



**Windy Gap Firing Project  
Loan Feasibility Study  
Submitted to the Colorado Water Conservation Board**

**Municipal Subdistrict, Northern Colorado Water Conservation District, acting by  
and through its Windy Gap Firing Project Water Activity Enterprise**

Contact: John Budde, CPA, CGMA  
Municipal Subdistrict, Northern Colorado Water

Conservancy District  
220 Water Avenue  
Berthoud, Colorado 80513

Phone: 970-622-2253

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[jbudde@northernwater.org](mailto:jbudde@northernwater.org)

October 1, 2017

**FEASIBILITY STUDY APPROVAL**  
Pursuant to Colorado Revised Statutes 37-60-121 & 122, and  
in accordance with policies adopted by the Board, the  
CWCB staff has determined this Feasibility Study meets all  
applicable requirements for approval.

Signed  11/3/17  
Date



# COLORADO

Colorado Water  
Conservation Board

Department of Natural Resources

## Water Project Loan Program

### Application Type

☐ Prequalification (Attach 3 years of financial statements) ☒ Loan Approval (Attach Loan Feasibility Study)

### Agency/Company Information

Company / Borrower Name: Windy Gap Firing Project Water Activity Enterprise, a government-owned business by the Municipal Subdistrict, Northern Colorado Water Conservancy District

Authorized Agent & Title: Eric Wilkinson, General Manager

Address: 220 Water Avenue, Berthoud, CO 80513

Phone: (303 ) 622 2201 Email: ewilkinson@northernwater.org

Organization Type: ☐ Ditch Co., ☒ District, ☐ Municipality Incorporated? ☐ YES  
☐ Other: ☒ NO

County: Boulder, Broomfield, Larimer, Weld

Number of Shares/Taps:

Water District: Municipal Subdistrict, Northern Colorado Water Conservancy District

Avg. Water Diverted/Yr \_\_\_\_\_ acre-feet

Number of Shareholders/Customers Served: 12

Current Assessment per Share \$ \_\_\_\_\_ (Ditch Co)

Federal ID Number: 23-7072612

Average monthly water bill \$ \_\_\_\_\_ (Municipality)

### Contact Information

Project Representative: Jeff Drager

Phone: (970 ) 622 2333 Email: jdrager@northernwater.org

Engineer: Stantec - Craig Harris

Phone: (303 ) 291 2130 Email: craig.harris@stantec.com

Attorney: Bennett Raley

Phone: (303 ) 861 1963 ext 146 Email: BRaley@troutlaw.com

### Project Information

Project Name: Windy Gap Firing Project (WGFP)

Brief Description of Project: (Attach separate sheets if needed)

WGFP will entail construction of a new water storage reservoir that will provide more reliable water deliveries from the existing Windy Gap Project. Using existing Windy Gap water rights, WGFP is expected to provide a firm annually yield of 30,000 acre-feet of water to the 12 participants. WGFP will consist of the Chimney Hollow Reservoir and related facilities providing 90,000 acre-feet of dedicated storage.

General Location: (Attach Map of Area)

Chimney Hollow Reservoir, located southwest of Loveland and just west of Carter Reservoir

Estimated Engineering Costs:

Estimated Construction Costs:

Other Costs (Describe Above):

Estimated Total Project Costs: \$440 Million

Requested Loan Amount: \$90 Million

Requested Loan Term (10, 20, or 30 years):  
30 \_\_\_\_\_ Years

Project Start Date(s) Design: September 2016

Construction: September 2018

### Signature

GENERAL MANAGER

Signature / Title

10/1/17

Date

Return to: Finance Section Attn: Anna Mauss  
1313 Sherman St #718  
Denver, CO 80203  
Ph. 303/866.3449  
e-mail: anna.mauss@state.co.us





**Windy Gap Firming Project  
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**Municipal Subdistrict, Northern Colorado Water Conservation District, acting by  
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Phone: 970-622-2253  
Fax: 877-851-0017  
[jbudde@northernwater.org](mailto:jbudde@northernwater.org)  
October 1, 2017



## **Municipal Subdistrict, Northern Colorado Water Conservancy District (Subdistrict)**

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## Municipal Subdistrict, Northern Colorado Water Conservancy District

### General

The Subdistrict was organized as a subdistrict of Northern Colorado Water Conservancy District (Northern Water) by decree of the District Court of Weld County, Colorado, on July 6, 1970, pursuant to the Water Conservancy Act. Under the Water Conservancy Act, a subdistrict thus formed is a separate and independent conservancy district with the same powers and legal standing as its parent district and is an independent political subdivision of the State of Colorado. The Subdistrict has the authority to undertake projects separate from those undertaken by Northern Water.

The Subdistrict has an agreement with Northern Water whereby Northern Water provides all administrative, operation and maintenance functions for the subdistrict, and is reimbursed by the Subdistrict for the services rendered. The Board of the Subdistrict is, by statute, the same as the board of Northern Water. It has been the practice of the Subdistrict to elect a different slate of officers from those chosen by Northern Water. The staff of Northern Water serves as the staff of the Subdistrict, with the Subdistrict reimbursing Northern Water for the actual time of such staff plus an additional percentage to cover costs and overhead. Northern Water does not approve or modify the Subdistrict's budget, hold title to any of the Subdistrict's water rights, authorize issuance of Subdistrict's bonds or appoint the Subdistrict's Board or management. Therefore, the Subdistrict is not under control of Northern Water and is not included in Northern Water's financial reports. The Subdistrict's fiscal year end is September 30.

### History

#### Six Cities

Formal efforts to develop and construct the Windy Gap Project began in the summer of 1967 when Longmont Mayor Ralph Price filed for water rights on the Colorado River near Granby. Price was acting as trustee for a coalition of six Northern Colorado cities: Boulder, Estes Park, Fort Collins, Greeley, Longmont and Loveland.

#### A Geologic Cut Called Windy Gap

The Windy Gap Project they jointly pursued is located on the West Slope near a natural geologic cut called Windy Gap, just below the confluence of the Colorado and Fraser rivers. The cities envisioned Windy Gap as a water source to meet the future needs of the rapidly growing Northern Front Range. After studying growth rates and water supply demand projections, the six cities chose to pursue the Project to meet their future municipal needs.

#### Municipal Subdistrict Formed

In 1969, the participants realized that the work and expertise needed to build the Windy Gap Project required a stronger organization than they could provide independently. The Subdistrict was formally established on July 6, 1970, with the same powers and legal standing as the parent Northern Water.

## Municipal Subdistrict, Northern Colorado Water Conservancy District

WINDY GAP TIMELINE	1967 JULY 17	1969 FEBRUARY 24	1970 JULY 6	1981 APRIL/NOVEMBER	1985 JUNE 29	1999 NOVEMBER	2017 May
How the Windy Gap project came to be	Longmont Mayor Ralph Price files for water rights	Six Cities Committee formally created	Municipal Subdistrict formed	Reclamation approves project and ground breaking ceremony	Windy Gap Project dedicated and water deliveries begin	Establishment of the Windy Gap Firming Project Water Enterprise	Windy Gap Firming Project receives final federal permit

### The Windy Gap Project

Following completion and approval of an Environmental Impact Statement and acquisition of 23 permits and licenses, Windy Gap Project construction began in July 1981. The project was completed in 1985 and began delivering water to Subdistrict allottees in July. Today, the Windy Gap Project consists of a diversion dam on the Colorado River that creates the 445 acre-foot Windy Gap Reservoir, a pumping plant and a six mile pipeline to Lake Granby. This system is capable of delivering an average of 48,000 acre-feet of water annually, diverted primarily during the spring runoff season between April and July. During these periods of high flows in the Colorado and Fraser rivers, water is pumped from Windy Gap Reservoir to Lake Granby, where it is stored for delivery through the Colorado-Big Thompson Project (C-BT Project) facilities to water users on the Front Range. The Windy Gap Water Activity Enterprise Fund has no noncurrent liabilities and all outstanding indebtedness incurred for the construction of the Windy Gap Project was fully defeased in 2016. The water activity enterprise is legally distinct and financially independent fund and has been established in accordance with Colorado Statutes, and, as “enterprise” is excluded from the application of Article X, Section 20, of the Colorado Constitution.



*Windy Gap Pump Plant construction in the early 1980's.*



## Municipal Subdistrict, Northern Colorado Water Conservancy District

### Windy Gap Project Mitigation

The Subdistrict is required by the Water Conservancy Act to design, construct and operate the project in a manner that will not impair the Colorado River Basin or increase costs to its water users. To satisfy this requirement, the Subdistrict provided mitigation measures and additional benefits to the West Slope. These included:

- \$10.2 million payment to the Colorado River Water Conservation District, used as seed money to construct Wolford Mountain Reservoir
- \$550,000 to the U.S. Fish and Wildlife Service for endangered fish species studies
- \$500,000 to upgrade and provide new pumps for rancher diversions downstream
- \$420,000 to Hot Sulphur Springs for upgrading water and wastewater treatment facilities

### Water Allotment Contracts for Windy Gap Project

The Subdistrict has entered into Water Allotment Contracts (allotment contracts) with each of the Initial Participants and Participating Transferees for the Windy Gap Projects. Allotment contracts provide that participants annually receive their proportional share of Windy Gap water. Every unit equals 100 acre-feet of water, or 1/480 of the annual average yield produced. Each water allotment contract requires participants to make annual payments equal to the corresponding share of the costs related to the Subdistrict's acquisition of water rights, and operation, maintenance and replacement of Windy Gap Project features, as well as carriage charges to Northern Water and U.S. Bureau of Reclamation (Reclamation) for using the C-BT Project for storing and delivering Windy Gap water.

### Carriage Contract

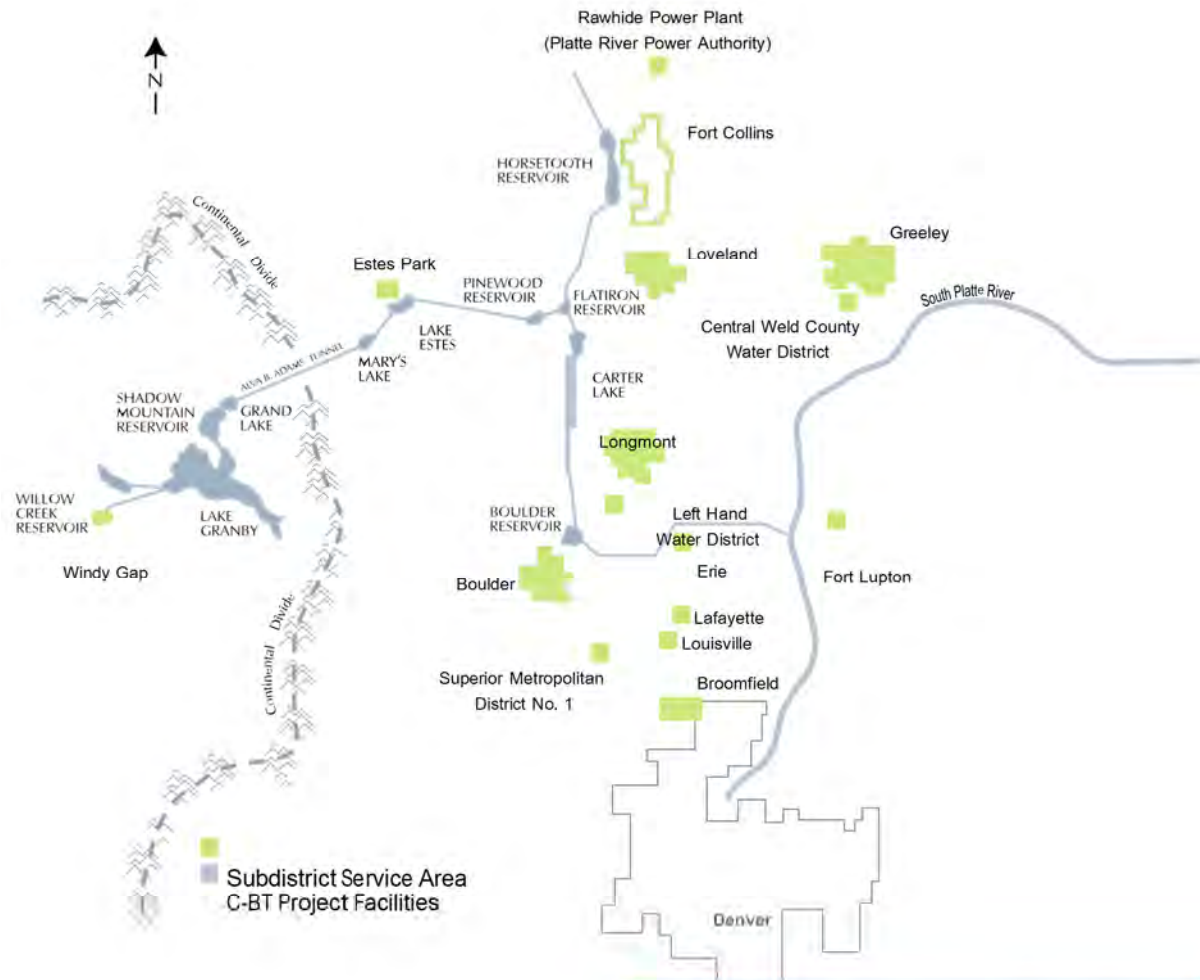
The Subdistrict has a Carriage Contract with Reclamation and Northern Water specifying how Windy Gap water will be stored and carried to the East Slope through the C-BT Project using the unused capacity of the existing C-BT Project's storage and conveyance facilities. Windy Gap's largest annual operating expense is carriage charges.



Windy Gap Pump Plant

## Municipal Subdistrict, Northern Colorado Water Conservancy District

### Service Area and Windy Gap Project Participants



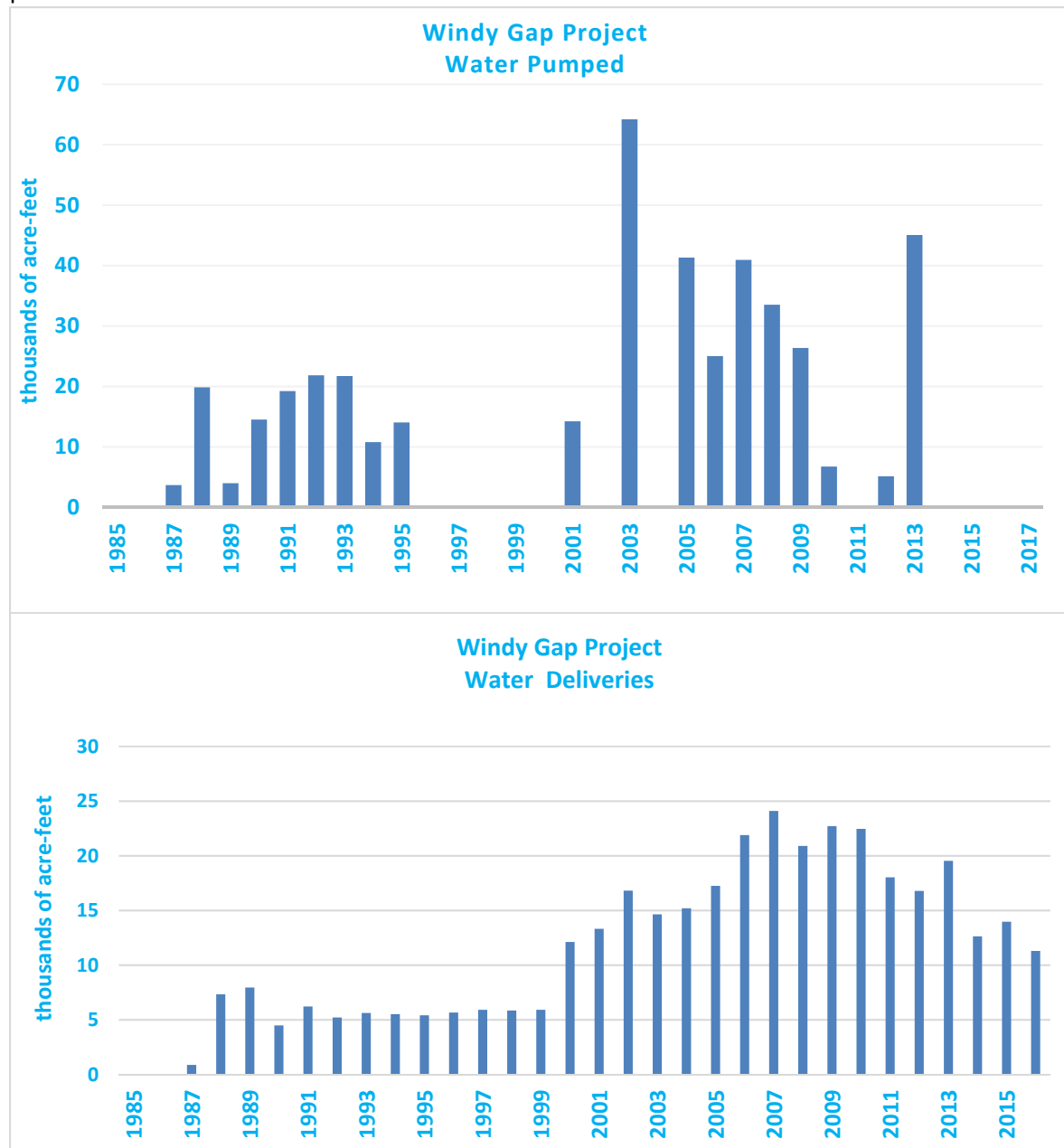
Windy Gap Participants		
Participants	Water Units	Percentage
Platte River Power Authority	147	30.6%
Longmont	80	16.7
Broomfield	56	11.7
Greeley	52	10.8
Loveland	40	8.3
Boulder	37	7.7
Erie	20	4.2
Little Thompson Water District	17	3.5
Superior	15	3.1
Louisville	6	1.3
Estes Park	3	0.6
Fort Lupton	3	0.6
Lafayette	3	0.6
Central Weld County Water District	1	0.2



## Municipal Subdistrict, Northern Colorado Water Conservancy District

### Windy Gap Project's Operating Results

Since the Project became operational in 1985, the Subdistrict has pumped 13,521.12-acre feet on an annual average basis and a maximum of 64,200-acre feet was pumped in 2003. On an annual average basis, participants took delivery of 11,419 acre-feet of water. The amount of annual pumping is based on water orders from the Participants and capacity available for Windy Gap Project water storage in Lake Granby. No water was pumped in 1996, 1997, 1998, 1999, 2000, 2011, 2014, 2015, 2016, and 2017 due to lack of available water storage in the C-BT project. A summary of water pumped and deliveries is provided in the charts below:



## Municipal Subdistrict, Northern Colorado Water Conservancy District

### The Windy Gap Firming Project

#### Windy Gap Firming Project Water Activity Enterprise Fund (WGFPWAE)

The Windy Gap Firming Project Water Activity Enterprise Fund is self-supporting through participants' contributions. The water activity enterprise is legally distinct and financially independent fund and has been established in accordance with Colorado Statutes, and, as "enterprise" is excluded from the application of Article X, Section 20, of the Colorado Constitution. The Subdistrict has undertaken the Windy Gap Firming Project to increase the reliable firm yield of the existing Windy Gap Project. The annual delivery of Windy Gap Project water is not reliable in years of low spring runoffs, due to the Windy Gap Project's junior water rights, and conversely, during some wet periods, storage space in Granby Reservoir is not available for Windy Gap Project Water. In 1999, a group of the Windy Gap Project participants working through the Subdistrict, initiated the proposed Project to complement the Windy Gap Project by firming a portion of their Windy Gap Project Water Units. The Project participants include the Platte River Power Authority, Central Weld County Water District, Little Thompson Water District and the municipalities of Broomfield, Fort Lupton, Greeley, Lafayette, Longmont, Louisville, Loveland, Superior and Erie.

#### Purpose

The specific purpose of the Windy Gap Firming Project is to increase the firm yield to approximately 30,000 acre-feet of water from the existing Windy Gap Project. Additional reliability and yield will be achieved by constructing a new 90,000 acre-foot reservoir, the Chimney Hollow Reservoir, located southwest of Loveland and just west of Carter Reservoir, dedicated to store Windy Gap Project water. Firm water deliveries from the Windy Gap Project are needed to meet a portion of the existing and future wholesale water supply demands of the Firming Project Participants and ultimately the existing and future demands the end users served within the boundaries of the Subdistrict.

#### Permits

The permitting process for the Windy Gap Firming Project began in 2003 and has included a 1041 permit which was received from Grand County in 2012, and an official Record of Decision (ROD) that was received from the U.S. Bureau of Reclamation in 2014, approving construction and operation of the Chimney Hollow Reservoir and a physical connection of the Chimney Hollow Reservoir and appurtenant facilities to the C-BT Project facilities. The Colorado Department of Public Health and Environment issued its 401 water quality certification for the Project on March 25, 2016. Also, the State of Colorado officially endorsed the Project and Chimney Hollow Reservoir on April 12, 2016. The final ROD and federal 404 Clean Water Act (CWA) permit from the U.S. Army Corps of Engineers was signed on May 17, 2017. This 404 CWA permit is the final federal requirement needed to construct Chimney Hollow Reservoir. The permit documents are available upon request.

## Municipal Subdistrict, Northern Colorado Water Conservancy District

### The Windy Gap Firing Project

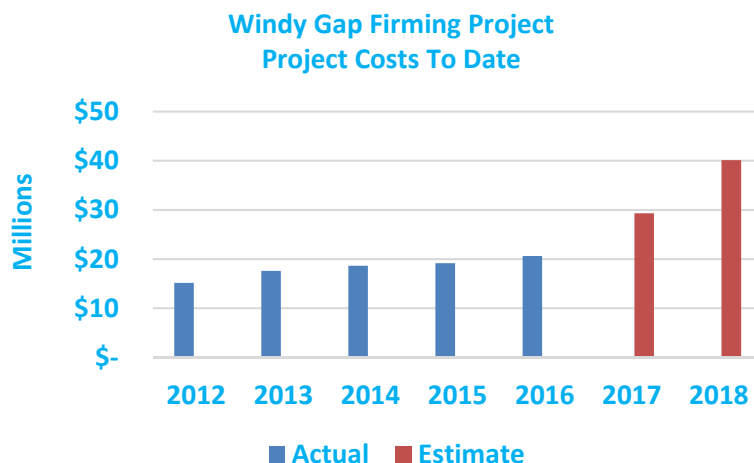
#### Description of Windy Gap Firing Project Facilities

Detailed design of the Windy Gap Firing Project facilities is expected to be complete in summer 2018, followed by 41 months of construction and is expected to be operational in 2022. The estimated cost of the reservoir and appurtenant facilities is approximately \$440 million. The justification for selecting the main dam type is included in appendix 3.

#### Primary appurtenances required for Chimney Hollow Dam and Reservoir include:

- Chimney Hollow Dam will be a rockfill dam with an asphalt core approximately 350 feet tall.
- A combined reservoir inlet and outlet consisting of a submerged single-level inlet, a tunnel under the right (east) abutment of the dam with a 6.5-foot-diameter steel-lined, concrete-encased conduit.
- A spillway with stilling basin to convey a peak discharge of about 850 cfs after the reservoir attenuates the peak inflow to the reservoir of about 20,200 cfs resulting from the inflow design flood (resulting from 80-percent of the general storm Probable Maximum Precipitation).
- A 36- foot- high saddle dam is required to close the southern end of the reservoir. It will also be an asphalt core rockfill dam.
- Water conveyance facilities include new buried pipelines connecting the Chimney Hollow inlet/outlet to the Bald Mountain Tunnel and Carter Lake Pressure Conduit and energy dissipation facilities to control flow and pressure in and out of the reservoir and prevent over-pressurization of the pressure conduit. Modifications in the various pipeline connections may be made during final design.
- Access road from the existing county road (Pole Hill Road) to the left (west) abutment.
- The existing electrical transmission line owned by Western Area Power Administration (WAPA) will be relocated outside of the reservoir area. This work will be done by WAPA under a separate contract and is not part of this scope of work.

A summary of project to date costs are provided in the chart below:





## **Municipal Subdistrict, Northern Colorado Water Conservancy District**

### **The Windy Gap Firming Project**

#### **Windy Gap Firming Project Proposed Financing Structure**

The anticipated plan for financing consists of a Senior/Subordinate structure in which the Windy Gap Firming Water Activity Enterprise will issue Senior Lien Water Revenue Bonds (Senior Bonds) and will also enter into a Subordinate Lien Loan (Subordinate Loan) from the Colorado Water Conservation Board (CWCB). The amount of the Subordinate Loan will be \$90 million. Section 12 of House Bill 17-1248 authorized the CWCB to make the Subordinate Loan for the Windy Gap Firming Project. The Governor signed the bill on May 23, 2017. Final approval of the Subordinate Loan by CWCB is expected in November 2017.

The Senior Bonds are anticipated to be a fixed-rate bond issuance of approximately \$100 to \$200 million. The proceeds of the Senior Bonds along with the Subordinate Loan, when combined with other funds provided by the Windy Gap Firming Project participants, will be used to pay the costs associated with the construction and completion of the Windy Gap Firming Project. It is expected that the Senior Bonds will close by the end of the third quarter of 2018.

#### **Security for the Subordinate Loan**

The Subordinate Loan will be payable from and secured by a pledge of the Windy Gap Firming Project Revenues (i.e. payments received by the Subdistrict, acting by and through its WGFPAE, from the Project Participants under the Project Allotment Contracts); provided that such pledge will be subordinate to the payment of the Senior Bonds issued for constructing the Windy Gap Firming Project.

#### **Sources of Payment of the Subordinate Loan**

The Subdistrict plans to enter into allotment contracts with each of the Windy Gap Firming Project Participants regarding the water storage capacity in the Windy Gap Firming Project. Under the proposed allotment contracts, payment of the debt service charges will be not conditioned upon the receipt of any amount of water storage by the respective Participants. Other terms will be determined after preliminary rating discussions are done.

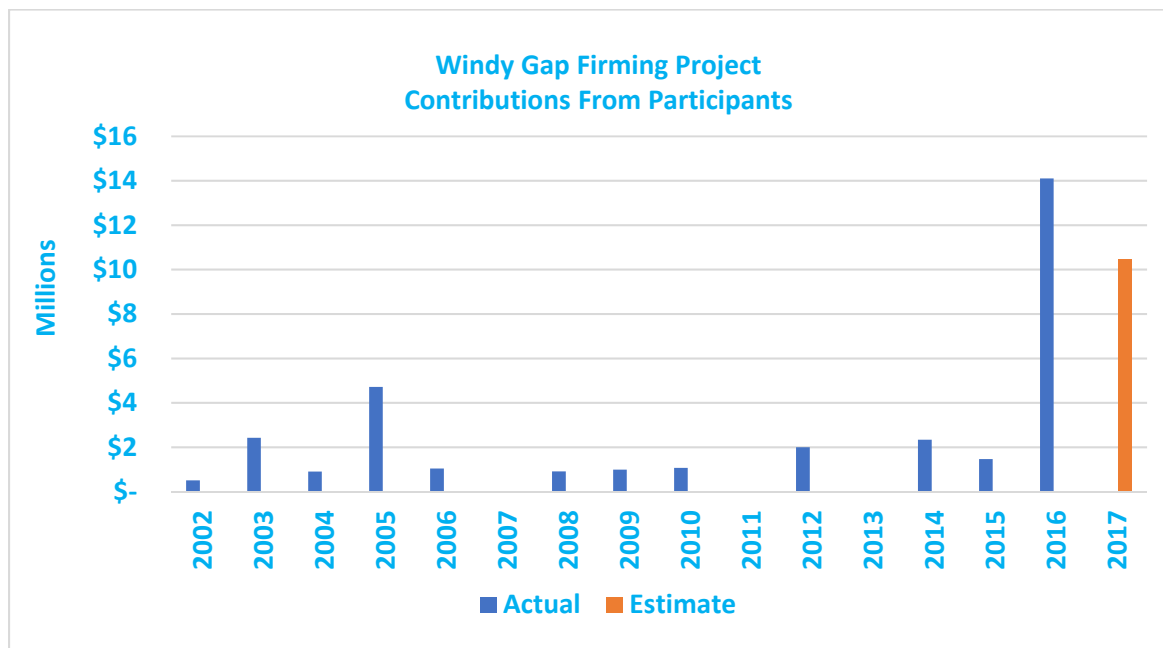
## Municipal Subdistrict, Northern Colorado Water Conservancy District

### The Windy Gap Firing Project

A summary of Windy Gap Firing Project Participants is provided in the table below:

Participants	Storage Volume (Acre-foot)	Percent
Broomfield	26,464	29.40%
Platte River Power Authority	14,136	15.71%
Longmont	10,000	11.11%
Loveland	9,451	10.50%
Greeley	9,189	10.21%
Erie	6,000	6.67%
Little Thompson Water District	4,850	5.39%
Superior	4,726	5.25%
Louisville	2,835	3.15%
Fort Lupton	1,103	1.23%
Lafayette	900	1.00%
Central Weld County Water District	346	0.38%
	90,000	100.00%

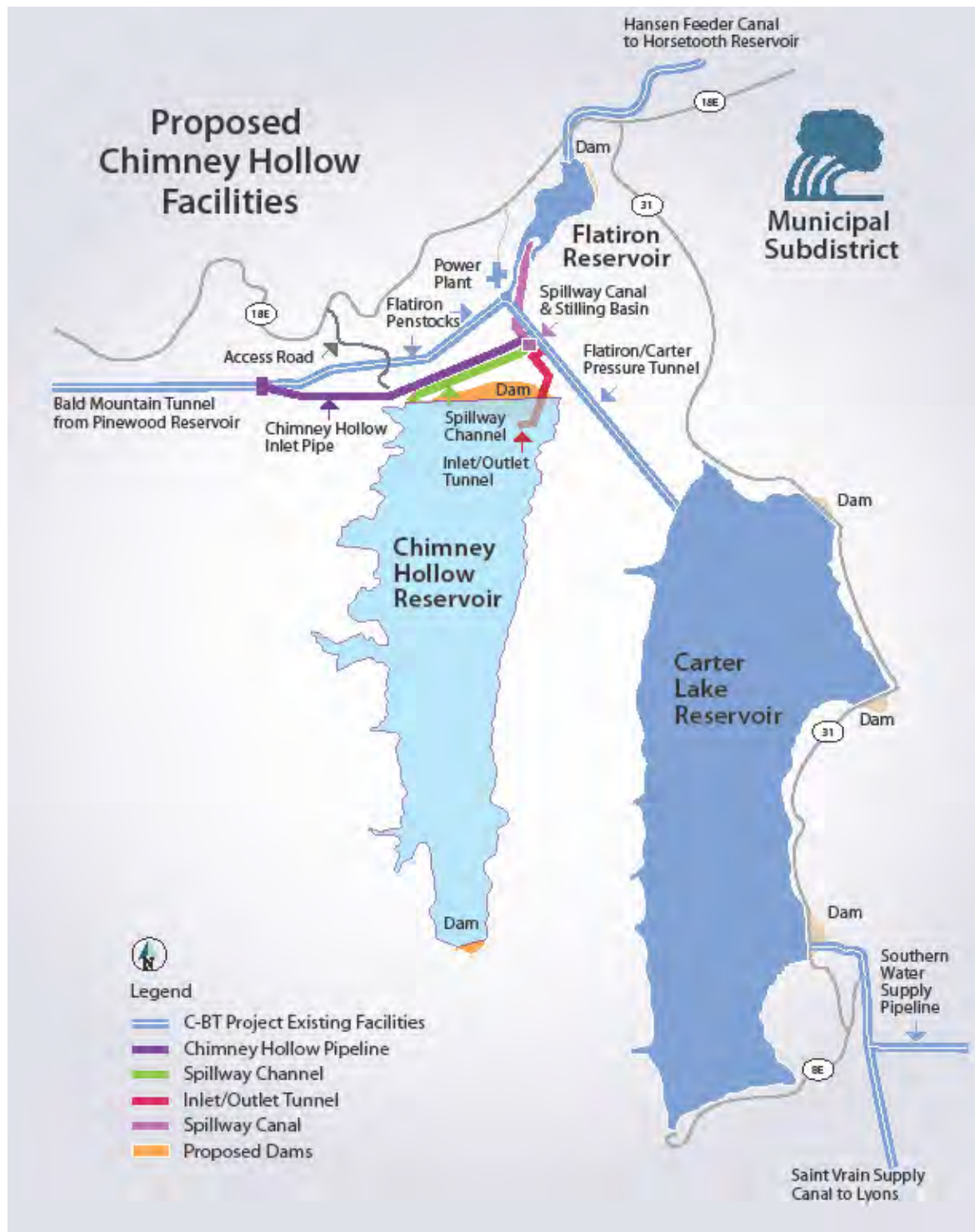
A summary of contributions from Windy Gap Firing Participants is provided in the chart below:



## Municipal Subdistrict, Northern Colorado Water Conservancy District

### The Windy Gap Firming Project

#### Proposed Chimney Hollow Facilities





**APPENDIX 1:**  
**Windy Gap Water Activity Enterprise and Fund Resolution**

**MUNICIPAL SUBDISTRICT  
NORTHERN COLORADO WATER CONSERVANCY DISTRICT**

**RESOLUTION  
MS-189-08-93**

**ESTABLISHMENT OF MUNICIPAL SUBDISTRICT,  
NORTHERN COLORADO WATER CONSERVANCY DISTRICT WINDY GAP  
WATER ACTIVITY ENTERPRISE AND FUND**

WHEREAS, the Board of Directors of Municipal Subdistrict, Northern Colorado Water Conservancy District hereby finds, determines, and declares that it is necessary and desirable to establish a water activity enterprise in accordance with Article 45.1 of Title 37, C.R.S.;

NOW, THEREFORE, BE RESOLVED, that the Board of Directors of said District establishes the Municipal Subdistrict, Northern Colorado Water Conservancy District - Windy Gap Water Activity Enterprise; effective September 30, 1993; and

BE IT FURTHER RESOLVED. that the Municipal Subdistrict, Northern Colorado Water Conservancy District - Windy Gap Water Activity Enterprise is established for the purpose of pursuing and continuing water activities in connection with the 'Windy Gap Project," including water acquisition and water project facility activities, and the construction, operation, repair, and replacement of water facilities related to providing water from and through the 'Windy Gap Project"; and

BE IT FURTHER RESOLVED, that, pursuant to and in accordance with Article 45.1 of Title 37. C.R.S., the governing body of Municipal Subdistrict, Northern Colorado Water Conservancy District - Windy Gap Project Water Activity Enterprise shall be the Board of Directors of the Municipal Subdistrict, Northern Colorado Water Conservancy District; and

BE IT FURTHER RESOLVED, that the Municipal Subdistrict, Northern Colorado Water Conservancy District - Windy Gap Project Water Activity Enterprise shall be entitled to exercise all powers. authorities, rights, and responsibilities which are exercisable by it in accordance with Article 45.1 of Title 37, C.R.S. and other applicable law; and

BE IT FURTHER RESOLVED, that all assets and liabilities of the water activity enterprise shall be accounted for in the Municipal Subdistrict, Northern Colorado Water Conservancy District Windy Gap Water Enterprise Fund; and

BE IT FURTHER RESOLVED, that the Board of Directors of the said District authorizes the transfer of assets. liabilities and contractual rights to the Municipal Subdistrict, Northern Colorado Water

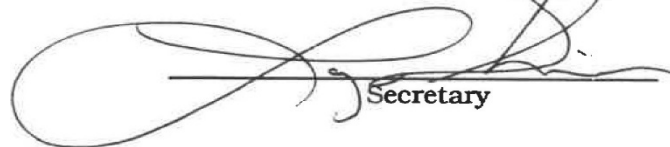
Conservancy District - Windy Gap Water Enterprise Fund in accordance with Article 45.1 of Title 37, C.R.S.; and

BE IT FURTHER RESOLVED, that the Municipal Subdistrict, Northern Colorado Water Conservancy District - Windy Gap Water Enterprise Fund shall not incur operating or capital expenditures prior to the fiscal year commencing October 1, 1993.

**CERTIFICATE**

I, Larry D. Simpson, do hereby certify that the above is a true and correct copy of a Resolution unanimously adopted by the Board of Directors of Municipal Subdistrict, Northern Colorado Conservancy District at a regular meeting of said Board held in Loveland, 1993.

**of Municipal Subdistrict, Northern Colorado Water  
d Board held in Loveland, Colorado, on August 13,**



Secretary

**APPENDIX 2:**  
**Windy Gap Firing Project Water Activity Enterprise and Fund Resolution**

**MUNICIPAL SUBDISTRICT,  
NORTHERN COLORADO WATER CONSERVANCY DISTRICT**

**RESOLUTION  
MS-239-11-99**

**ESTABLISHMENT OF MUNICIPAL SUBDISTRICT, NORTHERN COLORADO  
WATER CONSERVANCY DISTRICT -WINDY GAP FIRING PROJECT WATER ACTIVITY  
ENTERPRISE AND FUND**

WHEREAS, the Board of Directors of the Municipal Subdistrict, Northern Colorado Water Conservancy District, have received requests from the City of Broomfield and the Superior Metropolitan District No. 1 to investigate and pursue the construction of an emergency water storage reservoir for the purpose of firming the supply of water that they receive from the Windy Gap Project (the "Windy Gap Firing Project"), at their expense; and

WHEREAS, the Board of Directors of the Municipal Subdistrict, Northern Colorado Water Conservancy District, hereby finds, determines and declares that it is necessary and desirable to establish a water activity enterprise in accordance with Article 45.1 of Title 37, C.R.S., for the purpose of pursuing the Windy Gap Firing Project;

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors of said Subdistrict establishes the Municipal Subdistrict, Northern Colorado Water Conservancy District - Windy Gap Firing Project Water Activity Enterprise, effective November 4, 1999;

BE IT FURTHER RESOLVED, that the Board of Directors of said Subdistrict directs the staff and counsel of the Subdistrict to investigate and pursue the Windy Gap Firing Project through the Municipal Subdistrict, Northern Colorado Water Conservancy District - Windy Gap Firing Project Water Activity Enterprise, in a manner that will maximize the benefits of firming the supply of water from the Windy Gap Project for all participants in the Windy Gap Project who want to participate in the Windy Gap Firing Project, all at the expense of those entities that desire to participate in the Windy Gap Firing Project; and

BE IT FURTHER RESOLVED, that the Municipal Subdistrict, Northern Colorado Water Conservancy District - Windy Gap Firing Project Water Activity Enterprise is established for the purpose of pursuing and continuing water activities in connection with firming the supplies of water from the Windy Gap Project, including water project or facility activities, and the construction, operation, repair, and replacement of water facilities related to firming the supplies of water from the Windy Gap Project; and

BE IT FURTHER RESOLVED, that, pursuant to and in accordance with Article 45.1 of Title 37, C.R.S., the governing body of the Municipal Subdistrict, Northern Colorado Water Conservancy District -Windy Gap



Firming Project Water Activity Enterprise shall be the Board of Directors of the Municipal Subdistrict, Northern Colorado Water Conservancy District; and

BE IT FURTHER RESOLVED, that the Municipal Subdistrict, Northern Colorado Water Conservancy District - Windy Gap Firming Project Water Activity Enterprise shall be entitled to exercise all powers, authorities, rights, and responsibilities which are exercisable by it in accordance with Article 45.1 of Title 37, C.R.S. and other applicable law; and

BE IT FURTHER RESOLVED, that all assets and liabilities of the water activity enterprise shall be accounted for in Municipal Subdistrict, Northern Colorado Water Conservancy District - Windy Gap Firming Project Water Activity Enterprise Fund; and

BE IT FURTHER RESOLVED, that the Board of Directors of the said Subdistrict authorizes the transfer of assets, liabilities and contractual rights to the Municipal Subdistrict, Northern Colorado Water Conservancy District - Windy Gap Firming Project Water Activity Enterprise Fund in accordance with Article 45.1 of Title 37, C.R.S.; and

BE IT FURTHER RESOLVED, that the Municipal Subdistrict, Northern Colorado Water Conservancy District -Windy Gap Firming Project Water Activity Enterprise Fund shall not incur operating or capital expenditures prior to November 4, 1999.

#### CERTIFICATE

I, Eric W. Wilkinson, do hereby certify that the above is a true and correct copy of a Resolution unanimously adopted by the Board of Directors of the Municipal Subdistrict, Northern Colorado Water Conservancy District at a regular meeting of said Board held in Loveland, Colorado, on November 4, 1999.

A handwritten signature in dark ink, appearing to read "Eric W. Wilkinson", is written over a horizontal line.

Secretary

### APPENDIX 3: Justification for Selecting Main Dam Type



#### **Stantec Consulting Services, Inc.**

1560 Broadway St., Suite 1800 Denver, CO  
80202

September 27, 2017

File: 10509247

**Attention: Mr. Jeff Drager**

Municipal Subdistrict  
Northern Colorado Water Conservancy District  
220 Water Avenue  
Berthoud, CO 80513  
Dear Jeff,

**Reference: Chimney Hollow Reservoir Project**  
**Justification for Selecting Main Dam Type**

The purpose of this letter is to provide a summary of the project definition phase and alternatives evaluation that led to the selection of an asphaltic core rockfill dam (ACRD) structure for the main dam of the Chimney Hollow Reservoir Project. The project definition phase consisted of geotechnical investigations, an alternatives development and analysis, comparative cost estimate, and reviews by expert panels.

An assessment of the geologic features at the site was conducted using data from previous investigations and the data collected from the 2016 GEI & Stantec geotechnical investigation which consisted of geologic mapping, 14 seismic refraction lines, 37 drill holes, 27 test pits, and a laboratory testing program. The data from the field investigation is presented in the Geotechnical Data Report (GEI, 2017a)<sup>1</sup> and the

interpretations of the geotechnical data are provided in the Geotechnical Recommendations Report (GEI, 2017b)<sup>2</sup> and the Geotechnical Design Report (MWH now part of Stantec, 2017a)<sup>2</sup>. The geotechnical

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<sup>1</sup> GEI Consultants, Inc., 2017a. "Chimney Hollow Reservoir Geotechnical Data Report, Larimer County, Colorado," January.

<sup>2</sup> GEI Consultants, Inc., 2017b. Chimney Hollow Reservoir Geotechnical Recommendations Report, Larimer County, Colorado, January 18.

<sup>2</sup> MWH, now a part of Stantec Consulting Services Inc. (MWH), 2017a. "Geotechnical Design Report, Chimney Hollow Reservoir Project," February.

investigation data and interpretations were used to develop a common characterization of foundation conditions and an estimate of available borrow quantities for the core, rockfill, and earth fill material.

The alternatives analysis performed on the main dam consisted of reviewing the preliminary designs for the earth core rockfill dam (ECDR), concrete faced rockfill dam (CFRD), and asphaltic concrete core rockfill dam (ACRD) alternatives. After reviewing International Commission on Large Dams (ICOLD) guidelines, similar projects, and published documents, the design criteria for the ECDR, CFRD, and ACRD alternatives were selected. Based on the updated design criteria, a conceptual layout was generated for each dam type alternative. The designs were used to estimate quantities for the major cost items (rockfill, core material, filters, concrete, hydraulic asphalt concrete, etc.). The results and conclusions from the alternatives analysis are included in the Alternatives Analysis and Dam Type Selection Report (MWH now part of Stantec, 2017b)<sup>3</sup>.

The Alternatives Analysis and Dam Type Selection Report recommends an ACRD dam as the preferred option based on:

- Construction cost;
- Anticipated dam performance;
- Construction schedule and risk of schedule delays;
- Risk for potential construction cost increases;
- Risks associated with offsite borrow materials;
- Additional environmental permitting and risk for environmental permitting delays; and
- Contractor familiarity with dam type.

The selection criteria listed above were evaluated and weighted for each of the three dam types. The ACRD was the highest ranked or tied for the highest ranked alternative for anticipated performance, estimated construction cost, potential construction cost increases, potential additional environmental permitting, offsite material risk and schedule delays. The results of the evaluation were presented to Stantec's internal technical review board, the Subdistrict, and an external project review board led by the State of Colorado State Engineering Office (SEO).

A key aspect of the design team recommendation is that the final construction of the hydraulic asphalt concrete core feature be performed by one of three globally recognized specialty contractors with experience in HAC core construction. The use of one of these specialty firms reduces construction and long-term performance risks below that of other configurations. Including the HAC specialty firms in pre-qualified teams also eliminates the concerns that would otherwise exist with contractor familiarity with the technology. The use of HAC, a manufactured material, for the core of the dam removes the risks associated with variability of natural clay that, when available, is often the preferred cost-effective

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<sup>3</sup> MWH, now a part of Stantec Consulting Services Inc. (MWH), 2017b. "Alternatives Analysis and Dam Type Selection, Chimney Hollow Reservoir Project," March.



material for dam construction. At the Chimney Hollow site the clay materials were contained in variable deposits which represent significant risk for potential construction cost increases.

Stantec's internal technical review (ITR) team consisted of industry recognized experts in dam design and construction and included Dr. Kaare Hoeg, one of the global experts in HAC technology, reviewed the project definition phase documents including the geotechnical investigations and the Alternatives Analysis and Dam Type Selection Report. The Stantec ITR team concurred with the recommendation of the design team to advance the project using an ACRD configuration for the Chimney Hollow dam. (Feb 2017)<sup>4</sup>

An external technical project review board led by the SEO also reviewed the project definition phase geotechnical investigations and reports and concurred with the recommendation to advance the project with the ACRD dam configuration. (March 2017)<sup>5</sup>. Excerpts from the external technical project review board's report that support the selection of the ACRD dam configuration are provided below:

- The ECRD and CFRD designs present slightly higher risks with regard to material quality and availability, and therefore the ACRD is the preferred option for development at the next level of design.
- The ACRD is an internationally accepted technology for constructing large dams, with at least eight dams of comparable or greater height to the proposed Chimney Hollow Dam having been completed and with dams in service for as long as about 55 years. The existing ACRD dams have a very good performance record, almost all with minimal reported leakage. With the asphalt concrete core encased within the dam and not subject to exposure to environmental factors, such as ultraviolet radiation, long term deterioration of the asphalt concrete is not expected to be a concern. The first asphalt concrete core dams in North America have recently been constructed and successfully put into service in Canada, and at least one other new asphalt concrete core dam is currently being designed for construction in the United States.
- The PRB (external technical project review board) concurs with the selection of the ACRD as the preferred alternative for the main dam.

The Subdistrict reviewed and accepted Stantec's recommendation of the ACRD Dam, supported by the report by the external review board.

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<sup>4</sup> MWH now part of Stantec, 2017, "Chimney Hollow Dam, Internal Technical Review (ITR) Meeting No. 2, Final Report," February 26.

<sup>5</sup> Chimney Hollow Reservoir Project Review Board, 2017, "Meeting No. 1 Final Report," March 31.

Regards,

**Stantec Consulting Services Inc.**



Donald Montgomery, P.E.

Design Manager and Dam Design Lead

Phone: 303-291-2130

Attachment: None

cc: Joe Donnelly, Subdistrict

Craig Harris, Stantec

Brian Hall, Stantec

CHIMNEY HOLLOW DAM  
ACRD  
*Opinion of Probable Construction Costs*

Currency: USD-United States- MAY 2017 Dollar

Grand Total Price:					\$ 424,944,971	
Item	Description	Quantity	UOM	Unit Price	Total Price	Comments
<b>General Bid Items</b>					<b>\$12,569,367</b>	
1	Mobilization	1.00	LS	1,758,380.20	\$1,758,380	
2	Dewatering	1.00	LS	476,250.00	\$476,250	
3	Sediment and Erosion Control	1.00	LS	450,000.00	\$450,000	
4	Stream Diversion	1.00	LS	483,081.60	\$483,082	
5	Permanent Access Roads	3,700.00	LF	174.60	\$1,146,013	
6	Relocation of Transmission Line	1.00	LS	3,500,000.00	\$3,500,000	
7	Maintenance Road	21,450.00	LF	170.43	\$3,655,643	
8	Onsite Power Distribution & Instrument & Control	1.00	LS	500,000.00	\$500,000	
9	Final Site Seeding & Planting	1.00	LS	600,000.00	\$600,000	
<b>Main Dam</b>					<b>\$154,555,285</b>	
7	Clearing and Grubbing	55.00	Acres	2,206.32	\$121,348	
8	Stripping	55.00	Acres	9,734.89	\$535,419	
9	Unclassified Excavation	1,562,000.00	CY	3.21	\$5,010,292	
10	Foundation Preparation	12,000.00	SY	2.65	\$31,800	
11	Foundation Drilling and Grouting	1.00	LS	9,208,761.00	\$9,208,761	
12	Asphaltic Concrete - On-Site Materials	74,000.00	CY	222.92	\$16,496,234	
13	Zone 2a and 2b - Fine Transition Zone	287,000.00	CY	24.47	\$7,021,624	
14	Fine Filter Zone Blanket Sand	62,000.00	CY	28.43	\$1,762,386	
15	Coarse Filter Zone 1.5 Thick	62,000.00	CY	28.43	\$1,762,516	
16	Zone 3 Transition Zone 6in Minus	745,000.00	CY	8.94	\$6,657,313	
17	Zone 4 Rockfill 12 to 6in Minus	11,206,000.00	CY	8.88	\$99,485,949	
18	RipRap 3ft Thick	144,000.00	CY	17.96	\$2,585,550	
19	Structural Concrete (concrete sill, grout cap)	7,000.00	CY	516.78	\$3,617,495	
20	Filter Drain Pipe	1,500.00	LF	20.10	\$30,150	
21	Instrumentation	1.00	LS	228,448.00	\$228,448	
<b>Saddle Dam</b>					<b>\$7,328,071</b>	
22	Clearing and Grubbing	5.00	Acres	1,483.40	\$7,417	
23	Stripping	5.00	Acres	10,708.38	\$53,542	
24	Unclassified Excavation	68,000.00	CY	3.74	\$254,047	
25	Foundation Preparation	3,200.00	SY	3.97	\$12,720	
26	Foundation Drilling and Grouting	1.00	LS	2,955,916.00	\$2,955,916	
27	Asphaltic Concrete - On-Site Materials	2,500.00	CY	227.03	\$567,565	
28	Zone 2a and 2b - Fine Transition Zone	14,900.00	CY	30.38	\$452,592	
29	Fine Filter Zone Blanket Sand	2,700.00	CY	36.49	\$98,528	
30	Coarse Filter Zone 1.5 Thick	2,700.00	CY	35.21	\$95,058	
31	Zone 3 Transition Zone 6in Minus	29,700.00	CY	13.95	\$414,218	
32	Zone 4 Rockfill 12 to 6in Minus	63,000.00	CY	18.93	\$1,192,473	
33	RipRap 3ft Thick	7,500.00	CY	27.19	\$203,945	
34	Filter Drain Pipe	500.00	LF	20.10	\$10,050	
35	Structural Concrete ( Grout Cap)	1,900.00	CY	500.00	\$950,000	
36	Instrumentation	1.00	LS	60,000.00	\$60,000	
<b>TUNNEL</b>		<b>1,877.00</b>	<b>LF</b>		<b>\$11,624,978</b>	
41	Tunnel Grouting	4,608.00	LF	61.98	285,594	
42	Upstream Portal	1.00	LS	45,695.79	45,696	
43	Concrete Tunnel Floor	984.00	CY	241.96	238,087	
44	Upstream Tunnel 9FT HS Excavation	1,090.00	LF	1,170.54	1,275,891	
45	Upstream Rock Bolts & Wire Mesh	1.00	LS	390,112.09	390,112	
46	Upstream Tunnel Shotcrete	35.00	CY	630.51	22,068	
47	Upstream Steel Sets	9,252.00	LBS	3.05	28,188	
48	Install Steel Pipe in Tunnel	1,877.00	LF	1,050.51	1,971,803	
49	Upstream Concrete Encasement of Pipe	2,877.00	CY	179.63	516,798	
50	Valve Cavern Excavation	43.00	LF	3,332.83	143,311	
51	Valve Cavern Rock Bolts & Wire Mesh	1.00	LS	19,733.36	19,733	
52	Valve Cavern Concrete Lining	286.00	CY	377.53	107,973	
53	Valve Cavern Mechanical	1.00	LS	849,737.20	849,737	
54	Downstream Tunnel 21 FT HS Excavation	787.00	LF	3,435.62	2,703,833	
55	Downstream Rock Bolts & Wire Mesh	1.00	LS	645,776.97	645,777	
56	Downstream Tunnel Shotcrete	81.00	CY	630.51	51,071	
57	Downstream Steel Sets	1.00	LS	40,691.60	40,692	
58	Downstream Concrete Lining	4,503.00	CY	429.66	1,934,766	
59	DownstreamTunnel Concrete Supports	120.00	CY	875.26	105,031	
60	Vent Pipe Downstream 18in	830.00	LF	166.88	138,511	
61	Downstream Portal	1.00	LS	60,306.99	60,307	
62	Tunnel Electrical	1.00	LS	50,000.00	50,000	
<b>I/O WORKS INTAKE STRUCTURE</b>		<b>1.00</b>	<b>LS</b>		<b>\$1,228,096</b>	
63	Upstream Intake Structure Excavation	8,500.00	CY	14.26	121,191	
64	Concrete Intake Structure	670.00	CY	434.75	291,281	
65	Upstream Intake Structure Trashracks	4.00	EA	52,000.00	208,000	
66	Upstream Intake Structure Misc Metals	1.00	LS	150,000.00	150,000	
67	Vent Pipe 30in Concrete Encased	730.00	LF	558.39	407,625	
68	Bulkhead Gate	1.00	LS	50,000.00	50,000	
<b>PIPELINE FROM TUNNEL PORTAL TO VALVE HOUSE</b>		<b>640.00</b>	<b>LF</b>		<b>\$827,057</b>	
71	Buried Pipeline 78in from Tunnel Portal to Valve House	640.00	LF	1,292.28	827,057	
<b>SPILLWAY</b>		<b>1.00</b>	<b>LS</b>		<b>\$4,183,909</b>	
72	Unclassified Excavation	40,200.00	CY	12.55	504,707	
73	Spillway Underdrain System	8,804.00	LF	31.55	277,729	
74	Rock Anchors	1,314.00	EA	150.56	197,836	
75	Spillway Concrete	4,636.00	CY	568.90	2,637,398	
76	Spillway Backfill	24,375.00	CY	17.78	433,328	
77	Spillway Fencing	6,570.00	LF	20.23	132,911	
<b>OPEN CHANNEL FROM SPILLWAY</b>		<b>1.00</b>	<b>LS</b>		<b>\$600,318</b>	

MWH now part of STANTEC						
CHIMNEY HOLLOW DAM ACRD Opinion of Probable Construction Costs						
Currency: USD-United States- MAY 2017 Dollar						
Grand Total Price:					\$ 424,944,971	
Item	Description	Quantity	UOM	Unit Price	Total Price	Comments
78	Channel Excavation	24,300.00	CY	8.35	202,923	
79	Channel Rip Rap Bedding	4,133.00	CY	24.28	100,366	
80	Channel Rip Rap	16,533.00	CY	17.97	297,030	
	PIPE CONNECTION TO EXISTING PENSTOCK	1.00	LS		\$736,919	
81	Pipeline Connection to Existing Penstock	1.00	LS	736,919.17	736,919	
	SPILLWAY FROM VALVE HOUSE	1.00	LS		\$1,206,882	
82	Unclassified Excavation	26,000.00	CY	13.00	338,118	
83	Spillway Concrete	1,050.00	CY	597.31	627,172	
84	Spillway Backfill	12,500.00	CY	17.71	221,363	
85	Spillway Fencing	1,000.00	LF	20.23	20,230	
	BURIED PIPELINE FROM PENSTOCK TO VALVE HOUSE	1.00	LS		\$8,261,827	
86	Pipeline Buried 72in Steel	6,600.00	LF	1,251.79	8,261,827	
	VALVE VAULT FROM EXISTING PENSTOCK	1.00	LS		\$1,274,617	
87	Valve Vault	1.00	LS	1,274,617.00	1,274,617	
	VALVE HOUSE 100 x 90 x 12	1.00	LS		\$10,137,013	
88	Valve House	1.00	LS	10,137,013.24	10,137,013	
	CONNECTION TO CARTER LAKE PRESSURE CONDUIT	1.00	LS		\$1,975,345	
89	Valve Vault	1.00	LS	1,011,806.00	1,011,806	
90	Connection to Carter Lake Pressure Conduit	1.00	LS	204,165.50	204,166	
91	Carter Tunnel Valves	2.00	EA	379,686.50	759,373	
				Direct Cost Subtotal	\$216,509,685	
	Field Oversight Expenses				\$19,081,161	
1	Contractor Indirects	41.50	MO	459,787.00	19,081,161	
	Allowances				\$73,622,139	
1	Unlisted Items Allowance	1	Lump Sum	5%	\$11,779,542	
2	Scope, Quantities, Unit Cost and Market Conditions Allowance	1	Lump Sum	25%	\$61,842,597	
				Running Subtotal:	\$309,212,985	
	Markups				\$42,300,336	
1	Prime Contractor OH & P on Self-Perform	1	Lump Sum	12%	\$37,105,558	
2	Bond & Insurance	1	Lump Sum	1.5%	\$5,194,778	
3	Taxes on Materials	1	Lump Sum	0%	\$0	included
4	Escalation for Project Duration	1	Lump Sum	0%	\$0	not included
					\$351,513,321	Estimated Construction Cost w/Contingency
	Project Administration & Management***				\$73,431,650	
1	Field Exploration and Design Engineering	1	Lump Sum	\$11,880,000.00	\$11,880,000	Current Contract with MWH
2	Construction Management, Engineering, and QA (**NC	1	Lump Sum	\$19,000,000.00	\$19,000,000	
3	Legal and Administrative Fees and Permitting (**NCWC	1	Lump Sum	\$16,000,000.00	\$16,000,000	
4	NCWCD Program / Project Management (**NCWCD)	1	Lump Sum	\$4,000,000.00	\$4,000,000	
5	Estimated Mitigation and Enhancement Cost (**NCWC	1	Lump Sum	\$17,551,650.00	\$17,551,650	
6	Land Acquisition (**NCWCD)	1	Lump Sum	\$5,000,000.00	\$5,000,000	
7	Sunk Costs	1	Lump Sum			not included
				Grand Total:	\$424,944,971	Total Estimated Program Costs
Cost Range:					\$339,956,000	\$552,428,000
					-20%	30%
NOTES						
This OPCC is classified as a Class 3 cost estimate per AACE guidelines. However, major schedule driven items will be estimated with crews/productions in the Final Document.						
Pricing basis = 1st Qtr 2017, escalation to midpoint of construction is not included.						
Pricing assumes competitive market conditions at time of tender (+3 bidders/trade).						
(**NCWCD) These lump sum amounts listed in Project Administration & Management section were reported by Engineering Solutions, as being provided by Client.						
***There may be additional "Sunk" costs not included in the six items listed above.						
Estimating Disclaimer - Engineer's Opinion of Probable Construction Costs						
The estimate of costs shown and any resulting conclusions on the project financial, economic feasibility or funding requirements have been prepared from guidance in the project evaluation and implementation from the information available at the time the estimate was prepared. The final Costs of the project and resulting feasibility will depend on actual labor and material costs, competitive market conditions and other variable factors. Accordingly, the final project costs may vary from the estimate. Project feasibility, benefit/cost analysis, and risk must be reviewed prior to making specific funding decisions and establishment of the project budget.						
AACE International CLASS 3 Cost Estimate - Class 3 estimates are generally prepared to form the basis for budget authorization, appropriation, and/or funding. Typically engineering is from 10% to 40% complete, and would comprise a minimum of process flow diagrams, utility flow diagrams, preliminary piping and instrumentation diagrams, plot plan, developed layout drawings, and essentially complete engineered process and utility equipment lists. They are typically prepared to support full project funding requests, and become the first of the project phase "control estimates" against which all actual costs and resources will be monitored for variation to budget. Most Class 3 estimates involve more deterministic estimating methods than stochastic methods. Typical accuracy ranges for Class 3 estimates are from +/- 10% to 30% (sometimes higher), depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination.(AACE International Recommended Practices and Standards).						



# RECLAMATION

*Managing Water in the West*

## Windy Gap Firming Project Final Environmental Impact Statement

### Executive Summary FES 11-29



U.S. Department of the Interior  
Bureau of Reclamation  
Great Plains Region  
Eastern Colorado Area Office  
Loveland, Colorado

*Cooperating Agencies:*

- U.S. Army Corps of Engineers
- U.S. Department of Energy,  
Western Area Power Administration DOE/EIS-0370
- Grand County

November 2011



# **EXECUTIVE SUMMARY**

## **FINAL ENVIRONMENTAL IMPACT STATEMENT**

### **WINDY GAP FIRING PROJECT**

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#### **INTRODUCTION**

The Windy Gap Firing Project (WGFP) is a proposed water supply project that would provide more reliable water deliveries to Colorado's Front Range and West Slope communities and industries. The Municipal Subdistrict, Northern Colorado Water Conservancy District (Northern Water) acting by and through the Windy Gap Firing Project Water Activity Enterprise (Subdistrict), on behalf of WGFP Participants, is seeking approval from the U.S. Bureau of Reclamation (Reclamation) for additional physical connections to Colorado-Big Thompson (C-BT) Project facilities in order to implement the proposed project. Reclamation's decision on the WGFP is a major federal action requiring

preparation of an Environmental Impact Statement (EIS). This Executive Summary summarizes the alternatives analyzed in detail and their anticipated environmental effects. The reader is referred to the entire Final EIS for a more complete description and analysis.

Due to limitations and constraints with the existing system, the current Windy Gap Project facilities, which were completed in 1985, are unable to deliver the anticipated firm yield of water. Water deliveries from the West Slope currently are limited by storage capacity in Granby Reservoir and by the delivery capacity of the Adams Tunnel, which delivers water from Grand Lake to the East Slope. The WGFP would add water storage and related facilities to the existing Windy Gap operations capable of delivering a firm annual yield of about 30,000 acre-feet (AF) to Project Participants. The intent of the WGFP is to improve the yield from an existing project and existing Windy Gap water rights.

Project Participants in the WGFP include municipalities, rural domestic water districts, and an industrial water user. Project Participants on the East Slope are the City and County of Broomfield, Central Weld County Water District, Town of Erie, City of Evans, City of Fort Lupton, City of Greeley, City of Lafayette, Little Thompson Water District, City of Longmont, City of Louisville, City of Loveland, Platte River Power Authority, and the Town of Superior. In addition, the project seeks to firm the water supply for the Middle Park Water Conservancy District (MPWCD), which is a wholesale water supplier that allocates Windy Gap water to about 67 water providers, including towns, water districts, agricultural water suppliers, consumers,



**Existing Windy Gap Reservoir, Grand County, Colorado**

and ski areas in Grand and Summit counties on the West Slope. WGFP Participants determined that a cooperative project was the most efficient means to firm Windy Gap water deliveries rather than each entity developing storage for its own share of Windy Gap water.

## **COOPERATING AGENCIES**

In addition to Reclamation (the lead agency), the U.S. Army Corps of Engineers (Corps), Western Area Power Administration (Western), and Grand County are cooperating agencies. The Corps has regulatory authority under the Clean Water Act for actions that require the placement of dredge or fill material in a water of the United States. Western is participating as a cooperating agency because it has jurisdiction over the transmission line that would be relocated if Chimney Hollow Reservoir is constructed. Western would need to acquire a new easement for the relocated line as well as construct, operate, and maintain the line. Western also has responsibilities for marketing additional power that may be generated as a result of the WGFP. Grand County has an interest in the project because Colorado River diversions and several alternative reservoir sites are located in the county.

## **REVISIONS SINCE THE DRAFT EIS**

The Draft EIS was released for public review in August 2008. Reclamation held two open house/public hearings during the comment period to give the public an opportunity to learn more about the alternatives and impacts, and to formally comment on the Draft EIS. Notice of the public hearings was included with the Federal Register notification; distribution of the Draft EIS; and publication in newspapers, Internet message boards and blogs, and by e-mail. The public hearings were held at the McKee Conference Center in Loveland, Colorado on October 7, 2008 and at the Inn at Silver Creek in the Town of Granby, Colorado on October 9, 2008.

The comment period on the Draft EIS ended on December 29, 2008. Reclamation received approximately 1,150 letters, comment forms, and recorded written and oral comments (including 714 form letters) on the proposed project from the public, businesses, environmental groups, and federal, state, and local agencies. In response to these comments and additional information available since completion of the Draft EIS, Reclamation has revised portions of the Final EIS. This includes additional analyses, incorporation of new information, and revision of the discussion for some resources to better define and explain potential impacts. Significant changes included in the Final EIS are summarized below with locations where more detailed information is available. In addition, Volume 2 of the Final EIS includes a response to the substantive comments received on the Draft EIS.

## **Change in Firming Storage Request**

The amount of firming storage requested by Platte River Power Authority (Platte River) and the City of Loveland (Loveland) changed after the modeling was completed for the Draft EIS. Platte River decreased their firming storage request by 1,000 AF from 13,000 AF to 12,000 AF and Loveland increased their firming storage request by 1,000 AF from 6,000 AF to 7,000 AF. The total firming storage requested by all

Participants (not including MPWCD) remains at 87,180 AF; however, 1,000 AF of storage has been shifted from Platte River to Loveland. Because there is no change in the total storage requested by the Participants, the effects of this change on model results including Windy Gap diversions and streamflow on the East and West slopes was negligible.

## **Mitigation**

Substantial effort has gone into developing mitigation measures to offset or reduce identified impacts from implementation of the WGFP. A major component of the new mitigation is contained in the *Fish and Wildlife Mitigation Plan* (FWMP) that was developed by the Subdistrict in cooperation with the Colorado Division of Parks and Wildlife (CDPW). The FWMP was adopted by the Colorado Wildlife Commission on June 9, 2011 and by the Colorado Water Conservation Board on July 13, 2011 (Appendix E). On October 6, 2011, Reclamation was notified by the State of Colorado that the FWMP incorporated into and made a part of this Final EIS, comprehensively addresses impacts to Colorado's fish and wildlife resource and is the official position of the State with regard to mitigation of impacts from this project. Key components of the FWMP and other mitigation measures are listed in the *Mitigation* section on page ES-24 and in Section 3.25 of the FEIS.

## **Colorado River Temperature Modeling**

Since completion of the Draft EIS, additional stream temperature data for the Colorado River became available, which allowed the development of a dynamic temperature model to better predict the effects of alternative actions on river temperature. Thus, the previous analysis using the QUAL2K model for temperature analysis was replaced by the results from the dynamic temperature model as discussed in *Surface Water Quality* (Section 3.8 of the Final EIS).

## **Granby Reservoir, Shadow Mountain Reservoir, and Grand Lake Nutrient Loading**

Nutrient loadings to Granby Reservoir, Shadow Mountain Reservoir, and Grand Lake (Three Lakes) were recalculated for the Final EIS after it was discovered that historic water quality data from an incorrect location on Willow Creek were used for the analysis upstream of Windy Gap Reservoir in the Draft EIS. Revised total nitrogen and phosphorus loadings to the Three Lakes are found in Tables 3-68, 3-69, and 3-70 of the Final EIS.

## **Recreation**

To clarify potential impacts to recreational rafting and kayaking on the Colorado River, the preferred flow ranges were simplified to indicate that the preferred flow range for boating in Big Gore Canyon is 850 to 1,250 cfs and that flows of 1,100 to 2,200 cfs are preferred for the Pumphouse Reach. An analysis of a change in frequency of flows in these ranges is found in *Recreation* (Section 3.19.2 of the Final EIS). The socioeconomic effect of the revised impact analysis for recreational boating is found in *Socioeconomics* (Section 3.22.2.4 of the Final EIS).

## Aquatic Resources

The discussion of aquatic resources was revised with new tables and graphics to better illustrate modeled changes in rainbow trout and brown trout habitat associated with projected changes in streamflow. New tables and figures are in *Aquatic Resources* (Section 3.9.2 of the Final EIS).

## Reasonably Foreseeable Future Actions

Since completion of the Draft EIS, additional information or new actions were identified that are likely to occur in the future and would contribute to cumulative effects as described below:

**Climate Change.** Climate change is an evolving science and while it is still difficult to predict the specific impacts of climate change on the Proposed Action, new information on the latest potential changes in temperature, precipitation, and runoff for the upper Colorado River basin was added to the Final EIS as described in Section 2.8.2 of the Final EIS. The effects associated with climate change are discussed in the cumulative effects section for relevant resources including *Surface Water Hydrology*, *Stream Morphology*, *Surface Water Quality*, and *Aquatic Resources*.

**10825 Project.** This project would permanently supply 10,825 AF of water per year during the late summer months to assist with the recovery of endangered fish in the “15-Mile Reach” of the Colorado River near Grand Junction per the Upper Colorado River Endangered Fish Recovery Program. The proposed project includes release of 5,412.5 AF of water from Granby Reservoir to the Colorado River each year during the late summer and fall. This action was considered in the evaluation of impacts to stream temperature in the cumulative effects section of *Surface Water Quality* (Section 3.8.3.1 of the Final EIS).

**Windy Gap Firing Project and Moffat Collection System Project Fish and Wildlife Enhancement Plans.** In addition to the Fish and Wildlife Mitigation Plans developed by the Subdistrict as a component of mitigation for the WGFP and by Denver Water for the proposed Moffat Collection System Project (Moffat Project) pursuant to regulations implementing CRS 37-60-122.2(2), both the Subdistrict and Denver Water cooperatively developed separate enhancement plans to further improve existing fish and wildlife resources. These enhancement plans are intended to enhance fish and wildlife resources over and above the levels existing without the WGFP and Moffat Project and were endorsed by the Colorado Wildlife Commission on June 9, 2011 and by the Colorado Water Conservation Board on July 13, 2011. The cumulative effects of the enhancements are discussed in *Surface Water Quality* (Section 3.8.3.1) and *Aquatic Resources* (Section 3.9.3.1) in the Final EIS.

**Colorado River Cooperative Agreement.** As part of negotiations between West Slope parties and Denver Water, Grand County and Denver Water have reached a proposed agreement that addresses some of the issues related to Denver Water’s existing operations in Grand County. In the Proposed Colorado River Cooperative Agreement, Denver Water has committed to the Learning By Doing Cooperative Effort and additional resource commitments to provide environmental enhancements to benefit the aquatic environment in the Fraser, Williams Fork, and upper Colorado rivers. These commitments are contingent upon the issuance and acceptance by Denver Water of the permits necessary for construction of the Moffat Project.

## PROJECT NEED

Windy Gap Project water is currently diverted from the Colorado River just downstream of the confluence of the Colorado and Fraser rivers into the Windy Gap Reservoir (Figure ES-1). From the reservoir the water is pumped to Granby Reservoir for storage and conveyance through C-BT Project facilities and ultimate delivery to Windy Gap Project allottees on the East Slope. MPWCD's Windy Gap water is stored in Granby Reservoir and released to replace stream diversions or ground water use by contract holders at various locations in Grand and Summit counties.

The original Windy Gap Project was estimated to deliver about 48,000 acre-feet (AF) of firm annual deliveries to Windy Gap allottees and the MPWCD; however, Project Participants have not been able to rely on Windy Gap water for water deliveries for two primary reasons:

- In dry years, the Windy Gap Project has not been able to divert water because more senior water rights upstream and downstream have a higher priority to divert water and “call out” the more junior Windy Gap Project water right. In addition, the Windy Gap Project is required to bypass water to maintain certain minimum streamflows downstream of the Windy Gap diversion dam.
- Granby Reservoir, a component of the C-BT Project, is currently the only storage available for Windy Gap water prior to delivery to Participants. Water conveyed and stored for the C-BT Project has priority over water conveyed and stored for the Windy Gap Project. Thus in wet years, when the C-BT system is full, there is no conveyance or storage capacity for Windy Gap Project water. This prevents the Windy Gap Project from storing water in some wet years for use in subsequent dry years.

Because the Windy Gap Project is unable to provide reliable yields in both wet and dry years, the current firm yield is zero. Firm yield is typically defined as the amount of water that can be delivered on a reliable basis in all years and is typically determined by yield in dry years. For the Windy Gap Project, lack of available storage space in wet years also affects yield.

### Purpose and Need

The purpose of the Windy Gap Firing Project is to deliver a firm annual yield of about 30,000 AF of water from the existing Windy Gap Project to meet a portion of the water deliveries anticipated from the original Windy Gap Project and to provide up to 3,000 AF of storage to firm water deliveries for the Middle Park Water Conservancy District. Firm water deliveries from the Windy Gap Project are needed to meet a portion of the existing and future demands of the Project Participants.

Figure ES-1. Windy Gap Reservoir facilities.

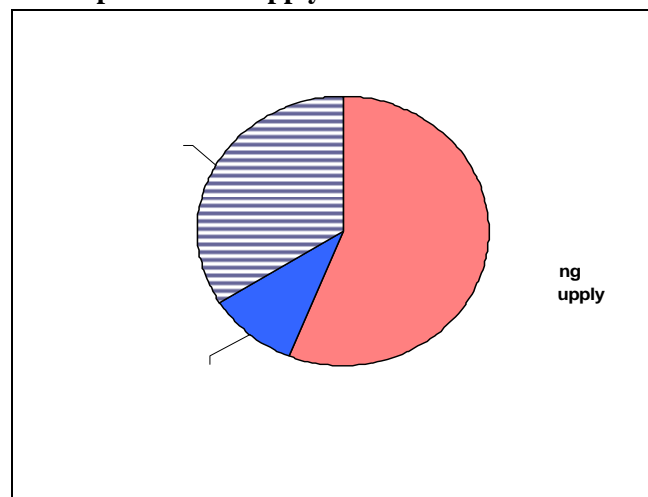




Participants in the proposed project have a need to firm Windy Gap water deliveries to meet existing and future water demands. In 2005, WGFP Participants had a firm water supply of about 141,000 AF and a demand of about 120,000 AF. Water demand for East Slope Participants is projected to increase to about 251,000 AF by 2050 and shortages in firm yield at that time would increase to more than 110,000 AF (Table ES-1). Water demand is projected to increase 17,000 AF by 2030 for Grand and Summit county water users partially served by the MPWCD. While water conservation is an important strategy used by all the Participants to improve the efficiency of water use, extend supplies, and reduce overall demand, conservation measures alone will not be sufficient to meet projected water demands.

The WGFP would collectively supply about 10 percent of the projected 2050 East Slope Participant water supply needs (Figure ES-2) and would contribute to meeting the future demands of Grand and Summit counties. The source for about 34 percent of future water supplies is still unknown. It is anticipated that some portion of this future supply will be realized by increased water conservation, but additional water supplies will still be needed.

**Figure ES-2. Summary of projected 2050 Participant water supply sources.**



**Table ES-1. WGFP Participant water supply, demand, and estimated shortage.**

Participant	Firm Supply from All Sources (2005)	Projected 2050 Water Demand	Estimated 2050 Water Shortage	Estimated Firm Yield under the Proposed Action**
Broomfield	13,739	24,400	10,661	5,600
Central Weld County Water District	2,786	5,900	3,114	93
Erie	2,145	8,900	6,755	1,840
Evans	9,298	13,300	4,002	455
Fort Lupton	3,538	6,800	3,262	265
Greeley	43,850	78,500	34,650	2,230
Lafayette	4,534	8,600	4,066	610
Longmont	30,963	42,300	11,337	4,515
Louisville	5,063	6,900	1,837	825
Loveland	17,792	28,300	10,508	2,075
Little Thompson Water District	5,510	19,100	13,590	1,200
MPWCD	NA	*	NA	429
Platte River Power Authority	0	5,150	5,150	5,050
Superior	1,544	3,300	1,756	1,380
<b>TOTAL</b>	<b>140,762</b>	<b>251,450</b>	<b>110,688</b>	<b>26,567</b>

\* Grand and Summit counties project an increase in water demand of 17,000 AF by 2030, with a total build-out demand of about 32,000 AF.

\*\* Values rounded.

## ALTERNATIVES

Following extensive screening of more than 170 different alternatives using National Environmental Policy Act (NEPA) criteria and Clean Water Act Section 404(b)(1) guidelines, in cooperation with the Corps, five alternatives were included for evaluation in the EIS. The No Action Alternative and four action alternatives are described below.

- **Alternative 1 (No Action):** Continuation of operations under existing agreements between Reclamation and the Subdistrict for conveyance of Windy Gap water through C-BT facilities and the enlargement of Ralph Price Reservoir by the City of Longmont.
- **Alternative 2 (Proposed Action):** Chimney Hollow Reservoir (90,000 AF) with prepositioning.
- **Alternative 3:** Chimney Hollow Reservoir (70,000 AF) and Jasper East Reservoir (20,000 AF).
- **Alternative 4:** Chimney Hollow Reservoir (70,000 AF) and Rockwell/Mueller Creek Reservoir (20,000 AF).
- **Alternative 5:** Dry Creek Reservoir (60,000 AF) and Rockwell/Mueller Creek Reservoir (30,000 AF).

The Municipal Subdistrict's Proposed Action is to construct a new 90,000 AF Chimney Hollow Reservoir on the East Slope near Carter Lake and to allow the storage of C-BT Project water in the new reservoir to improve Windy Gap yield.

Alternative 2, construction of Chimney Hollow Reservoir with prepositioning, along with associated operational changes developed as part of mitigation, is the Bureau of Reclamation's preferred alternative.

### Alternative 1 (No Action)

The No Action Alternative defines what Participants would do if Reclamation does not approve a new connection of WGFP facilities to C-BT facilities as required for the action alternatives. Under this alternative, Participants would maximize delivery of Windy Gap water according to their demand, water rights, availability of storage in Granby Reservoir, and existing Adams Tunnel conveyance constraints. The City of Longmont would evaluate the enlargement of Ralph Price Reservoir by raising the dam and increasing storage capacity by 13,000 AF (Figure ES-3). Participants that do not have a currently defined storage option would take delivery of Windy Gap water whenever it is available within the capacity of their existing water systems and delivery points under the terms of the existing contract between Reclamation and the Subdistrict. Windy Gap diversions will increase in the future regardless of whether one of the action alternatives is implemented because of increased demand.

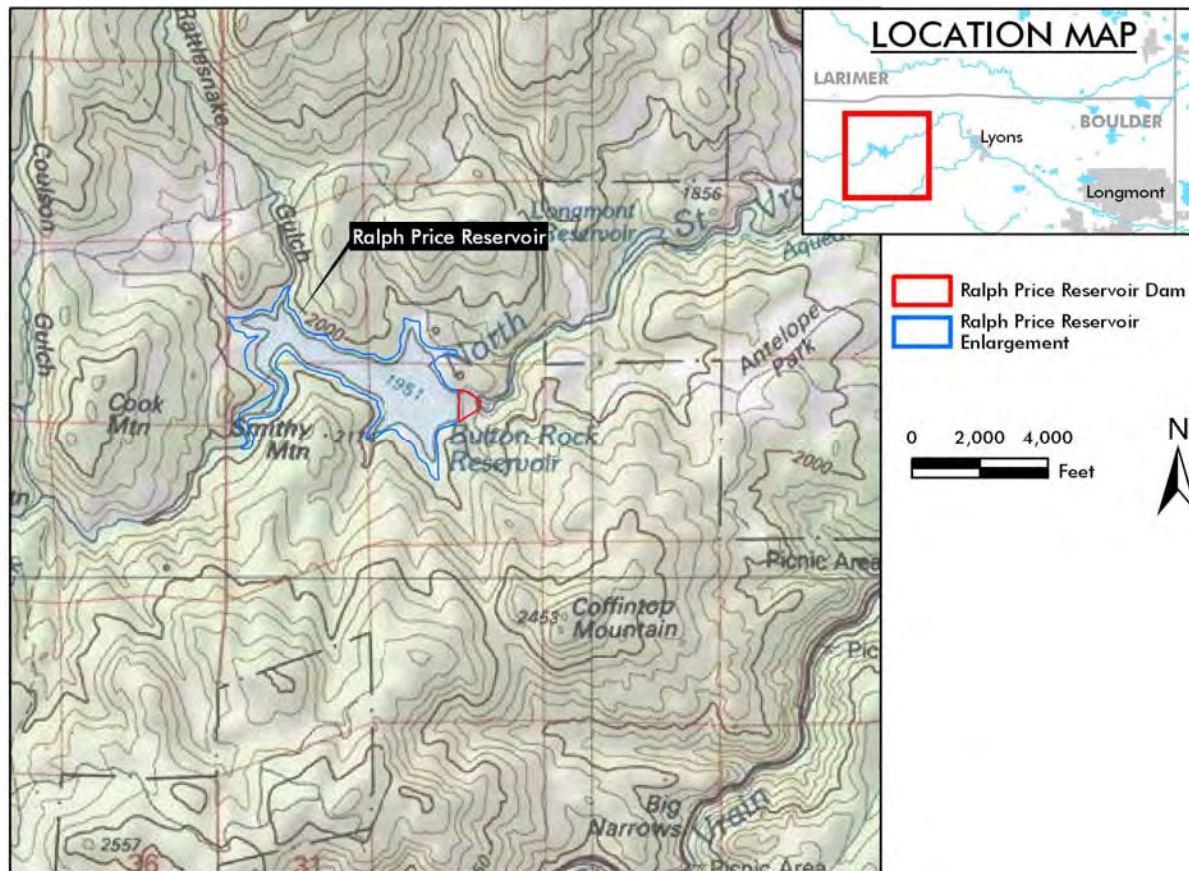
### Alternative 2 (Proposed Action)

The Proposed Action includes construction of a 90,000 AF Chimney Hollow Reservoir, along with the ability to store, or preposition, C-BT water in the new reservoir (Figure ES-4). Water would be conveyed to Chimney Hollow Reservoir via a new pipeline connection to existing East Slope C-BT facilities.



Chimney Hollow Reservoir Site

**Figure ES-3. Ralph Price Reservoir enlargement under the No Action Alternative.**



New connections between Chimney Hollow Reservoir and Carter Lake would allow delivery of water to Participants using existing infrastructure. No new West Slope infrastructure would be needed to divert or convey water to the East Slope.

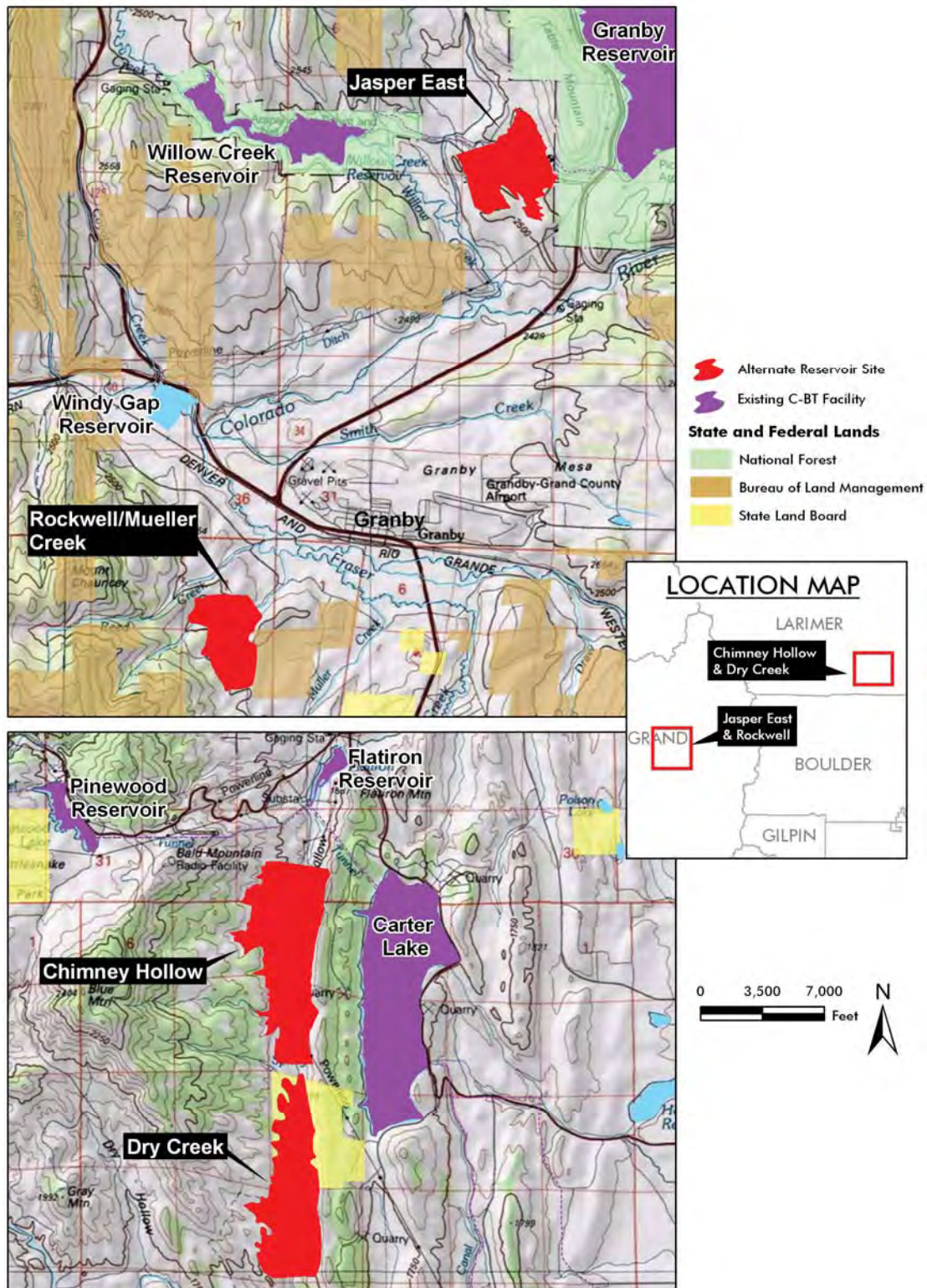
Prepositioning would involve the use of available Adams Tunnel capacity to deliver C-BT water into Chimney Hollow Reservoir to occupy storage space that is not occupied by Windy Gap water. The delivery of C-BT water from Granby Reservoir into Chimney Hollow Reservoir would create space for Windy Gap water in Granby Reservoir. When Windy Gap water is diverted into Granby Reservoir, the C-BT water in Chimney Hollow Reservoir would be exchanged for a like amount of Windy Gap water in Granby Reservoir. Total allowable C-BT storage would not change and the existing C-BT diversions would not be expanded. If operated in this manner, Chimney Hollow Reservoir would be nearly full most of the time.

### **Alternative 3**

Alternative 3 is a combination of a 70,000 AF Chimney Hollow Reservoir on the East Slope and a 20,000 AF Jasper East Reservoir on the West Slope (Figure ES-4). A new 1-mile-long pipeline would connect Jasper East Reservoir to the existing Windy Gap pipeline that delivers water to Granby Reservoir. The Willow Creek Pump Station, forebay, and portions of the canal and pipeline would be relocated. The availability of a



Figure ES-4. Alternative new reservoir sites.



new West Slope reservoir would allow water diversions from the existing Windy Gap Reservoir to be delivered to either Jasper East Reservoir or Granby Reservoir. Thus, when Granby Reservoir is full or the Adams Tunnel is at capacity, Windy Gap water would be diverted and stored in Jasper East Reservoir until there is sufficient capacity to transfer water to Chimney Hollow Reservoir.

#### **Alternative 4**

Alternative 4 is a combination of a 70,000 AF Chimney Hollow Reservoir on the East Slope and a 20,000 AF Rockwell/Mueller Creek Reservoir (Rockwell Reservoir) on the West Slope (Figure ES-4). Deliveries to and from Rockwell Reservoir would require a new connection to the existing Windy Gap pump station and a new 3.3-mile-long pipeline to Rockwell Reservoir. As with the Jasper East Reservoir site, the availability of a new West Slope reservoir would allow water diversions from the existing Windy Gap Reservoir to be delivered to either Rockwell Reservoir or Granby Reservoir. When Granby Reservoir is full or the Adams Tunnel is at capacity, Windy Gap water would be diverted and stored in Rockwell Reservoir until there is sufficient capacity to transfer water to Chimney Hollow Reservoir.

#### **Alternative 5**

Alternative 5 is a combination of a 60,000 AF Dry Creek Reservoir on the East Slope and a 30,000 AF Rockwell Reservoir on the West Slope (Figure ES-4). Water deliveries to and from Rockwell Reservoir would require a new pipeline and connection to the existing Windy Gap pump station. A new 3.4-mile-long pipeline connection to C-BT facilities would convey Windy Gap water to Dry Creek Reservoir. A new 2.1-mile-long pipeline also would be needed to deliver water from Dry Creek Reservoir to Carter Lake. As with Alternatives 3 and 4, the availability of a new West Slope reservoir would allow water diversions from the existing Windy Gap Reservoir to be delivered to either Rockwell Reservoir or Granby Reservoir. When Granby Reservoir is full or the Adams Tunnel is at capacity, Windy Gap water would be diverted and stored in Rockwell Reservoir until there is sufficient capacity to transfer water to Dry Creek Reservoir.

### **ENVIRONMENTAL EFFECTS**

The WGFP would result in environmental effects to a number of resources. The effects of all of the action alternatives related to increased water diversions would be similar because similar amounts of water would be diverted from the Colorado River. The No Action Alternative would result in similar, but smaller, effects because Windy Gap diversions would increase in the future with a higher water demand even though the enlargement of Ralph Price Reservoir would only increase storage for Windy Gap water by 13,000 AF. This summary focuses on those resources with the greatest potential impacts. Effects on ground water, geology, soils, air quality, noise, cultural resources, and visual quality are expected to be minimal and are not discussed in this summary. However, impacts to these resources are discussed in detail in the Final EIS. The following sections summarize the effects to key resources of concern. It should be noted that the effects presented in the following sections are based on an analysis of the alternatives without any mitigation. Proposed mitigation, which is discussed at the end of this summary, would reduce the effects in many cases.



## Surface Water Hydrology

The WGFP would result in increased diversions and reduced flows in the Colorado River below Windy Gap Reservoir. In many years, the flows would be unchanged, but in wetter years, diversions would increase, with a corresponding decrease in Colorado River flows. Estimated average annual flow changes based on hydrologic modeling are described below.

- Windy Gap diversions would increase about 7,000 AF per year on average from existing conditions under the No Action Alternative compared to an increase of about 9,500 AF for the Proposed Action, and an increase of 12,000 AF for the other alternatives (Table ES-2).

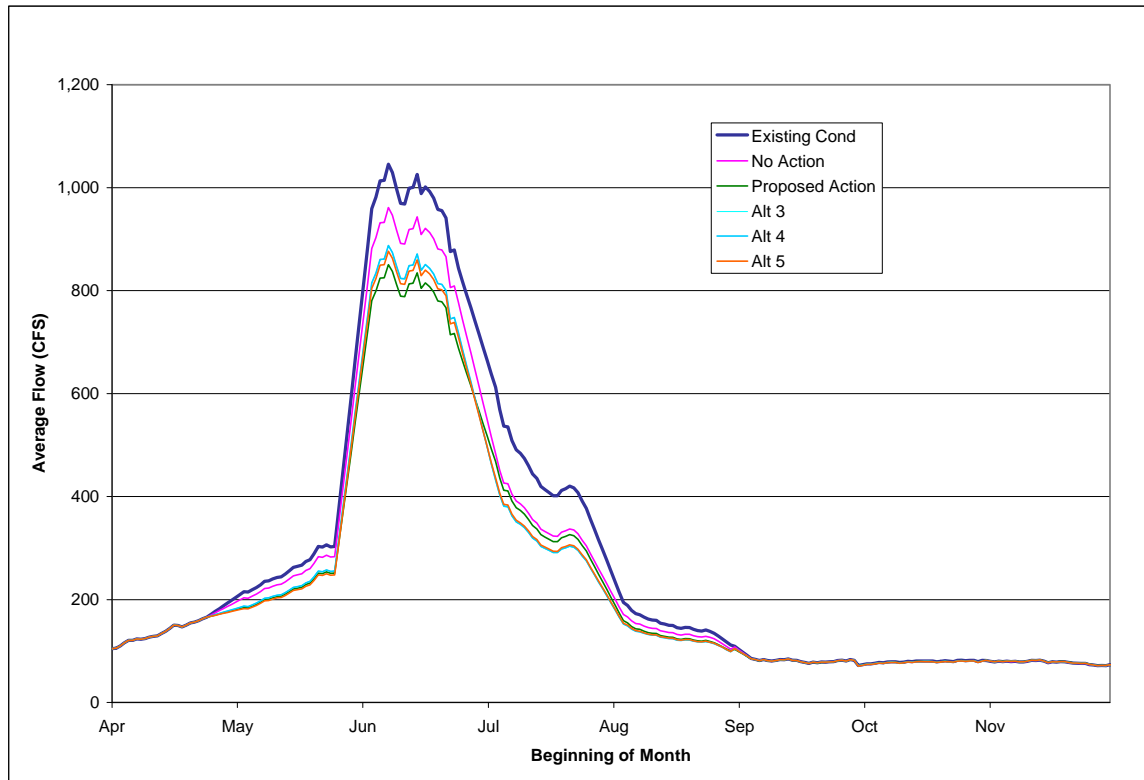
**Table ES-2. Average annual changes in Colorado River flow and diversions by alternative.**

Alternative	Colorado River below Granby Reservoir		Windy Gap Diversions		Colorado River below Windy Gap		Colorado River below Kremmling	
	AF	%	AF	%	AF	%	AF	%
Existing Conditions	59,385	—	36,532	—	151,358	—	701,801	—
Alt 1 – No Action	55,345	-7	43,573	+19	138,914	-8	689,357	-2
Alt 2 – Proposed Action	50,220	-15	46,084	+26	130,075	-14	680,512	-3
Alt 3	52,071	-12	48,052	+32	130,370	-14	680,807	-3
Alt 4	52,091	-12	47,997	+31	130,453	-14	680,890	-3
Alt 5	51,903	-13	48,483	+33	129,681	-14	680,118	-3

- Colorado River average annual flow below Granby Reservoir would decrease about 7 percent (4,000 AF) under the No Action Alternative, 15 percent (9,000 AF) under the Proposed Action, and 12 to 13 percent for the other alternatives as a result of the availability of additional Windy Gap storage and fewer reservoir spills (Table ES-2). This effect would occur primarily during spill years, when flows are higher than normal.
- Colorado River average annual flow below the Windy Gap Reservoir would decrease by 8 percent (12,000 AF) under the No Action Alternative compared to a 14 percent (21,000 AF) decrease for the action alternatives (Table ES-2). The majority of WGFP diversions would occur in May and June, but in some years, diversion would occur between April and August (Figure ES-5). Although WGFP diversions in July are generally lower than May and June, the greatest percentage reduction in Colorado River flows would occur in July. Average monthly flow reductions up to 20 percent for the No Action Alternative, 23 percent for the Proposed Action, and 28 percent for Alternatives 3 to 5 are predicted for July. In wet years, WGFP diversions as a percent of existing flow would be greater. In dry years, there would be no change in flow from existing conditions.
- Colorado River average annual streamflow reductions below the confluence with the Blue River would be about 2 percent (12,000 AF) under the No Action Alternative and 3 percent (21,000 AF) for the action alternatives (Table ES-2).
- Average annual Willow Creek streamflow below Willow Creek Reservoir would decrease by 7 percent (1,400 AF) under the No Action Alternative, 14 percent (2,600 AF) for the Proposed Action, and 12 percent (2,200 AF) for the other alternatives due to changes in Willow Creek Feeder Canal

deliveries to Granby Reservoir. This effect would occur primarily during spill years, when flows are higher than normal.

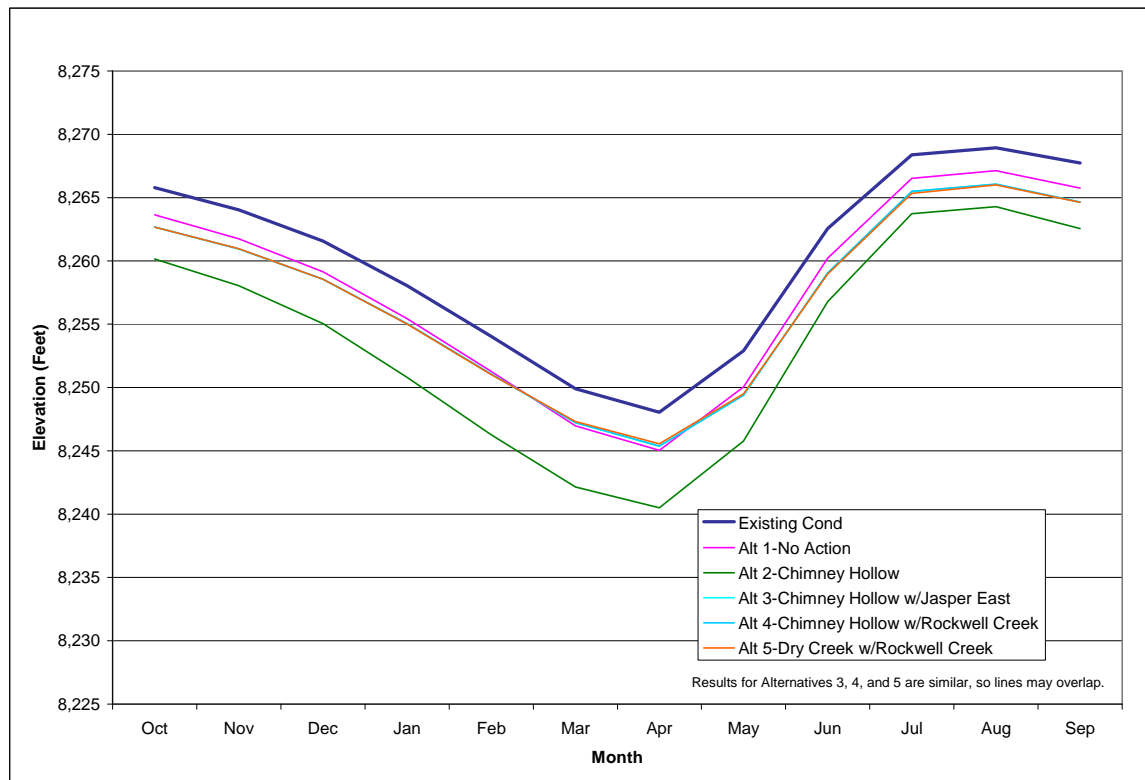
**Figure ES-5. Average daily flow in the Colorado River below Windy Gap Reservoir by alternative.**



- Big Thompson River flows below Lake Estes would increase about 1 percent (450 AF) on average under the No Action Alternative compared to a 5 percent increase (3,200 AF) for the Proposed Action, and less than a 2 percent increase (1,000 AF) for the other alternatives as a result of the additional Windy Gap water imports and lower diversions for power generation in the C-BT system.
- Streamflow below Participant wastewater treatment plants (WWTPs) would increase from the discharge of Windy Gap return flows to the Big Thompson River, St. Vrain Creek, Big Dry Creek, and Coal Creek.
- Water levels in Grand Lake or Shadow Mountain Reservoir would not change under any of the alternatives.
- Granby Reservoir average monthly water levels would decrease from 2 to 3 feet under the No Action Alternative, 5 to 8 feet under the Proposed Action, and 3 to 4 feet under the other alternatives (Figure ES-6). A series of dry years could lower water levels up to 23 feet under the Proposed Action. Mitigation Measure #3 at the end of this section would address this impact.
- Water levels in Carter Lake would decrease less than 1 foot under all of the alternatives.
- Average monthly water levels in Horsetooth Reservoir would not change under the No Action Alternative, but would decrease 2 to 6 feet under the Proposed Action and would decrease 0 to 2 feet

under the other action alternatives. Mitigation Measure #3 at the end of this section would address this impact.

**Figure ES-6. Granby Reservoir estimated average monthly surface elevation by alternative.**



- Windy Gap firm yield would increase from zero under existing conditions to about 26,000 AF under the Proposed Action and other action alternatives (Table ES-3). Firm yield under the No Action Alternative would be about 1,200 AF, which does not meet the applicant's purpose and need.

### Stream Morphology and Floodplains

Stream morphology refers to the form and structure of a stream, including its channel, banks, floodplain and drainage area, which could be altered as a result of changes in flow. The upper Colorado River is a morphologically stable stream and the changes in flow predicted from the WGFP are not expected to substantially affect stream morphology or sediment transport and deposition in the Colorado River below Windy Gap Reservoir.

**Table ES-3. Windy Gap Firing Project firm yield.**

Condition/Alternative	Firm Yield (AF)
Existing Conditions	0
Alt. 1 – No Action	1,229
Alt. 2 – Proposed Action	26,559
Alt. 3	25,849
Alt. 4	25,849
Alt. 5	26,629

Channel maintenance flows are considered necessary to maintain the physical characteristics of a stream channel and are critical to ensuring unimpaired flow and sediment conveyance. A range of channel maintenance flows provide the benefits of conveying water and eroded materials from tributaries without aggradation or degradation, preventing vegetation encroachment and narrowing of the channel, sustaining aquatic ecosystems, temporarily storing flood flows on the floodplain, and maintaining healthy streambank and floodplain vegetation. The range of channel maintenance flows is generally defined as bankfull discharge, which is the peak flow that occurs every 1.5 to 2 years, to higher flows that occur about every 25 years. The lower limit is the flow rate at which coarse sediment transport begins and the upper limit is the flow above which valley rather than channel maintenance occurs and when property damage may occur.

- Under all alternatives, the percentage of years that channel maintenance flows occur on the Colorado River at the Hot Sulphur Springs gage below the Windy Gap diversion would be less than under existing conditions. The decrease in channel maintenance flows is predicted to range from 4 percent less years for 2- to 5-year flows up to a 13 percent decrease for 5- to 10-year flows. The duration of channel maintenance flows would decrease by 2 to 4 days for the lower range of such flows (510 to 1,240 cfs) and increase by 1 to 3 days for greater flows. The projected reduction in the frequency of peak discharges and channel maintenance flows is unlikely to substantially affect stream morphology or change sediment transport or deposition.
- Flushing flows in the Colorado River equal to or greater than 450 cfs, which occur about 28 days per year on average under existing conditions, would decrease to 23 days per year under the No Action Alternative, and 20 to 21 days under the Proposed Action and the other alternatives. The reduction in the frequency of flushing flows would remain adequate to transport sediment and prevent deposition. Mitigation Measure #2 at the end of this section would address this impact.
- Increased flows in East Slope streams below the Participants WWTPs would have minimal effect on stream morphology.
- The potential for flooding along the Colorado River and Willow Creek would decrease and the potential for flooding along East Slope streams below the Participants WWTPs would increase slightly.

## **Surface Water Quality**

Water quality impacts from the WGFP would occur as a result of changes in Colorado River flow below Granby Reservoir; in Willow Creek below Willow Creek Reservoir; and in several East Slope streams, including the Big Thompson River, St. Vrain Creek, North St. Vrain Creek, Coal Creek, Big Dry Creek, and the Cache la Poudre River. Potential effects to water quality also were evaluated for the Three Lakes system (Granby Reservoir, Shadow Mountain Reservoir, and Grand Lake), Carter Lake, and Horsetooth Reservoir, as well as the predicted water quality for new reservoirs. Stream and reservoir water quality models were used to estimate the following water quality effects.

- Dynamic temperature modeling indicates that the chronic maximum weekly average temperature (MWAT) standard, and occasionally the acute daily maximum (DM) temperature standard, would be exceeded more frequently than existing conditions under all of the alternatives in the 24-mile reach of the Colorado River below Windy Gap Reservoir to the confluence with the Williams Fork. Mitigation Measure #1 at the end of this section would address these impacts.

- Ammonia and inorganic phosphorus concentrations in the Colorado River are predicted to increase and dissolved oxygen (DO) concentrations decrease under all alternatives. Water quality standards would not be exceeded under average flow conditions, but when Windy Gap diversions reduce flow to the 90 cfs minimum flow, the DO concentration is predicted to be less than the spawning standard for a few miles upstream of the Williams Fork, although this would occur outside of the spawning season. Mitigation Measure #4 at the end of this section would address this impact.
- Ammonia and some metal concentrations in Willow Creek would increase slightly for all alternatives, but water quality standards are not expected to be exceeded. Mitigation Measure #4 at the end of this section would address this impact.
- **Granby Reservoir:** Total phosphorus concentrations are predicted to increase under all alternatives and total nitrogen concentrations would increase under the No Action Alternative and Proposed Action (Table ES-4). Alternatives 3 to 5 would have lower nitrogen levels due to the effects of storage in a West Slope Reservoir prior to delivery to Granby Reservoir. Chlorophyll *a* concentrations (algae) are predicted to increase under the Proposed Action, but there would be no change in water clarity as measured by the Secchi-disk depth for any of the alternatives. Mitigation Measures #4 and #7 at the end of this section would address these impacts.

**Table ES-4. Granby Reservoir predicted water quality changes (on an average annual basis) by alternative compared to existing conditions.**

Parameter	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3	Alternative 4	Alternative 5
Total phosphorus (µg/L)	+6.3%	+12.7%	+4.0%	+3.2%	+1.6%
Total nitrogen (µg/L)	+0.3%	+0.7%	-2.1%	-2.8%	-3.5%
Chlorophyll <i>a</i> (µg/L)	No Change	+2.4%	No Change	No Change	No Change
Peak chlorophyll <i>a</i> (µg/L)	No Change	-1.5%	No Change	No Change	No Change
Secchi-disk depth (m)	No Change	No Change	No Change	No Change	No Change
Trophic state	No Change	No Change	No Change	No Change	No Change
Minimum DO (mg/L)	-2.2%	-4.4%	No Change	No Change	No Change
TSS (mg/L)	No Change	+4.3%	+4.3%	+4.3%	+4.3%

- **Shadow Mountain Reservoir:** All alternatives would increase phosphorus concentrations and total nitrogen would increase in Alternatives 1 to 3 and decrease in Alternatives 4 and 5 (Table ES-5). Chlorophyll *a* concentrations would increase in Alternatives 1 to 3. Water clarity would not change in any alternative. Dissolved oxygen would decrease under the Proposed Action and would not change in other alternatives. Mitigation Measures #4 and #7 at the end of this section would address these impacts.



**Table ES-5. Shadow Mountain Reservoir predicted water quality changes (on an average annual basis) by alternative compared to existing conditions.**

Parameter	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3	Alternative 4	Alternative 5
Total phosphorus (µg/L)	+5.6%	+11.3%	+8.1%	+4.8%	+3.2%
Total nitrogen (µg/L)	+1.1%	+1.8%	+0.4%	-0.7%	-1.1%
Chlorophyll <i>a</i> (µg/L)	+1.8%	+1.8%	+1.8%	No Change	No Change
Peak chlorophyll <i>a</i> (µg/L)	+3.4%	+6.8%	+1.1%	No Change	-1.1%
Secchi-disk depth (m)	No Change	No Change	No Change	No Change	No Change
Trophic state	No Change	No Change	No Change	No Change	No Change
Minimum DO (mg/L)	No Change	-1.4%	No Change	No Change	No Change
TSS (mg/L)	+5.0%	+5.0%	+5.0%	+5.0%	+5.0%

- **Grand Lake:** Total phosphorus concentrations are predicted to increase under all alternatives (Table ES-6) and total nitrogen is predicted to increase under the No Action Alternative and Proposed Action. Chlorophyll *a* concentrations would increase under all alternatives and Secchi-disk depth would decrease under all alternatives except Alternative 5. Dissolved oxygen concentrations would decrease under all alternatives. Mitigation Measures #4 and #7 at the end of this section would address these impacts.

**Table ES-6. Grand Lake predicted water quality changes (on an average annual basis) by alternative compared to existing conditions.**

Parameter	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3	Alternative 4	Alternative 5
Total phosphorus (µg/L)	+6.0%	+12.0%	+6.0%	+6.0%	+4.8%
Total nitrogen (µg/L)	+0.4%	+1.6%	-0.4%	-0.4%	-0.8%
Chlorophyll <i>a</i> (µg/L)	+4.2%	+6.1%	+4.2%	+2.0%	+2.0%
Peak chlorophyll <i>a</i> (µg/L)	+4.1%	+5.4%	+1.4%	+1.4%	No Change
Secchi-disk depth (m)	-3.8%	-3.8%	-3.8%	-3.8%	No Change
Trophic state	No Change	No Change	No Change	No Change	No Change
Minimum DO (mg/L)	-11.1%	-7.4%	-5.6%	-5.6%	-5.6%
TSS (mg/L)	No Change	+5.6%	+5.6%	+5.6%	No Change

- No additional water quality standards would be exceeded at the Three Lakes. Lower DO levels would contribute to continued exceedance of the manganese standard in the Three Lakes.
- Ammonia concentrations in St. Vrain Creek, Big Dry Creek, and Coal Creek would increase under all of the alternatives. The potential for exceedance of the water quality standard is possible for some locations.
- In Carter Lake and Horsetooth Reservoir, total phosphorus, total nitrogen, and chlorophyll *a* concentrations would increase, and DO concentrations would decrease. Lower DO concentrations in Horsetooth Reservoir would contribute to continued exceedance of the manganese standard. Mitigation Measure #4 at the end of this section would address these impacts.

## Aquatic Resources

The assessment of effects to fish habitat along the Colorado River was modeled following the concepts of the Instream Flow Incremental Methodology (IFIM). This approach combines stream hydraulics, habitat use criteria, and hydrology to predict fish habitat as a function of streamflow. Fish community and fish populations were assessed based on changes in physical habitat, as well as projected water quality changes within those systems in rivers and reservoirs. The changes were compared to the existing conditions to determine if there would be factors that affect fish populations at the acute or chronic level. Major effects are summarized below:

- Aquatic habitat modeling of the Colorado River for the alternatives indicate the greatest decrease in fish habitat would occur from Windy Gap Reservoir downstream to the Williams Fork. Reductions in fish habitat are generally greatest in July and August. Adult rainbow trout habitat would decrease up to 34 percent in August, while adult brown trout habitat would decrease less than 8 percent. The hydrologic model indicates WGFP diversions of more than 100 AF in August would increase from 6 times in the 47-year hydrologic modeling period to 15 times. Actual WGFP pumping in August is likely to be less because a new reservoir(s) would typically be close to full in years when the WGFP diversions are in priority in August and the cost of pumping is high for the limited available water. WGFP diversions in June often results in an increase in fish habitat by lowering high flows. Adult rainbow trout habitat increases by approximately 20 percent in average years downstream of Windy Gap Reservoir.
- In the Colorado River below the Williams Fork, decrease in rainbow or brown trout habitat for juveniles or adults would be less than 15 percent.
- No adverse impacts to spring spawning rainbow trout or fall spawning brown trout are predicted for any of the alternatives.
- The predicted flow regime in the Colorado River as a result of the No Action Alternative and action alternatives would still include the components for stream health, but at lower levels than existing conditions.
- Projected increases in the exceedance of the aquatic life chronic and acute stream temperature standards for the Colorado River under all alternatives would increase the stress on fish populations, although predicted exceedances as a result of the WGFP would occur only in about 4 out of 15 years, assuming very warm July and August air temperatures. Increased stream temperature, particularly the acute daily maximum temperatures, has the greatest potential for affecting trout species in the Colorado River between Windy Gap Reservoir and the Williams Fork. Mitigation Measure #1 at the end of this section would address this impact.
- The amount and frequency of available habitat for adult brown trout in Willow Creek would decrease up to 25 percent under the action alternatives.
- Lower water levels and predicted changes in water quality in Granby Reservoir, Carter Lake, and Horsetooth Reservoir are unlikely to impact fish because lake productivity is expected to remain within the range observed under existing conditions. No change in fish population dynamics are expected from changes in the physical environment at Grand Lake, Shadow Mountain Reservoir, Granby Reservoir, Carter Lake, or Horsetooth Reservoir.
- Increased East Slope streamflows would slightly enhance fish habitat in the Big Thompson River, St. Vrain Creek, Big Dry Creek, and Coal Creek.

- Flow changes in North St. Vrain Creek under the No Action Alternative would affect fish habitat both positively and negatively depending on storage and release from Ralph Price Reservoir.

## Vegetation and Wetlands

Permanent effects to vegetation and wetland resources would occur in areas that would be inundated by a reservoir or located within the footprint of dams, roads, relocated transmission line, or other facilities.

Temporary effects to vegetation and wetlands from construction of pipelines, staging areas, and other short-term disturbances would be revegetated following construction.

- The enlargement of Ralph Price Reservoir under the No Action Alternative would result in a loss of about 77 acres of forest vegetation. Construction of Chimney Hollow Reservoir would permanently impact about 790 acres of shrublands, grasslands, and forest vegetation. The other alternatives would impact about 1,000 to 1,100 acres of mixed vegetation types.
- All of the alternatives would result in permanent and temporary impacts to wetlands and other waters (Table ES-7). Of the action alternatives, the Proposed Action would have the least impact to wetlands and waters. Mitigation Measure #8 at the end of this section would address this impact.

**Table ES-7. Summary of effects to wetlands and other waters by alternative.**

Wetlands and Other Waters	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3	Alternative 4*	Alternative 5*
	Acres				
Permanent	0.4	2.9	30.3	9.4 – 20.0	15.7 – 28.3
Temporary	—	0.2	5.2	3.9 – 6.9	4.3 – 7.3
TOTAL	0.4	3.1	35.5	13.3 – 26.9	20.0 – 35.6

\*The range in wetland impacts is due to uncertainty about the wetlands present at the Rockwell/Mueller Creek Reservoir site. Access to this site for field survey was denied by the landowners.

## Wildlife

The potential effects on wildlife resources were assessed using information on known populations or suitable habitat. Permanent impacts to wildlife habitat could occur in areas that would be inundated or permanently disturbed by project features such as the dam, access roads, and pump stations. Temporary impacts to habitat from pipelines and staging areas would be reclaimed following construction. Effects to waterbirds and aquatic and riverine mammals from changes in hydrology were based on potential effects to riparian vegetation.

- Enlargement of Ralph Price Reservoir would result in the loss of 77 acres of elk and mule deer winter range and habitat for other terrestrial wildlife species.
- Construction of Chimney Hollow Reservoir under the Proposed Action would result in the loss of 810 acres of elk winter range, mule deer winter range and concentration area, and black bear foraging area. A slightly smaller Chimney Hollow Reservoir under Alternatives 3 and 4 would impact similar habitats on about 675 acres. Habitat for migratory birds, northern leopard frog, common garter snake, and other species would be impacted at Chimney Hollow Reservoir. This impact is addressed in the FWMP, Appendix E.

- Construction of Jasper East Reservoir would impact about 480 acres of moose and mule deer summer range and 24 acres of elk winter range. Elk movement in the area could shift as a result of the new reservoir.
- Construction of Rockwell Reservoir would affect about 312 acres of summer range for moose and mule deer and 73 acres of elk winter range. About 300 acres of greater sage grouse habitat would be lost.
- Construction of Dry Creek Reservoir would result in the loss of about 650 acres of elk and mule deer winter range.

### **Threatened and Endangered Species**

Federally threatened and endangered species are protected under the Endangered Species Act. Potential direct and indirect effects to threatened or endangered species were evaluated for each alternative.

- All of the alternatives would result in depletions that affect Colorado River endangered fish downstream of the Windy Gap diversion. Reclamation reinitiated consultation with the U.S. Fish and Wildlife Service (Service) because the stream depletions associated with the Proposed Action would adversely impact bonytail chub, Colorado pikeminnow humpback chub, and razorback sucker. The Service issued a biological opinion on February 12, 2010 for the Preferred Alternative (Appendix D of the Final EIS). The biological opinion determined that the Windy Gap Project meets the criteria for coverage under the existing “Programmatic Biological Opinion” because a Recovery Agreement was previously signed by the Subdistrict in 2000. The Subdistrict would need to make a monetary contribution for water depletions to help fund their share of the costs of recovery actions as part of Mitigation Measure #5.
- Construction of Rockwell Reservoir would result in the loss of less than 10 acres of potential lynx habitat.

### **Land Use and Ownership**

Potential effects to existing land ownership were evaluated by overlaying proposed project facilities for each alternative on land ownership maps. Potential conflicts with local land use regulations were also evaluated for each of the alternative reservoir sites. Predicted construction traffic volumes and visitor estimates were used to evaluate short and long-term effects to local traffic.

- Enlargement of Ralph Price Reservoir would occur entirely on City of Longmont property. Traffic would increase on U.S. 36 and County Road 80 during construction.
- Construction of Chimney Hollow Reservoir would require acquisition or easements on private and Reclamation land, and relocation of 3.8 miles of Western’s transmission line. Traffic would increase on County Road 18E and County Road 31 during construction. Recreation traffic on County Road 18E would increase when the reservoir is complete to access Chimney Hollow open space, which would be managed by Larimer County.
- Construction of Jasper East Reservoir would require acquisition of Reclamation managed land and relocation of the Willow Creek Pump station and a portion of the canal (facilities that are part of the C-BT Project). County Road 40 to Willow Creek would need to be relocated and a right-of-way through private land would have to be obtained.

- Construction of Rockwell Reservoir would require acquisition of private land, including four residences. Bureau of Land Management property would also be affected and realignment of County Road 57 would be required. Traffic would increase on these county roads and U.S. 40 during construction.
- Private, state, and Reclamation-managed property would be affected by construction of Dry Creek Reservoir. Three private residences and a llama operation would be impacted. Traffic on County Road 31 would increase during construction.
- No elements associated with the construction of alternative reservoirs and facilities were identified that would directly conflict with local land use plans or other regulations. The review process in Larimer, Grand, and Boulder counties, to the extent applicable, would further evaluate the effects of the actions and any conditions for approval.

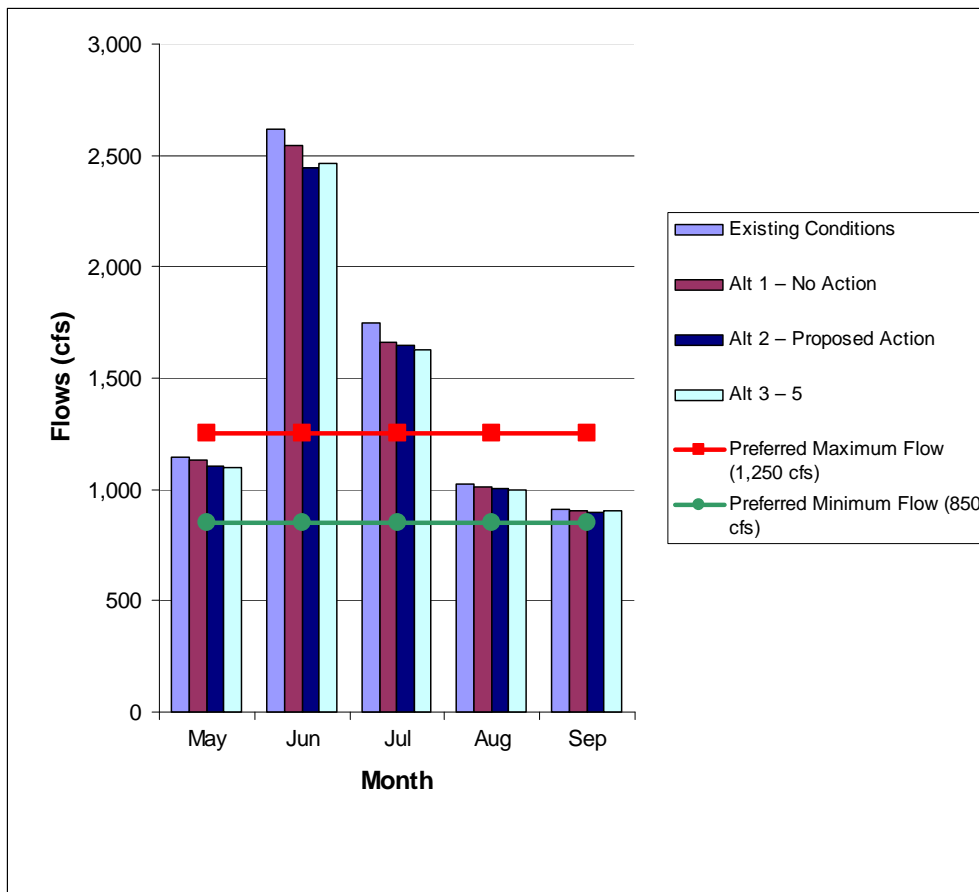
## Recreation

Potential recreation effects were based primarily on changes in hydrologic conditions at reservoirs and streams in the study area. Changes in preferred flows for rafting and kayaking in the Colorado River were used to evaluate the effect on river recreation. Potential effects to rafting and kayaking on the Colorado River were evaluated for Byers Canyon below Hot Sulphur Springs, and in the Big Gore Canyon and Pumphouse reaches of the Colorado River below Kremmling. Daily hydrologic data from 1950 to 1996 were used to estimate the change in the number of days when preferred rafting and kayaking flows would occur in those reaches of the river.

- There would be no change in the number of days that flows are above the preferred minimum kayaking flows in Byers Canyon (400 cfs) in 29 years of the 47-year study period. In the remaining 18 years, the No Action Alternative would result in 8 fewer days per year where flows were less than preferred, while the action alternatives would result in 12 fewer days.
- For Big Gore Canyon, there would be no change from existing conditions in the number of days that preferred rafting flows of 850 to 1,250 cfs occur for any of the alternatives in 37 years of the 47-year study period. Under the No Action Alternative and Proposed Action, there would be about 2.3 days per year, on average, with fewer preferred rafting flows during the 10 years when flows fall outside of the preferred range. The greatest decrease in the number of days with preferred flows for rafting in the driest year would be 11 days under all of the alternatives. Average monthly flows and preferred flows for rafting are shown in Figure ES-7. Mitigation Measure #6 at the end of this section would address this impact.
- The number of days preferred kayaking flows between 1,100 and 2,200 cfs occur in Big Gore Canyon and the Pumphouse reach would not change in 32 years of the 47-year study period for any of the alternatives. Over the 47-year study period, there would be about 1 more day of preferred kayaking flows under the No Action Alternative and Alternative 4 compared to existing conditions. The greatest change in the number of days with preferred kayaking flows in the driest year would be 15 days fewer under all of the alternatives, with an increase of up to 7 days with preferred kayaking flows under the No Action Alternative and 6 more days under the Proposed Action.
- No measurable effect to angler user days on the Colorado River or associated economic effects were identified for any of the alternatives.

- Granby Reservoir boat ramps would remain accessible in the summer under all alternatives, except in dry years when access to the Arapaho Bay boat ramp would be diminished due to lower water levels. Mitigation Measure #3 at the end of this section would address this impact.
- Kayaking opportunities in North St. Vrain Creek would be reduced in July under the No Action Alternative.
- Access to the South Bay-South boat ramp in Horsetooth Reservoir could be impacted under the Proposed Action in September and by all alternatives in dry years. Mitigation Measure #3 at the end of this section would help address this impact.
- The new Chimney Hollow Reservoir would provide nonmotorized boating, fishing, and hiking opportunities under Larimer County management, with 50,000 visitors estimated annually.
- No managing agency has been identified for other potential new reservoirs, but recreation development is possible if a managing entity is found.

**Figure ES-7. Average monthly streamflows on the Colorado River through Big Gore Canyon for rafting.**





## Socioeconomics

Socioeconomic effects evaluated include the cost of alternatives, impact of construction and operation on employment and spending, and the effects of hydrologic changes to recreation resources, such as boating and fishing.

- Enlargement of Ralph Price Reservoir under the No Action Alternative would cost about \$31 million (Table ES-8). The cost of the action alternatives in 2005 dollars, ranges from \$223 million for the Proposed Action to \$288 million for Alternative 5.

**Table ES-8. Project, direct labor, and operation and maintenance costs by alternative.**

Alternative	Total Project Costs	Direct Labor	Annual O&M Costs
	Millions of 2005 dollars		
Alternative 1 – No Action	\$31	\$8	No change
Alternative 2 – Proposed Action	\$223*	\$47	\$0.79
Alternative 3	\$240	\$49	\$1.37
Alternative 4	\$252	\$52	\$1.73
Alternative 5	\$288	\$60	\$2.24

\*Cost for Chimney Hollow Reservoir in 2007 dollars increased 17 percent to \$261 million.

- All of the alternatives would increase local and regional employment and construction-related spending.
- The alternatives would generate additional hydropower revenues ranging from \$850,000 for the No Action Alternative to \$1.4 million for Alternative 5. Western would use this energy to fill existing contracts entered into following original construction of the Windy Gap Project.
- Hydrologic changes that reduce or increase the number of days that preferred flows for boating in the Colorado River occur, could impact recreation-associated spending. Assuming a decrease in the number of days of preferred flows results in a total loss in recreation user days, the annualized cost or benefit to recreational boating based on changes in flow preferences over the 47-year study period is shown in Table ES-9.
- The economic effect for the worst-case individual year (based on the 47-year study period) when preferred flows would not be available, could result in a loss of about 429 visitor days for commercial rafting in Big Gore Canyon with a value of about \$31,000. In the Pumphouse reach, a maximum loss of 15 boating days in a single year under all of the alternatives would result in a loss of 6,705 visitor days with a value of \$492,750. This analysis makes the conservative assumption that no boating occurs when flows are outside of the preferred flow range.
- Some years would have an increase in boating days within the preferred ranges from WGFP diversions. This would result in 2,700 to 4,500 additional visitor days with a value of \$197,000 to \$329,000.

**Table ES-9. Annualized cost (-) or benefit (+) from recreational boating on the Colorado River by alternative.**

Alternative	Byers Canyon (Kayaking)	Big Gore Canyon (Rafting and Kayaking)	Pumphouse (Rafting and Kayaking)
Alt 1 – No Action	Minor	-\$2,423	-\$132,798
Alt 2 – Proposed Action	Minor	-\$3,392	-\$144,680
Alt 3 – 5	Minor	-\$3,756	-\$139,787

## CUMULATIVE EFFECTS

Several reasonably foreseeable actions are anticipated to occur regardless of the implementation of any of the action alternatives or the No Action Alternative. Reasonably foreseeable future actions, when combined with past and present actions and the alternatives evaluated in this Final EIS, may result in cumulative effects. Reasonably foreseeable effects were classified as either water-based or land-based actions that might have effects overlapping those of the WGFP.

### Water-based Reasonably Foreseeable Actions

- Denver Water Moffat Collection System Project
- Increased water use from population growth in Grand and Summit counties
- Reduction of Xcel Energy's Shoshone Power Plant call
- Elimination of releases from Williams Fork and WOLFORD Mountain reservoirs to meet flow recommendations (10,825 AF of water) for endangered fish
- Increase in WOLFORD Mountain Reservoir contract demand
- Expiration of Denver Water's contract with Big Lake Ditch in 2013
- Climatic change (not quantitatively assessed)
- Mountain pine beetle killed trees (not quantitatively assessed)
- 10825 Project with 5,412.5 AF releases from Granby Reservoir
- Subdistrict and Denver Water Fish and Wildlife Enhancement Plans
- Denver Water Colorado River Cooperative Agreement

### Land-based Reasonably Foreseeable Actions

- Various residential developments near new reservoir sites
- Western's replacement of the transmission line from the Granby Pumping Plant to the Windy Gap substation
- Larimer County open space development near Chimney Hollow Reservoir

### Cumulative Resource Effects

Future implementation of water-based reasonably foreseeable actions would result in changes in the amount and timing of Colorado River streamflows. In general, less water would be available for diversion by the WGFP. Firm yield for the Proposed Action (24,000 AF) would be about 2,500 AF less than under the direct effect model run. The hydrologic changes associated with the WGFP would be slightly less than those described for direct effects because of the lower water diversions, although cumulative water diversions would be greater. Water quality in the Colorado River from lower overall flows and increased wastewater

discharges upstream of Windy Gap Reservoir would result in higher ammonia concentrations and possibly lower inorganic phosphorus levels with assumed improvements in wastewater treatment. The potential for exceedance of the temperature standards in the Colorado River would increase with cumulative water diversions, but the releases from Granby Reservoir in the late summer from the 10825 Project would reduce temperature increases. Water quality in the Three Lakes, Carter Lake, and Horsetooth Reservoir would be similar to that under direct effects. Less fish habitat would be available in the Colorado River from the cumulative decrease in streamflows. Preferred recreational boating flows in the Big Gore Canyon and Pumphouse reaches of the Colorado River would occur less frequently, primarily because of lower Blue River flows from increased Denver Water demands. However, the assumption used in hydrologic modeling for Denver Water's future diversions in the Blue River basin are overstated by about 30,000 AF; therefore, reductions in Colorado River streamflow below the confluence with the Blue River are overstated in the Final EIS. The economic effects of reduced preferred flows for boating also would be greater than under direct effects. Other resource effects would be similar to those described for direct effects.

## MITIGATION

Avoidance and minimization of environmental impacts began with the screening of potential alternatives as described in Chapter 2 of the Final EIS. Comments received on the Draft EIS from the public; federal, state, and local agencies; and cooperating agencies provided valuable feedback in identifying additional mitigation measures that would reduce impacts associated with implementation of the WGFP. Mitigation and environmental commitments for the Proposed Action are discussed in detail in the mitigation sections for each resource and are summarized in Section 3.25 of the Final EIS. Following is a brief summary of the principal mitigation measures that would be implemented for the Proposed Action.

1. Curtailment of WGFP diversions after July 15 when temperature in the Colorado River below Windy Gap Reservoir and above the Williams Fork exceeds the chronic or acute temperature standard.
2. Flushing flows from the original Windy Gap Project (1980 MOU) would be modified to increase from 450 to 600 cfs. In any year when flows below Windy Gap have not exceeded 600 cfs for at least 50 consecutive hours in the previous two years, and total Subdistrict water supplies in Chimney Hollow and Granby Reservoirs exceed 60,000 AF on April 1, the Subdistrict would cease all Windy Gap pumping for at least 50 consecutive hours to enhance peak flows below Windy Gap.
3. The originally proposed prepositioning of C-BT water to Chimney Hollow Reservoir was modified to maintain higher water levels (>8,250 feet in elevation) in Granby Reservoir.
4. To offset nutrient loading to Granby Reservoir, Shadow Mountain Reservoir, and Grand Lake, the Subdistrict would implement point and nonpoint source nutrient mitigation measures upstream of Windy Gap Reservoir. This would serve to improve water quality in portions of Willow Creek, the Fraser River, and Colorado River year-round and offset nutrient loading to the Three Lakes from WGFP pumping.

5. The Subdistrict would participate in the Upper Colorado River Recovery Program and pay a fee to address depletions that would impact Colorado River endangered fish species.
6. Curtailment of WGFP diversions during the annual Gore Race in August would occur if flows in Gore Canyon drop below 1,250 cfs.
7. The Subdistrict would commit to continued participation and funding of the ongoing Nutrient Studies, with participation and collaboration by Reclamation, Northern Water, and Grand County, to better understand water quality issues in the Three Lakes system and provide guidance for future management decisions.
8. All permanent wetland impacts would be replaced by purchasing wetland bank credits.
9. Per an agreement with Larimer County Parks and Open Lands, Chimney Hollow Reservoir would be managed as open space. A plan for habitat restoration, enhancement, and wildlife management would be developed with Larimer County and CDPW.
10. A variety of best management practices would be implemented during and following construction to reduce erosion, protect water quality, suppress dust and noise, revegetate disturbed areas, and protect or avoid important wildlife habitat.

## **WHAT'S NEXT?**

A number of decisions, permits, and approvals are needed from federal, state, and local agencies to implement the WGFP. Reclamation is responsible for NEPA compliance and other decisions associated with use and connection to C-BT facilities, any changes in C-BT operations, and use of Reclamation land. The Corps, as a cooperating agency, has regulatory authority for Section 404 dredge and fill permitting requirements under the Clean Water Act. Western, a federal power marketing agency in the U.S. Department of Energy, will make a decision on the relocation of a transmission line for the Chimney Hollow Reservoir alternative. Both the Corps and Western are using this Final EIS to meet NEPA compliance requirements for their federal actions associated with the WGFP.

As the lead agency, Reclamation is responsible for preparation of the Final EIS and Record of Decision (ROD). In addition, Reclamation must make several decisions regarding potential actions associated with implementation of the Proposed Action or other alternatives. All of the action alternatives would involve a physical connection of WGFP conveyance facilities on the East Slope to C-BT facilities. Reclamation will need to decide whether to allow this connection. The No Action Alternative does not require any authorization by Reclamation.

Because the Proposed Action includes the storage of C-BT water in a new WGFP facility (a concept referred to as prepositioning), Reclamation also will need to make a decision regarding accounting for changes in the C-BT system to allow water storage and exchange between the two projects to occur. Implementation of prepositioning may require modification or replacement of the existing conveyance and storage contract between Reclamation, the Subdistrict, and Northern Water.

Reclamation expects to complete the NEPA process with a Record of Decision (ROD) no sooner than 30 days after the Final EIS is made available to the public. The ROD will document Reclamation's selection of an alternative for the WGFP and discuss the factors, including C-BT Project water rights that were considered in making that decision. If the selected alternative includes issuing a water contract, Reclamation intends to determine whether the proposed contract complies with Senate Document 80, and other applicable authorities, prior to execution of the proposed contract.

Copies of the Final EIS and related documents are available online from Reclamation's website at:  
[www.usbr.gov/gp/eca0](http://www.usbr.gov/gp/eca0)

To receive a copy of the Final EIS on compact disk, please submit a written request to the attention of Lucy Maldonado through regular mail or e-mail:

**Mail:** Lucy Maldonado, Bureau of Reclamation  
11056 West County Rd. 18E  
Loveland, CO 80537

**Fax:** Lucy Maldonado, 970-663-3212

**E-mail:** [lmaldonado@usbr.gov](mailto:lmaldonado@usbr.gov)

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