point, exchanging water with an upstream user, constructing a treatment plant, or other means.

## Environmental Consequences

In providing 40,000 AF in combined firm yield to the Participants, all of the NISP alternatives would have significant environmental effects. Many of the environmental effects are common to the alternatives; however, there are differences among the alternatives in how they would affect environmental resources. Alternative 1 (No Action) would rely primarily on the conversion of agricultural water rights to M&I use to provide the firm yield to the Participants. The most significant effect associated with Alternative 1 would be the removal of irrigation from up to 69,200 acres of agricultural lands and the conversion of the irrigated agricultural lands to dry land uses. The action alternatives (Alternatives 2, 3, and 4) would rely on the District's Grey Mountain and SPWCP water rights and, therefore, have similar effects on streamflows of the Poudre and South Platte rivers. All of the action alternatives would affect flows in the Poudre River in two ways: first, water would be diverted from the Poudre River when the District's Grey Mountain water right is in priority. The District does not currently exercise the Grey Mountain water right; therefore, these diversions would cause new depletions to the Poudre River. The diversions would occur primarily from the Poudre Valley Canal during periods of high flows; thus, the greatest changes in flows would typically occur in May, June, and July of wet and average years. Diversions when the

Grey Mountain water right is in priority would affect flows in about 55 miles of the Poudre River from the Poudre Valley Canal to the confluence with the South Platte River.

Second, all of the action alternatives have the SPWCP as a component that involves an exchange of water diverted from the South Platte River for water diverted from the Poudre River. The exchange involves diverting water from the Poudre River at the Poudre Valley Canal, which is currently diverted from the Poudre River about 23 miles downstream for irrigation. The exchange diversions would not be new to the Poudre River, but would occur about 23 miles higher in the Poudre River. Therefore, the exchange would reduce existing flows in about 23 miles of the Poudre River, from the Poudre Valley Canal located downstream of the mouth of Poudre Canyon, through Laporte and Fort Collins, to about 12 miles downstream of Fort Collins. The exchange would not affect existing flows on the Poudre River downstream of the New Cache Canal diversion, which is the most downstream anticipated exchange location.

The greatest effect of NISP on Poudre River flows would be the combined effect of the exchange and the exercise of the Grey Mountain water right. This combined reduction in flow would occur on an approximate 23-mile reach of the Poudre River from the Poudre Valley Canal, downstream of the mouth of Poudre Canyon to the diversion for the New Cache Canal about 2 miles south of Timnath. The District's Proposed Action (Alternative 2) would reduce monthly average streamflow through Fort Collins as represented by the Lincoln Avenue gage in May, June, July, and August of all years, ranging from a 71 percent reduction in May of average years to a 26 percent reduction in streamflow in August of dry years.

The reduction in streamflow to the Poudre River at the Lincoln Avenue stream gage for Alternatives 3 and 4 is similar to the District's Proposed Action with the exception that Alternative 3 (Cactus Hill Reservoir and SPWCP) and Subalternative 4.2, which also includes Cactus Hill Reservoir, have slightly greater streamflow reductions in wet and average years. This difference is due to the larger size of the proposed Cactus Hill Reservoir (180,000 AF) compared to the proposed Glade Reservoir (170,000 AF). Cactus Hill Reservoir is proposed to be larger to compensate for increased evaporation on the plains relative to the higher elevation foothills location of Glade Reservoir.

The following summarizes the effects that distinguish each of the alternatives.

### **Alternative 1—No Action**

The No Action alternative is not expected to substantially affect streamflows in the region. It was assumed that the current points of diversion would not change due to the inability to predict where the changes would occur. Measures would be required in the adjudication process of transferring the agricultural water rights to M&I use to ensure no injury to other water users on the various streams and rivers. The Participants would be required to continue historical diversion and return flow patterns.

The purchase of C-BT units and the relocation of their place of use is a common practice within the boundaries of the District. Because C-BT water is transmountain water, this process is permitted without mitigating any changes in flow experienced by downstream water users. Depending on how the units are relocated, there could be minor localized increases or reductions in the flows of stream reaches, but on balance, changes in flows would be negligible.

Municipal well pumping from the South Platte River alluvium by Fort Morgan and Fort Lupton would likely occur out-of-priority, because new wells would have very junior water rights. As a result, these entities would need to acquire senior agricultural water to augment South Platte River flows. This process mitigates water rights

impacts due to the increased well pumping. Acquisition and transfer of agricultural water for augmentation purposes would require maintenance of the existing return flow regime to avoid injury to other water users. The conversion of gravel pits to water storage reservoirs for Alternative 1 would require water to augment evaporation losses from the gravel pits, and would therefore mitigate effects to streamflows. The No Action alternative would allow the water rights junior to the District's Grey Mountain water right to seek a permit to divert the flows and it is unknown what the impact on the Poudre River flows would be. It is likely that the Poudre River flows would be reduced under a different water right if the No Action alternative is implemented.

The No Action alternative would involve the removal of irrigation from up to 69,200 acres of irrigated agricultural lands, about 11 percent of the total irrigated acreage in the region, and would substantially accelerate and contribute to the regional trend of the transfer of agricultural water to M&I uses. The current production value associated with the 69,200 acres is estimated at \$27.1 million or about 4.5 percent of total agricultural output in the region.

The removal of irrigation from up to 69,200 acres of agricultural lands would result in a loss of about 1,384 acres of wetlands, which is substantially greater than any of the other alternatives. At a projected total capital cost of about \$830,500,000, the No Action alternative would cost substantially more than the other alternatives and would have the greatest increase in inflation-adjusted rate increases for the Participants' water bills of 38 percent (2010) and 17 percent (2020) relative to the other alternatives.

#### **Alternative 2—Proposed Action—Glade Reservoir and SPWCP**

As previously discussed, Alternative 2 and the other action alternatives would reduce streamflows in the Poudre and South Platte rivers. The effects of reduced streamflows distinguish Alternative 2 and the other action alternatives (Alternatives 3 and 4) from the No Action alternative; however, these effects for the most part, are not useful in determining the differences among the action alternatives.

There are some differences in the way the action alternatives would affect streamflows. Those alternatives involving the proposed Cactus Hill Reservoir would cause slightly greater reductions of about 2 to 3 percent in streamflows due to the larger storage volume of Cactus Hill Reservoir compared to Glade Reservoir. Cactus Hill Reservoir would be 10,000 AF larger to compensate for increased evaporation on the plains compared to the foothills location of Glade Reservoir. Additionally, Glade Reservoir would deliver water near the delivery point for C-BT water from Horsetooth Reservoir to the Poudre River, Glade Reservoir (Alternatives 2 and 4) could exchange C-BT water into Horsetooth Reservoir and deliver exchanged C-BT water from Glade Reservoir to the Poudre River about 7 miles above Fort Collins. Because of Glade Reservoir's location, it could also divert water from the Poudre River using the Munroe Canal diversion, which is about 5 miles higher on the Poudre River than the Poudre Valley Canal diversion. Use of the Munroe Canal diversion could facilitate another exchange of C-BT water with the North Poudre Irrigation Company (NPIC). Glade Reservoir could deliver Glade Reservoir water to the Munroe Canal near the Glade dam site in exchange for C-BT water. The C-BT water that would have been diverted by the NPIC at the Munroe Canal would stay in the Poudre River for about 5 miles until diverted by Glade Reservoir and the Poudre Valley Canal. Therefore, the alternatives involving Glade Reservoir could increase flows in the 5-mile reach of the Poudre River between the Munroe Canal diversion and the Poudre Valley Canal. Increased flows in the range of 38 to 43 cfs would occur in late summer and could extend the boating season into August on the much used Filter Plant segment of the Poudre River as long as there is sufficient C-BT water carried by the Munroe Canal to make the exchange.

Alternative 2 would involve the inundation of about 7 miles of U.S. 287. The relocation of U.S. 287 would have environmental effects in addition to the effects of the construction and operation of Glade Reservoir and the SPWCP. The following effects include Glade Reservoir, the SPWCP and associated facilities, and the realignment of U.S. 287.

Alternative 2 would cause the direct loss of about 44 acres of wetlands. This loss of wetlands is the lowest wetland loss of all of the alternatives. Alternative 2 would cause the greatest loss of native plant communities (2,705 to 2,807 acres), about 20 percent more than the other action alternatives, but would have substantially fewer impacts to all vegetation (3,942 acres) than Alternative 3 (6,927 acres).

Glade Reservoir (Alternative 2 and Subalternative 4.1) would cause the loss of about 50 acres of the federally threatened Preble's meadow jumping mouse habitat and disturb another 26 acres of habitat. The alternatives that do not include Glade Reservoir (No Action alternative, Alternative 3, and Subalternative 4.2) have no known direct impact on any federally listed species or their habitat.

Glade Reservoir (Alternative 2 and Subalternative 4.1) is the only alternative facility that may be managed for public recreation. Recreation at the reservoir was estimated to provide an annual public recreation value of about \$17,115,400. Public recreation at the reservoir would seasonally increase traffic in the vicinity of Glade Reservoir. In addition to U.S. 287, the construction of Glade Reservoir would also inundate access to the State Trust Land west of the proposed reservoir. Access to Bonner Spring Ranch Road, and Big Ridge Way may need realignment, but would not be inundated by Glade Reservoir.

Glade Reservoir (Alternative 2 and Subalternative 4.1) is the only alternative facility that has any known geological issues. A fault in the vicinity of the dam may cause construction and seepage issues that would need to be addressed in the final design. The western realignment alternative for U.S. 287 involves a rock cut through the Morrison Formation, a known fossiliferous formation. Other alternatives do not involve substantial disturbances to known fossiliferous formations.

TCE contaminated ground water located in the vicinity of the forebay will require mitigation efforts associated with forebay construction activities.

The projected total capital cost for Alternative 2 is about \$426 million (excludes the Carter pipeline option) and is projected to be the least expensive alternative. Alternative 2 is projected to result in an inflation-adjusted rate increase for the Participants' water bills of 10 percent (2010) and -6 percent (2020).

### **Alternative 3—Cactus Hill Reservoir and SPWCP**

Similar to the other action alternatives (Alternatives 2 and 4), Alternative 3 would reduce streamflows in the Poudre and South Platte rivers. As discussed under Alternative 2, Alternative 3 would result in slightly greater reductions in streamflows due to the increased size of Cactus Hill Reservoir to offset increased evaporation of the proposed Cactus Hill Reservoir relative to proposed Glade Reservoir. Cactus Hill Reservoir distinguishes Alternative 3 and Subalternative 4.2 from Alternative 2 and Subalternative 4.1, which include the proposed Glade Reservoir.

Cactus Hill Reservoir has a larger volume than Glade Reservoir and is substantially shallower with a greater surface area than Glade Reservoir. The greater surface area of Cactus Hill Reservoir would result in a substantially greater loss of vegetation (6,237 acres) than Alternative 2 (3,942 acres). Alternative 3 would cause the loss of 79 acres of wetlands.

Alternative 3 would involve the relocation of Weld County Roads 19 and 20, and Platte River Power transmission lines that would be inundated by Cactus Hill Reservoir. Cactus Hill Reservoir would inundate 11 private residences and an additional nine residences are within 1,000 feet of the proposed Cactus Hill Reservoir.

The projected total capital cost for Alternative 3 is about \$452,192,200 (excluding the Carter pipeline option), which is more than Alternative 2 but less than the other alternatives. Alternative 3 is projected to result in inflation-adjusted rate increases for the Participants' water bills of 12 percent (2010) and -5 percent (2020).

#### **Alternative 4—Glade Reservoir or Cactus Hill Reservoir and SPWCP and Agricultural Transfers**

Similar to the other action alternatives (Alternatives 2 and 3), Alternative 4 would reduce streamflows in the Poudre and South Platte rivers. Subalternative 4.1 includes Glade Reservoir and Subalternative 4.2 substitutes Cactus Hill Reservoir for Glade Reservoir. Both subalternatives involve a reduced Galeton Reservoir (20,000 AF) and obtaining 12,000 AF of the 40,000 AF of firm yield from agricultural transfers that would remove irrigation from an estimated 17,137 acres of agricultural lands. The reduced size of Galeton Reservoir and substitution of 12,000 AF of yield from agricultural transfers lessens the reductions in streamflows in the South Platte River associated with the SPWCP relative to Alternatives 2 and 3, but would not affect flow reductions in the Poudre River associated with Alternative 2 or 3. For example, in average years in June when flows are estimated to be reduced the most in the South Platte River (14.9 percent by Alternative 2 or 15.4 percent by Alternative 3), Alternative 4 would have smaller flow reductions in the South Platte River (1.9 percent for Subalternative 4.1 and 1.8 percent for Subalternative 4.2). Approximately 397 acres of wetlands would be lost under Subalternative 4.1, and approximately 385 acres would be lost under Subalternative 4.2. Most of these losses (353 acres) would be due to transfer of agricultural lands. The combination of agricultural transfers with either Glade Reservoir (Subalternative 4.1) or Cactus Hill Reservoir (Subalternative 4.2) would result in environmental effects between the No Action alternative and Alternative 2 (matched with Subalternative 4.1) and Alternative 3 (matched with Subalternative 4.2).

Projected total capital costs for Subalternative 4.1 (\$570 million) and Subalternative 4.2 (\$596 million) are greater than Alternatives 2 and 3, but are less than the No Action alternative. Subalternative 4.1 is projected to result in inflation-adjusted rate increase for the Participants' water bills of 19 percent (2010) and no change (2020), and under Subalternative 4.2, 21 percent (2010) and 1 percent (2020).

## **Cumulative Effects**

Cumulative effects are the impacts on the environment that result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such action (40 CFR 1508.7). Past actions related to water development have resulted in cumulative effects, which continue to influence the present environmental conditions, which in turn will be affected by the NISP alternatives and reasonably foreseeable actions. The following past actions are viewed as continuing regional trends most likely to interact with the alternatives and cause cumulative effects:

- Increase for need of M&I water
- Increase in water supply project development to meet increased need for M&I water
- Increase of the transfer of agricultural water to M&I use
- Increase in water conservation by water providers and users
- Decrease in lands devoted to agricultural production

- Increase in developed lands
- Increase in population
- Increase in infrastructure to support population growth

These regional trends have resulted in changes in flows in the Poudre and South Platte rivers including reduced peak flow and increased base flows. These regional trends have also resulted in changes in land use including the reduction of agricultural and undeveloped lands due to residential and commercial development and construction of associated infrastructures, and the transfer of irrigation water to M&I use.

Several reasonably foreseeable actions in the region were identified. These reasonably foreseeable actions were categorized as either water-based or land-based activities. The following were identified as reasonably foreseeable water-based actions:

- Halligan and Seaman Water Management Projects
- Windy Gap Firing Project
- Dry Creek Reservoir Project
- Moffat Collection System Project
- Chatfield Reservoir Reallocation
- City of Denver Reuse Project
- City of Aurora Prairie Waters Project
- Cache la Poudre River Flood Reduction and Ecosystem Project
- Augmentation of lower South Platte River wells
- City of Fort Collins water craft course
- Greeley and CDOW new fishing access
- Termination of municipal/domestic leaseback of C-BT water to agriculture
- Modified diversion patterns above the mouth of Poudre Canyon
- Greeley Bellvue Pipeline Project
- Climate change

The following were identified as reasonably foreseeable land-based actions:

- Reservoir construction and expansion
- Population growth in the northern Front Range
- Land development
- North I-25 transportation improvements
- Commercial and residential development along the Poudre River in Fort Collins
- Poudre River regional trail connections

The incremental effects of the alternatives combined with regional trends, past and present actions, and reasonably foreseeable actions are summarized in Table ES-2.

## **Alternative 1**

Cumulative effects resulting from the incremental effects of the No Action alternative (Alternative 1) added to other past, present, and reasonably foreseeable water-based actions are unlikely to occur because the transfer of agricultural water to M&I use is unlikely to result in overall reductions to streamflows in the Poudre and South

Platte rivers except in reaches affected by a change in the point of diversion. However, the No Action alternative would incrementally add to the cumulative effect and regional trend of the reduction in agricultural land and productivity due to the removal of irrigation from up to 69,200 acres of irrigated agricultural lands.

## **Alternative 2**

Cumulative effects resulting from the incremental effects of the Proposed Action (Alternative 2) added to other past, present, and reasonably foreseeable water-based activities are likely to occur. The trend of decreasing flows in the Poudre River would be incrementally increased by Alternative 2 combined with the Halligan and Seaman Water Management Projects (HSWMPs). Alternative 2, when combined with past actions, would further reduce flows in the Poudre River from near the mouth of the Poudre Canyon to the confluence with the South Platte River when NISP was diverting, primarily during wet and average water years. When combined with the HSWMPs, Alternative 2 would further reduce flows in the Poudre River from near the mouth of the Poudre Canyon to above Fort Collins. Alternative 2 would also add to the trend of altered flows in the South Platte River.

## **Alternative 3**

The cumulative effects associated with Alternative 3 would be similar to the cumulative effects for Alternative 2 except the reductions in flow on the Poudre and South Platte rivers would be slightly greater for Alternative 3 due to the larger size of Cactus Hill Reservoir (180,000 AF) relative to Glade Reservoir (170,000 AF).

## **Alternative 4**

Alternative 4 would have water-based and land-based cumulative effects. The water-based cumulative effects on the Poudre River would be the same for Subalternative 4.1 (Glade Reservoir) and Subalternative 4.2 (Cactus Hill Reservoir). The transfer of water from 17,137 acres of irrigated agricultural lands would lessen flow reduction in the South Platte River compared to Alternatives 2 and 3 due to a smaller SPWCP. However, the dry up of 17,137 acres of irrigated agricultural land would add to the regional trend of reduction in agricultural land productivity.

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**Table ES-2. NISP Cumulative Effects on Regional Trends.**

Regional Trends	Past and Present Actions	Reasonably Foreseeable Actions	Alternative 1	Alternative 2	Alternative 3	Alternative 4
<b>Water-Based Effects</b>						
Reduced flows in Poudre River	On average, about 430,000 AF of the annual flow of the Poudre River is diverted for ag. and M&I use.	Halligan and Seaman Projects – anticipated to increase trend of reduced flows.	Neutral – would not increase or decrease trend.	Would reduce high flows in wet and average years, and when combined with the HSWMPs would contribute to the trend of reduced flows in the Poudre River, from the canyon mouth through Fort Collins.		
		Windy Gap Firming Project – would not reduce Poudre River flows.	0 <sup>1</sup>	0	0	0
		Dry Creek Reservoir – would not reduce Poudre River flows.	0	0	0	0
		Moffat Collection System Project – would not affect Poudre River flows.	0	0	0	0
		Chatfield Reservoir reallocation – would not affect Poudre River flows.	0	0	0	0
		City of Denver Reuse Project – would not affect Poudre River flows.	0	0	0	0
		City of Aurora Prairie Waters Project – would not affect Poudre River flows.	0	0	0	0
		Poudre River Flood Reduction and Ecosystem Restoration Project – would not affect normal flows in the Poudre River flows,	0	Would reduce high flows, and when combined with the flood reduction project, would likely further reduce flood flows to the degree that NISP diverts during flood flows.		

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Regional Trends	Past and Present Actions	Reasonably Foreseeable Actions	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		but would reduce flood stage in a 17-mile reach near Greeley.				
		Augmentation of lower South Platte River wells – would not affect Poudre River flows.	0	0	0	0
		City of Fort Collins water craft course – would not affect Poudre River flows, but diversions that would reduce streamflows in the Poudre River below 150 cfs during the boating season would shorten the season for use of the proposed course.	0	Diversions from the Poudre River would shorten the seasonal use of the proposed course in May and July of average years. The course would not be functional in dry years with the proposed minimum design flows. NISP, and potentially Halligan and Seaman, would further reduce flows in the vicinity of the proposed paddle park.		
		Greeley and CDOW new fishing access.	0	0	0	0
		Termination of municipal/domestic leaseback of C-BT to ag.	Would further decrease the need for irrigation water including C-BT, which would decrease delivery of irrigation water via the Poudre River.	When combined with the action alternatives, the reduction or termination of C-BT leaseback/rental programs to ag. could in the future result in reduced releases of C-BT from the Hansen Canal outlet to the Poudre River and reduced exchange capacity on the Poudre River.		
		Modified diversion patterns above the mouth of the Poudre Canyon.	0	0	0	0

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Regional Trends	Past and Present Actions	Reasonably Foreseeable Actions	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		Greeley Bellvue Pipeline Project.	0	When combined with the action alternatives, the additional capacity provided by the pipeline could facilitate the transfer of ag. water to M&I and diversion of the transferred water higher in the Poudre River Basin, resulting in reduced flows on the lower Poudre River.		
		Climate change.	0	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.		
Changes in flows in the South Platte River that have resulted in a trend of reduced peak flows and increased base flows.	Historically, the flows in the South Platte River have been altered by extensive storage, diversion for agriculture, and M&I uses and imports to the South Platte River Basin.	Halligan and Seaman Projects – may decrease flows in the South Platte River due to reductions in flows in the Poudre River.	0	Would reduce flows in the South Platte River due to the SPWCP and reductions to flow in the Poudre River. Would reduce high flows in June of wet and average years by about 12% and 15%, respectively. Winter time flows would be reduced by 5% to 11%.	Lessens flow reduction in South Platte River compared to Alternatives 2 and 3 due to a smaller SPWCP.	
		Windy Gap Firming Project – may increase base flows of the South Platte River depending on the degree to which the imported Windy Gap water is reused.	0	Depending on the degree to which Windy Gap water is reused, the Windy Gap Firming Project may lessen the reductions of South Platte River flows associated with NISP.		
		Dry Creek Reservoir – stores C-BT water for drought protection and return flows from this imported water could increase the base flows of the South Platte River.	0	Depending on the degree to which return flows from participants in Dry Creek Reservoir reach the South Platte River; Dry Creek Reservoir may lessen the reductions in South Platte River flows associated with NISP.		

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Regional Trends	Past and Present Actions	Reasonably Foreseeable Actions	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		Moffat Collection System Project – return flows from the imported water associated with this project could increase the base flows of the South Platte River, depending on the degree to which the imported water is reused.	0	Modeled flow reductions for NISP in the South Platte River included future estimated reuse of water imported by the Moffat Collection System Project. Denver’s reuse of the imported water would not provide water that could offset flow reductions in the South Platte River associated with NISP.		
		Chatfield Reservoir Reallocation Project – could seasonally increase flows in the South Platte River from Chatfield Reservoir to Kersey depending on the alternative selected and how the reallocation is managed.	0	Depending on how the Chatfield Reservoir Reallocation Project is managed, it may lessen the flow reductions to the South Platte associated with NISP.		
		City of Denver Reuse Project – would increase Denver’s reuse of imported water. The increased reuse of imported water would reduce the contribution of imported water to the South Platte River.	0	Modeled flow reductions for NISP in the South Platte River included future estimated reuse of water imported by Denver. Denver’s increased reuse of the imported water would not provide water that could offset flow reductions in the South Platte River associated with NISP.		
		City of Aurora Prairie Waters Project – would increase the reuse of imported water. The increased reuse of imported water would reduce the contribution	0	Modeled flow reductions for NISP in the South Platte River included future estimated reuse of water imported by Aurora. Aurora’s increased reuse of the imported water would not provide water that could offset flow reductions in the South Platte River associated with NISP.		

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Regional Trends	Past and Present Actions	Reasonably Foreseeable Actions	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		of imported water to the South Platte River.				
		Poudre River Flood Reduction and Ecosystem Restoration Project – would not directly affect South Platte River flows, but may help attenuate fixed flows in the Poudre River that could help to reduce flood flows on the South Platte River.	0	It is unlikely that the Poudre River flood reduction project combined with NISP would affect flows in the South Platte River.		
		Augmentation of lower South Platte River wells – would increase base flows and decrease high flows and possibly winter flows in the South Platte River.	0	Augmentation plans on the South Platte River are likely to be diverting water from the South Platte River at about the same time of year as the SPWCP. Therefore, NISP, combined with the well augmentation, is likely to decrease flows in the South Platte River during the fall and winter.		
		City of Fort Collins Water Craft Course – would not affect South Platte River flows.	0	0	0	0
		Greeley and CDOW New Fishing Access – would not affect South Platte River flows.	0	0	0	0
		Termination of municipal/domestic leaseback of C-BT to ag.	Would further decrease the need for irrigation water including C-BT, which could decrease delivery of irrigation water via the Poudre River.	When combined with the action alternatives, the reduction or termination of C-BT leaseback/rental programs to ag. could in the future result in reduced releases of C-BT, which could affect flows on the South Platte River.		

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Regional Trends	Past and Present Actions	Reasonably Foreseeable Actions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
		Modified diversion patterns above the mouth of the Poudre Canyon.	0	0	0	0	
		Greeley Bellvue Pipeline Project.	0	0	0	0	
		Climate change.	0	Climate change may affect precipitation, South Platte River streamflows, and the amount of water available for diversion by NISP, which could alter operation of the SPWCP and, in combination with the action alternatives, could further alter flows in the South Platte River.			
<b>Land-Based Effects</b>							
Reductions in agricultural and undeveloped lands due to residential and commercial development and associated infrastructure, and the transfer of irrigation water to M&I use.	The cumulative effects study area has had rapid development over the past 20 years that has significantly increased the area of developed lands and reduced the area of agricultural lands.	Reservoir construction and expansion – would inundate agricultural lands.	The removal of irrigation from up to 69,200 acres of irrigated ag. land would significantly increase the trend in reduced ag. productivity.	Would incrementally add to the loss of agricultural lands due to construction of facilities.	The removal of irrigation from 17,137 acres of irrigated ag. land would significantly increase the trend in reduced ag. productivity.		
		Population growth in the northern Front Range – population growth would not directly affect ag. lands; however, land use changes associated with population growth are anticipated to result in a reduction of ag. lands.	All of the alternatives are responding to current and projected population growth and the alternatives would not have an incremental effect on population growth.				
		Land development – the area of developed urban land in the cumulative effects study area is expected to increase by about 160% over 25 to	The removal of irrigation from up to 69,200 acres of irrigated ag. land would significantly increase the trend	Would incrementally add to the loss of agricultural lands due to construction of facilities.	The removal of irrigation from 17,137 acres of irrigated ag. lands would significantly increase the trend		

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Regional Trends	Past and Present Actions	Reasonably Foreseeable Actions	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		50 years. This substantial increase in developed lands would greatly reduce ag. lands.	in reduced ag. productivity.			in reduced ag. productivity.
		North I-25 Transportation Improvements – may have minor reductions in ag. lands.	The removal of irrigation from up to 69,200 acres of irrigated ag. land would significantly increase the trend in reduced ag. productivity.	Would incrementally add to the loss of agricultural lands due to construction of facilities.		The removal of irrigation from 17,137 acres of irrigated ag. lands would significantly increase the trend in reduced ag. productivity.
		Commercial area residential development in Fort Collins along the Poudre River – would not add to the trend of reduced ag. lands.	0	0	0	0
		Timnath Poudre trail connection – not anticipated to add to the trend of reduced ag. lands.	0	0	0	0

<sup>1</sup>0 indicates that the alternative is not anticipated to incrementally add to the regional trend when combined with past, present, and future actions.

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