

Moffat Collection System Project Fish and Wildlife Mitigation Plan

Prepared for:
The Colorado Wildlife Commission
In accordance with **CRS 37-60-122.2**

Prepared by:
Denver Water

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Water Collection System

EXECUTIVE SUMMARY

The City and County of Denver, acting by and through its Board of Water Commissioners (Denver Water) is proposing to construct the Moffat Collection System Project (Moffat Project), a project designed to provide 18,000 acre-feet (AF) per year of new water supply to Denver Water's customers. Denver Water proposes to enlarge its existing 42,000-AF Gross Reservoir, which is located in Boulder County, Colorado approximately 35 miles northwest of Denver and 6 miles southwest of the city of Boulder. The purpose of this Fish and Wildlife Mitigation Plan (FWMP) for the Moffat Project is to comply with the requirements of Colorado state law (CRS 37-60-122.2), as implemented by the procedural rules for the Colorado Wildlife Commission.

The Moffat Project must comply with the National Environmental Policy Act (NEPA) by preparing an Environmental Impact Statement (EIS) and the Clean Water Act by applying for a Section 404 Permit from the U.S. Army Corps of Engineers (Corps). Denver Water will also apply to the Federal Energy Regulatory Commission (FERC) to amend its hydropower license for the Gross Reservoir hydroelectric facility.

Denver Water is committed to comply with all mitigation measures in the FWMP, the Corps' Record of Decision and Section 404 Permit, and the FERC license.

Denver Water is also submitting a separate *Fish and Wildlife Enhancement Plan (Enhancement Plan)* in cooperation with the Municipal Subdistrict of the Northern Colorado Water Conservancy District (Subdistrict), proposing to enhance fish and wildlife resources over and above current conditions in the Colorado River below the Windy Gap diversion.

Since the Subdistrict is seeking approval through the state and federal regulatory processes for the WGFP concurrent with Denver Water's Moffat Project, both Denver Water and the Subdistrict have agreed to cooperate in a process of simultaneous development of mitigation and enhancement plans pursuant to CRS 37-60-122.2.

In addition to the required mitigation measures in the FWMP and voluntary enhancements in the *Enhancement Plan*, Denver Water and Grand County have reached a proposed agreement to provide environmental enhancements to benefit the aquatic environment in the Fraser, Williams Fork and Upper Colorado rivers, including participation in the cooperative effort called Learning by Doing (LBD).

Denver Water will mitigate for environmental impacts of the Moffat Project through the measures identified in this FWMP. Additionally, Denver Water is proposing to improve the aquatic and riparian habitat of the Colorado River in Grand County with measures identified in the separate *Enhancement Plan* and the LBD Cooperative Effort. The FWMP, *Enhancement Plan*, and LBD Cooperative Effort are conditioned upon Denver Water improving the reliability of the Moffat Collection System water supplies through successful permitting of the Moffat Project. The LBD Cooperative Effort is only being offered to enhance existing conditions in Grand County and is not intended to reduce the amount of mitigation the U.S. Army Corps of Engineers (Corps) will require to mitigate the identified impacts of the Moffat Project.

1.0 INTRODUCTION

1.1 Project Overview

The City and County of Denver, acting by and through its Board of Water Commissioners (Denver Water) is proposing to construct the Moffat Collection System Project (Moffat Project), a water supply project designed to provide 18,000 acre-feet (AF) per year of new water supply to Denver Water's customers. Denver Water proposes to enlarge its existing 42,000-AF Gross Reservoir, which is located in Boulder County, Colorado approximately 35 miles northwest of Denver and 6 miles southwest of the city of Boulder. Using existing infrastructure, water from the Fraser River, Williams Fork River, and South Boulder Creek would be diverted and delivered to Gross Reservoir during average-to-wet years via the Moffat Tunnel and South Boulder Creek. In order to provide 18,000 AF of new water supply, Gross Dam would be raised 125 feet to provide an additional 72,000 AF of storage capacity. The surface area of the reservoir would increase by 400 acres from 418 to 818 acres. Existing facilities, including the South Boulder Diversion Canal and Conduits 16 and 22, would be used to deliver water from the enlarged Gross Reservoir to the Moffat Water Treatment Plant and raw water customers.

In 2003, Denver Water notified the Corps of their intent to apply for a permit, pursuant to Section 404 of the Clean Water Act (Section 404 Permit), to place fill in jurisdictional waters of the U.S., including wetlands for a water supply project. The Corps determined that an Environmental Impact Statement (EIS) was needed to evaluate the direct and indirect effects of a range of reasonable alternatives. The Corps published their Draft EIS on the Moffat Project in October 2009.

The Draft EIS identified potential environmental impacts of the Moffat Project, including impacts to fish and wildlife resources. Pursuant to CRS 37-60-122.2(1), Denver Water prepared this Fish and Wildlife Mitigation Plan (FWMP) in consultation with the Colorado Division of Wildlife (CDOW) to mitigate fish and wildlife impacts from the Moffat Project identified in the Corps' Draft EIS. If, upon release of the Final EIS for the Moffat Project, impacts to fish and wildlife resources are identified that were not described in the Draft EIS, Denver Water will propose additional mitigation, if needed, for these new impacts. The additional mitigation will be developed in cooperation with the CDOW prior to submittal to the Corp for its consideration as a Section 404 permit condition for the Moffat Project. Denver Water will also reserve funds as an "insurance policy" to mitigate any new Moffat Project impacts to fish and wildlife resources identified in the Final EIS and required by the Corps.

In addition, to address existing stream conditions, Denver Water is submitting to the Colorado Wildlife Commission, pursuant to regulations implementing CRS 37-60-122.2(2), a proposal for enhancing fish and wildlife resources over and above the levels existing without the Moffat Project. Denver Water is also providing a copy of the proposed LBD Cooperative Effort agreement as an information piece for the Wildlife Commission. For an understanding of the environmental enhancements Denver Water is proposing, refer to the document titled, "*Moffat Collection System Project Fish and*

Wildlife Enhancement Plan” (Enhancement Plan), which includes a copy of the proposed LBD Cooperative Effort agreement. The *Enhancement Plan* is being submitted concurrently with the FWMP.

1.2 Regulatory Process

The Moffat Project is subject to numerous permits and approvals that require mitigation to offset environmental effects attributable to the proposed Gross Reservoir enlargement. Some of the key regulatory review processes evaluating fish and wildlife resources include the following:

NEPA/ Section 404: The Corps is the lead federal agency preparing the EIS in accordance with the National Environmental Policy Act (NEPA) and the Corps’ regulations for implementing NEPA (33 CFR 325, Appendix B). The U.S. Environmental Protection Agency (USEPA) and Federal Energy Regulatory Commission (FERC) are cooperating agencies, and Grand County is a consulting agency, in the EIS process. The Corps issued the Draft EIS in October 2009 for an extended agency and public comment period of 138 days. The Corps is currently in the process of responding to comments received. The Final EIS and Record of Decision are anticipated to be released by the Corps near the end of 2011. If the Corps issues a Section 404 permit, it will contain special conditions and mitigation measures to offset environmental effects resulting from unavoidable impacts to aquatic resources as well as special conditions to satisfy public interests.

FERC Hydropower License Amendment: Because Gross Reservoir is a FERC-licensed hydroelectric facility, Denver Water will apply to FERC to amend its hydropower license for Gross Reservoir. A Draft FERC Hydropower License Amendment Application was submitted by Denver Water to stakeholders and FERC in October 2009 for public comment. A final amendment application will be submitted to FERC following the Corps’ release of the Final EIS. In the amended license, FERC may impose license conditions for environmental protection within the Gross Reservoir project area. In addition, license conditions may be imposed by the U.S. Forest Service (USFS) for the protection of USFS lands under Section 4e of the Federal Power Act. The following is a list of license conditions (by associated license article number) that Denver Water currently complies with under its existing FERC license:

- 401: Erosion Control
- 402: Dissolved Oxygen (DO) and Water Temperature Monitoring of South Boulder Creek below Hydroelectric Facility
- 403/404: Ramping Rate Compliance
- 405: Rehabilitation and Restoration Plan (USFS Condition 104)
- 406: Weed Management Plan (USFS Conditions 107 and 108)
- 407: Forest Management Plan
- 410: Plan to Protect Rare and Sensitive Species in the Project Boundary
- 411: Participation in the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin

- 412/413: Participation in the Platte River Endangered Species Recovery Implementation Program
- 414: Visual Resource Protection Plan (USFS Condition 105)
- 415: Archaeological or Historic Sites
- 416/417: Recreation Management Plan (USFS Condition 106)
- 110: Channel Instability and Bank Erosion (USFS Condition 110)

Denver Water will prepare specifications for drainage, erosion control, revegetation, etc. as part of the dam construction plan approval with FERC.

USFWS Section 7 Consultation: The Corps initiated consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7(a) of the Endangered Species Act regarding effects of the Moffat Project on federally listed species and/or designated critical habitat. The USFWS issued a Biological Opinion on July 31, 2009 and determined that proposed depletions to the Colorado River and Platte River would be covered under Denver Water’s existing Recovery Agreement on the Colorado River and continued participation in the South Platte Water-Related Activities Program, Inc. (SPWRAP), respectively. In 2010, based on a review of the Draft EIS, the USFWS recommended that the Corps reinstate Section 7 consultation for the Moffat Project and amend the Biological Assessment to address the greenback lineage populations of cutthroat trout within the Project Area.

State FWMP: CRS 37-60-122.2 requires CDOW and Colorado Water Conservation Board (CWCB) review and input on mitigation for fish and wildlife impacts resulting from a federally approved water project. The rules at Section 1604B. instruct the Wildlife Commission to ensure that “the mitigation plan is economically reasonable and reflects a balance between protecting the fish and wildlife resources and the need to develop the state’s water resources.” Although the procedures for CRS 37-60-122.2 do not require public review and input, Denver Water and CDOW have been involved in extensive efforts to allow for public participation. To date, the Wildlife Commission has provided the following public meetings to solicit input on the potential impacts and mitigation for the Moffat Project:

- Wildlife Commission Workshop, December 9, 2010, Colorado Springs – CDOW presented the potential fish and wildlife impacts of the Moffat Project
- Wildlife Commission Public Meetings (“1313” Meetings), January 18, 2011 in Granby and January 20, 2011 in Boulder – Wildlife Commissioners solicited public comment on the potential fish and wildlife impacts of the Moffat Project
- Public Comment Period on Draft Enhancement and Mitigation Plans, Feb. 10-24, 2011 – CDOW invited public review and comment on the February 9th draft plans. The input was considered by CDOW, Denver Water and the Subdistrict in preparing the April 7th plans.
- Wildlife Commission Meeting, March 10, 2011 – Members of the public provided comments on the February 9th draft plans and review process.
- Wildlife Commission Meeting, May 6, 2011 – Members of the public provided comments on the April 7th plans submitted to the Wildlife Commission.

The FWMP will be reviewed by the Wildlife Commission to ensure that the state's fish and wildlife resources affected by the proposed water project are reasonably protected.

State Fish and Wildlife Enhancement Plan: CRS 37-60-122.2(2) makes a specific distinction between mitigation of impacts caused by the proposed project, and enhancing fish and wildlife resources over and above current conditions. This distinction is further defined in the Procedural Rules for the Wildlife Commission (Chapter 16), and clarified in a memorandum dated December 9, 2010 to the Director of the CDOW and the Wildlife Commission from the First Assistant Attorney General, Natural Resources and Environment Section. Accordingly, this FWMP includes mitigation measures to address the impacts that have been identified in the NEPA process for the proposed project. Denver Water has also prepared a separate *Enhancement Plan*, in accordance with CRS 37-60-122.2(2) to address issues raised by CDOW and other stakeholders regarding the current condition of the aquatic environment in the Colorado River, which includes proposed enhancement measures to enhance fish and wildlife resources over and above levels existing without the Moffat Project.

The Wildlife Commission has provided the following public meetings to solicit input on enhancement suggestions:

- Stakeholder Workshops, January 24-25, 2011, Winter Park – CDOW solicited input on options for fixing the upper Colorado River between Windy Gap and the Kemp-Breeze State Wildlife Area to ensure a functioning river that supports fish and wildlife resources given anticipated future flows.
- Public Comment Period on Draft Enhancement and Mitigation Plans, Feb. 10-24, 2011 – CDOW invited public review and comment on the draft plans. The input was reviewed by CDOW, Denver Water and the Subdistrict while preparing the April 7th plans.
- Wildlife Commission Meeting, March 10, 2011 – Members of the public provided comments on the February 9th draft plans and review process.
- Wildlife Commission Meeting, May 6, 2011 – Members of the public provided comments on the April 7th plans submitted to the Wildlife Commission on April 7, 2011.

1.3 Fish and Wildlife Mitigation Plan Stakeholders

Even before the public participation coordinated by the CDOW, Denver Water has been consulting and conferring with a broad range of federal and state agencies, as well as local governments and environmental groups, to solicit input on appropriate mitigation for the impacts identified in the Moffat Project Draft EIS. Meetings with these entities started in 2008 when Denver Water prepared the applicant's proposed mitigation plan for the Draft EIS. To date, these entities include:

- Federal: Corps, USEPA, FERC, USFS, and USFWS
- State: CDOW and Colorado Department of Public Health and Environment (CDPHE)
- Local: Grand County, Boulder County, cities of Boulder and Lafayette, and Town of Hot Sulphur Springs
- Non-governmental organizations: Trout Unlimited, and landowners along the upper Colorado River and in the Fraser River basin

1.4 Concurrent and Related Activities

Windy Gap Firming Project

The Windy Gap Firming Project (WGFP) is a proposed water supply project that would provide more reliable water deliveries to Front Range and West Slope communities and industries. The Municipal Subdistrict, Northern Colorado Water Conservancy District, acting by and through the WGFP Water Activity Enterprise (Subdistrict) is seeking to construct the project on behalf of the 13 WGFP Participants. Project Participants include the City and County of Broomfield, the towns of Erie and Superior, the cities of Evans, Fort Lupton, Greeley, Lafayette, Longmont, Louisville, Loveland, Little Thompson Water District, Central Weld County Water District, and the Platte River Power Authority.

The proposed WGFP is to add water storage and related facilities to the existing Windy Gap operations capable of delivering a firm annual yield of about 30,000 AF to Project Participants. The Subdistrict's Proposed Action is the construction of Chimney Hollow Reservoir to store Windy Gap Project water. The WGFP Draft EIS was issued by the U.S. Bureau of Reclamation in 2008.

The Moffat Project would increase diversions from the Fraser River Basin upstream of the Windy Gap Project diversion site on the Colorado River and would affect the availability of water for the WGFP. Diversions for the WGFP and Moffat Project would result in changes to flows in the Colorado River below the Windy Gap dam. Denver Water and the Subdistrict have agreed to cooperate with each other and with the Colorado Department of Natural Resources (DNR) and CDOW in concurrent development of the mitigation plans required under CRS 37-60-122.2 for the two projects. They will jointly develop stream temperature monitoring stations as mitigation (refer to Section 3.1.2 of this FWMP). Additionally, Denver Water and the Subdistrict have proposed enhancements with significant resources and funding to improve current conditions in the river. (Refer to the Enhancement Plans prepared by Denver Water and the Subdistrict, which include a discussion of the LBD Cooperative Effort.)

2.0 AVOIDANCE AND MINIMIZATION

The Corps conducted a detailed alternatives analysis, beginning with over 300 alternatives, to determine the range of reasonable alternatives to be analyzed in the EIS to avoid and minimize environmental impacts. The Applicant's preferred alternative to enlarge Gross Reservoir by 72,000 AF has been designed to avoid or minimize direct effects to wetlands and other waters of the U.S. to those that are unavoidable due to dam construction and reservoir inundation. As part of the federal and state permits and approvals, Denver Water will implement a variety of best management practices (BMPs) during and following construction to reduce erosion, protect water quality, suppress dust and noise, revegetate temporarily disturbed areas, and protect or avoid important wildlife habitat. Some of these environmental permits and approvals with BMPs and environmental protection measures include, among others:

- Migratory Bird Treaty Act Compliance
- CDPHE Fugitive Dust Control Plan
- CDPHE Stormwater Management Plan
- CDPHE Section 401 Water Quality Certification

The CDOW has also developed BMPs for the oil and gas industry to minimize adverse impacts to wildlife resources. Denver Water will develop appropriate BMPs when preparing final design and construction plans, and will consult with CDOW to avoid or minimize impacts on wildlife resources.

3.0 FISH AND WILDLIFE MITIGATION

Denver Water and CDOW have worked together, with input from numerous stakeholders, to ensure reasonable mitigation measures are recommended to offset the impacts to fish and wildlife resources identified in the Draft EIS for the Moffat Project. Tables 1- 7 present the proposed impacts of the project identified in the Moffat Project Draft EIS, the proposed mitigation measure and the agency responsible for ensuring compliance with the measure.

Denver Water's collection system is comprised of two major systems: the North System (also known as the Moffat Collection System) and the South System. Refer to the attached figure. The two collection systems are geographically distinct and are not physically connected. Operation of the Moffat Project would affect operations, diversion and stream flow regimes in both of Denver Water's collection systems. Of the 18,000 AF of new water supply to be provided by the Moffat Project, the approximate quantities of water that would be diverted annually from the following river systems are as follows:

- Moffat System (Fraser and Williams Fork rivers) 10,000 AF
- Blue River 5,000 AF
- South Platte River 2,000 AF
- South Boulder Creek 1,000 AF

Under its existing water rights, Denver Water would increase diversions primarily during average and wet years during the runoff months of May, June and July. There would be no additional diversions in dry years because Denver Water already diverts the maximum amount physically and legally available.

The discussion of impacts and mitigation measures are organized as follow:

- West Slope
 - Fraser and Williams Fork rivers
 - Upper Colorado River
 - Blue River
- East Slope
 - Gross Reservoir
 - South Boulder Creek
 - North Fork South Platte River
 - South Platte River

3.1 West Slope

3.1.1 Fraser and Upper Williams Fork Rivers

Operation of the Moffat Project would result in additional diversions in the Fraser River, upper Williams Fork River, and their tributaries. Flows would decrease in average and wet years due to the additional diversions by the Moffat Project. These additional diversions would be concentrated during the runoff months of May, June, and July and from September through April flow changes would be 1 cfs or less. During dry years, there would be no additional diversions. The Draft EIS determined that reductions in flow during runoff could decrease aquatic habitat availability in the Fraser River basin and the four headwater tributaries of the Williams Fork River: Steeleman, Bobtail, Jones and McQueary creeks. The reductions in flow could also result in increasing frequency of approaching or exceeding stream temperature standards at some locations. Temperatures exceeding the standards have occurred in the Fraser River and Ranch Creek in July and August based on data collected by the Grand County Water Information Network (GCWIN) in 2007 and 2008.

Tables 1 and 2 present the impacts and mitigation for the Fraser River and Williams Fork River, respectively.

Mitigation - Colorado River and Greenback Cutthroat Trout Habitat Improvements

One of CDOW's goals for West Slope headwaters is to reestablish a viable fishery for Colorado River cutthroat trout, a state species of special concern and Greenback cutthroat trout, a federally listed threatened species. The CDOW, USFWS and USFS are all signatories to a Conservation Agreement to reduce threats to Colorado River cutthroat trout, to stabilize or enhance its populations, and to maintain its ecosystems. To partially compensate for reduced flows and subsequent potential decrease in aquatic habitat in the Fraser and Williams Fork rivers and tributaries, Denver Water is proposing to construct new habitat for the Colorado River cutthroat trout and Greenback cutthroat trout. CDOW will select a headwater stream in Grand County that currently does not support cutthroat trout, construct a barrier at the downstream end of the habitat area, eradicate all the trout in the stream upstream of the barrier, and then reintroduce a core conservation population of cutthroat trout. Denver Water will provide funding to the CDOW for the habitat creation project and assist the CDOW in constructing the fish passage barrier. CDOW will obtain the necessary permits and approvals to conduct this work in the stream.

Mitigation – Stream Temperature Monitoring and Reductions in Diversions

Denver Water will pay USGS to install, monitor and maintain a real-time temperature monitoring station on Ranch Creek at the existing USGS gaging station near Fraser, CO (USGS gage #09032000). A real-time gaging and temperature station is currently operational on the Fraser River below Crooked Creek near Tabernash, CO (USGS gage #09033300). When specified temperature values are exceeded between July 15 and August 31, Denver Water will forgo up to 250 AF of diversions from its Fraser River Collection System by releasing up to 4 cubic feet per second (cfs) per day. The 250 AF is an estimate of the amount of water that would be diverted by the Moffat Project during

the month of August. The 250 AF will be available in all years except for droughts in Denver Water's Collection System. Since the proposed Moffat Project will not divert water during dry years, the additional 250 AF of bypass flows will not be made when Denver Water places its customers on water use restrictions as part of a drought response.

For the purposes of this mitigation plan, the threshold temperature will be 21.2°C ([70.2° F] Daily Maximum) and 17°C ([62.6° F] Maximum Weekly Average) as measured at the following locations:

1. USGS gage #09032000 – Ranch Creek near Fraser, CO
2. USGS gage #09033300 – Fraser River below Crooked Creek at Tabernash, CO

As stream temperatures approach these two thresholds, coordination will take place between Denver Water and CDOW as to what facilities will be bypassing water. Then, if stream temperature reaches these thresholds, water can be bypassed in an effort to address the temperature concerns. Denver Water will also cooperate with future studies to determine what factors, other than water flow, have effects on water temperatures in the Fraser River and its tributaries below Denver Water diversion structures.

The release of 250 AF of water may be suspended in the event that and at such times as there is no material causal relationship between the Moffat Collection System Project operations and any exceedance of the temperature thresholds at the monitoring stations identified above. For the purposes of this paragraph, a "material causal relationship" is defined as either an actual measurable impact on temperature using readily available monitoring technology or a modeled impact on temperature that is not *de minimus* and is based on a computer model or studies accepted by CDOW.

Denver Water will continue its participation in and support GCWIN to monitor stream temperatures in the Fraser River basin and the Colorado River. The GCWIN stream temperature monitoring program includes 31 monitoring sites in Grand County. Monitoring of stream temperatures in the Fraser River basin will also be a component of the LBD Cooperative Effort to be implemented with Grand County. Refer to the *Enhancement Plan* for details. If the stream temperature monitoring in the Fraser River Basin indicates a need for action, the LBD Cooperative Effort could coordinate the use of the 1,000 AF of bypasses in LBD with the 250 AF described above to address the identified temperature issue in the Fraser Basin or reserve the use of that water for addressing a temperature issue in the Colorado River downstream of the Windy Gap diversion.

Mitigation –Aquatic Habitat Improvements

Denver Water will provide up to \$750,000 for stream habitat restoration to compensate for reduced flows and subsequent potential decrease in aquatic habitat in the Fraser and upper Williams Fork rivers and tributaries. Denver Water will work with the CDOW and participants in the proposed LBD Cooperative Effort to design and implement stream habitat mitigation projects. All parties will work in good faith to ensure the project design and implementation compliments the enhancement efforts in the Basin. CDOW will be responsible for the actual design of the projects in consultation with the

Management Team for LBD and Denver Water will be responsible for permitting, implementing and maintaining the aquatic habitat improvements.

Funds may be used for stream improvements on private lands, but preference will be given to those lands where public access is allowed or on private lands where matching funds are provided. Any stream improvement on private lands will require landowner permission and a permanent easement with Denver Water or CDOW to ensure the mitigation measures remain effective for offsetting identified impacts from the Moffat Project.

3.1.2 Colorado River

Operation of the Moffat Project would cause depletions to the upper Colorado River basin, which may result in elevated stream temperatures on hot summer days. The reductions in flow would indirectly affect four endangered fish species: bonytail chub, Colorado pikeminnow, humpback chub and razorback sucker. Under the Endangered Species Act, the Corps initiated formal Section 7 Consultation with the USFWS regarding the depletion effects on these federally-listed species. The USFWS issued a Biological Opinion (BO) for the Moffat Project in July 2009 determining that the proposed depletions associated with the Moffat Project would be covered under Denver Water's Recovery Agreement as new depletions. Denver Water signed a Recovery Agreement with the USFWS in 2000, which governs consultations under Section 7 of the Endangered Species Act with respect to depletions caused by water users. New depletions of more than 100 AF/yr are assessed a one-time fee to help support the Upper Colorado River Endangered Fish Recovery Program.

Table 3 presents the impacts and mitigation for the Colorado River.

Mitigation - Upper Colorado River Endangered Fish Recovery Program

Denver Water will comply with the BO and make a payment as determined by the USFWS to help support the Upper Colorado River Endangered Fish Recovery Program.

Mitigation - Colorado River Basin Temperature Monitoring and Reductions in Diversions

Denver Water will work with the Subdistrict to install, monitor and maintain two continuous real-time temperature monitoring stations on the Colorado River to be located at the Windy Gap stream gage and upstream of the Williams Fork River confluence. When specified temperature values are exceeded between July 15 and August 31, Denver Water will forgo up to 250 AF of diversions from its Fraser River Collection System by releasing up to 4 cubic feet per second (cfs) per day. The 250 AF is an estimate of the amount of water that would be diverted by the Moffat Project during the month of August. The 250 AF will be available in all years except for droughts in Denver Water's Collection System. Since the proposed Moffat Project will not divert water during dry years, the additional 250 AF of bypass flows will not be made when Denver Water places its customers on water use restrictions as part of a drought response. The total amount of water available for temperature issues on the Fraser River, its tributaries, and the Colorado River shall not exceed 250 AF in any one year.

For the purposes of this mitigation plan, the threshold temperatures will be 23.8°C ([74.8° F] Daily Maximum) and 18.2°C ([64.8° F] Maximum Weekly Average). As stream temperatures approach these two thresholds, coordination will take place between Denver Water and CDOW as to what facilities will be bypassing water. Then, if the stream temperature reaches these thresholds, water can be bypassed in an effort to address temperature concerns. Denver Water will also cooperate with future studies to determine what factors, other than water flow, have effects on water temperatures in the Colorado River below Windy Gap to its confluence with the Blue River.

The release of 250 AF of water may be suspended in the event that and at such times as there is no material causal relationship between the Moffat Collection System Project operations and any exceedance of the temperature thresholds at the monitoring stations identified above. For the purposes of this paragraph, a “material causal relationship” is defined as either an actual measurable impact on temperature using readily available monitoring technology or a modeled impact on temperature that is not *de minimus* and is based on a computer model or studies accepted by CDOW.

3.1.3 Blue River

Flows in the Blue River basin would decrease about 5 percent in average and wet years during summer months, and increase slightly during winter months due to differences in Robert Tunnel diversions and spills at Dillon Reservoir. The Draft EIS identified no adverse effects to the aquatic habitat of the Blue River.

3.2 East Slope

3.2.1 Gross Reservoir

The expansion of Gross Reservoir would cause the loss of 1.95 acres of wetlands (1.84 acres due to reservoir inundation and tree clearing up to elevation 7,410 feet, and 0.11 acre due to the dam construction). These wetlands occur along drainages that are tributary to Gross Reservoir and along the shoreline of the reservoir.

About 4 acres of riparian resources would also be inundated by the expansion of Gross Reservoir. The majority of the riparian impacts would occur around the reservoir shoreline and Forsythe Gulch.

The initial filling of Gross Reservoir may increase organic matter in the reservoir, which could result in a minor short-term decrease in water quality. Once the organic matter has decayed or is removed from the reservoir, water quality should return to pre-construction conditions.

Table 4 presents the impacts and mitigation for Gross Reservoir.

Mitigation – Compensatory Wetlands

The wetland compensatory mitigation rule (*Federal Register*, Vol. 73, No. 70, April 10, 2008, 19670) establishes a priority for the use of wetland mitigation banks to compensate for wetland impacts. Denver Water proposes to purchase sufficient credits from an approved wetland mitigation bank to compensate for the 1.95 acres of lost wetlands.

As an alternative to the purchase of mitigation bank credits, Denver Water could create permittee-responsible mitigation in the South Boulder Creek watershed, including the area around Gross Reservoir. The mitigation areas would provide similar functions and values to the wetlands impacted as required by the Corps' compensatory mitigation rule.

Mitigation – Riparian Habitat Plantings

Similar to the existing riparian resources at Gross Reservoir, it is anticipated that the lost riparian resources would reestablish over time at the upper portions of an expanded Gross Reservoir. Denver Water will determine areas that likely will support riparian vegetation and plant native woody riparian vegetation in these areas to speed the establishment of riparian vegetation. To provide a supportive hydrology for the riparian vegetation, these plantings will occur once an expanded Gross Reservoir is filled.

Denver Water will prepare a riparian vegetation establishment plan for the CDOW and Corps that will:

- Establish a schedule for the proposed plantings
- Identify the areas (location and size) for proposed riparian establishment
- Identify the quantity, size, and species of plant materials
- Establish success criteria and monitoring requirements

Mitigation – Water Quality Monitoring

Denver Water will remove as much of the organic material (i.e., vegetation) as practicable from the inundation area prior to filling the reservoir. CDOW will monitor and evaluate metal levels in fish tissue for five years after the initial fill of the enlargement. In addition, Denver Water will continue its current water quality monitoring program.

3.2.2 South Boulder Creek

Operation of the Moffat Project would generally increase flows in South Boulder Creek upstream of Gross Reservoir, which could result in a minor impact to fish and invertebrates due to a potential reduction in fish habitat availability.

The expansion of Gross Reservoir would permanently impact approximately 8,356 linear feet of streams tributary to the reservoir. Approximately 8,180 linear feet of stream channel would be inundated by the expanded reservoir including:

- South Boulder Creek (2,575 feet)
- Winiger Gulch and a tributary (3,024 feet)
- Forsythe Gulch (1,420 feet)
- Unnamed Tributary (1,160 feet)

Approximately 176 linear feet of stream channel downstream of the dam would be impacted by the expanded dam footprint, including:

- South Boulder Creek (4 feet)
- Advent Gulch, an intermittent drainage (172 feet)

Table 5 presents the impacts and mitigation for South Boulder Creek.

Mitigation – Environmental Pool

Denver Water will compensate for the impacts to aquatic habitat in South Boulder Creek and the loss of stream channel tributary to Gross Reservoir by enhancing low flows in South Boulder Creek downstream of Gross Reservoir. This will be accomplished through a collaborative effort with the cities of Boulder and Lafayette to create an Environmental Pool in the expanded reservoir. Approximately 17 miles of aquatic habitat in South Boulder Creek from Gross Dam to the confluence with Boulder Creek would benefit by the release of water from the Environmental Pool during historic low flow conditions.

Discussions with CDOW, cities of Boulder and Lafayette, Boulder County, and Trout Unlimited indicated that the priority for aquatic habitat improvements on South Boulder Creek is downstream of Gross Reservoir below the South Boulder Diversion Canal. To address this priority, Denver Water would create an additional 5,000 AF Environmental Pool at Gross Reservoir. This additional storage would be filled with water rights owned and provided by the cities of Boulder and Lafayette and released for environmental flows. None of Denver Water's existing or future water supply would be stored in the Environmental Pool. Gross Dam would need to be raised approximately 6 feet, beyond the proposed expansion of the 7,400-foot spillway elevation, to a spillway elevation of 7,406 feet. The additional 5,000 AF of mitigation water stored in Gross Reservoir would be managed under an Intergovernmental Agreement, and released appropriately with the goal of meeting minimum in-stream flows in South Boulder Creek below Gross Reservoir. Denver Water entered into the Environmental Pool arrangement to serve as mitigation for any projected adverse aquatic impacts of the Moffat Project to South Boulder Creek and streams tributary to Gross Reservoir, and to provide the flexibility to enhance aquatic habitats downstream of Gross Reservoir.

Mitigation – Monitoring of Stream Bank Stability

Denver Water currently monitors for channel instability and bank erosion on USFS lands along South Boulder Creek between the Moffat Tunnel and Gross Reservoir. This is a USFS condition within Denver Water's existing FERC license. Denver Water will continue the current monitoring program and, if determined by CDOW, will add an additional monitoring site near the inlet to Gross Reservoir. In the event that localized areas of erosion are detected, Denver Water and the USFS will jointly develop protective measures to be implemented by Denver Water.

3.2.3 North Fork South Platte River

Operation of the Moffat Project would change Denver Water's releases from the Roberts Tunnel into the North Fork South Platte River (North Fork) downstream of the Roberts Tunnel outlet. Flows would generally be lower during winter months and higher during summer months. The lower flows during the winter months are due to a change in the artificial flow regime maintained in the North Fork by the importation of water from the Blue River and are not the result of any changes to the natural hydrology of the North Fork. These flow changes would potentially result in minor decreases in available habitat for brown trout and minor adverse effects to benthic invertebrate populations.

Table 6 presents the impacts and mitigation for North Fork South Platte River.

Mitigation – Aquatic Habitat Improvements

To compensate for reduced flows and subsequent potential decrease in aquatic habitat in the North Fork, Denver Water will implement the following actions:

1. Aquatic Habitat Improvements on the South Platte River. Denver Water will provide up to \$1.5 million for stream habitat improvements. For example, pool habitat could be created by a combination of boulder placement and grade controls. A management committee consisting of Denver Water, CDOW, and USFS will be established to identify locations for improvements. This committee will operate by consensus and make a good faith effort to resolve any conflicts. The committee will also coordinate with the South Platte Enhancement Board to ensure consistency with the South Platte Protection Plan and protection of the Resource Values. CDOW will be responsible for the actual design, permitting, and implementation of aquatic habitat improvements. These funds will be used for stream improvements primarily on public land. Funds may be used for stream restoration on private land, but only where a conservation easement is in place that allows public access. Any restoration activities on private land may be funded by other sources or may be funded through a program of matching private funds with public funds.
2. Bank Stabilization on the North Fork South Platte River. Denver Water will establish a stream bank stability monitoring program at up to five sites on USFS lands along the North Fork to monitor for evidence of bank erosion. If any bank erosion is observed, Denver Water will contribute up to \$250,000 for structural modification projects on USFS lands. These projects will be done in cooperation with the USFS and CDOW.

3.2.4 South Platte River

Operation of the Moffat Project would cause new depletions to the South Platte River, which could indirectly affect threatened or endangered species and associated habitat in the Platte River in Nebraska, including whooping crane, interior least tern, piping plover, pallid sturgeon, and western prairie fringed orchid. Under the Endangered Species Act, the Corps initiated formal Section 7 Consultation with the USFWS regarding the depletion effects on these federally-listed species. The USFWS issued a BO in July 2009 and determined that the proposed depletions associated with the Moffat Project would be covered under Denver Water's participation in the South Platte Water-Related Activities Program, Inc. (SPWRAP), which provides compliance with Section 7 requirements under the Platte River Recovery Implementation Program.

Table 7 presents the impacts and mitigation for South Platte River.

Mitigation – Platte River Recovery Program

Denver Water will continue participating in SPWRAP.

4.0 COST AND SCHEDULE

If permitted in 2011, Moffat Project is anticipated to start construction in 2013/2014. The estimated construction period is 4 years and operation would begin in 2017/2018. A schedule for implementing the mitigation measures will be developed with CDOW and presented in the final FWMP. The following is a summary of the estimated funding Denver Water will provide for the mitigation measures:

River Basin	Proposed Mitigation	Estimated Costs
Fraser River and upper Williams Fork River	--Colorado River Cutthroat Trout Habitat Improvements	--\$72,500
	-- Aquatic Habitat Restoration	--\$750,000
	-- Temperature Monitoring Station	-- \$20,000
Colorado River	--Temperature Monitoring Stations	-- \$50,000
	--BO Compliance	--\$280,000
Gross Reservoir	-- Riparian Vegetation Plantings	--\$40,000
	--Compensatory Wetlands	--\$300,000
	--Water Quality Monitoring	--\$0
South Boulder Creek	--Environmental Pool (total cost \$8 million)	--\$4,000,000 (DW share)
	-- Streambank Monitoring	--\$0
North Fork South Platte River and/or South Platte	--Aquatic habitat Restoration,	--\$1,500,000
	-- North Fork Bank Erosion with Aquatic Habitat Improvements	--\$250,000
	--SPWRAP	--\$0
TOTAL ESTIMATED COST		\$7,262,500

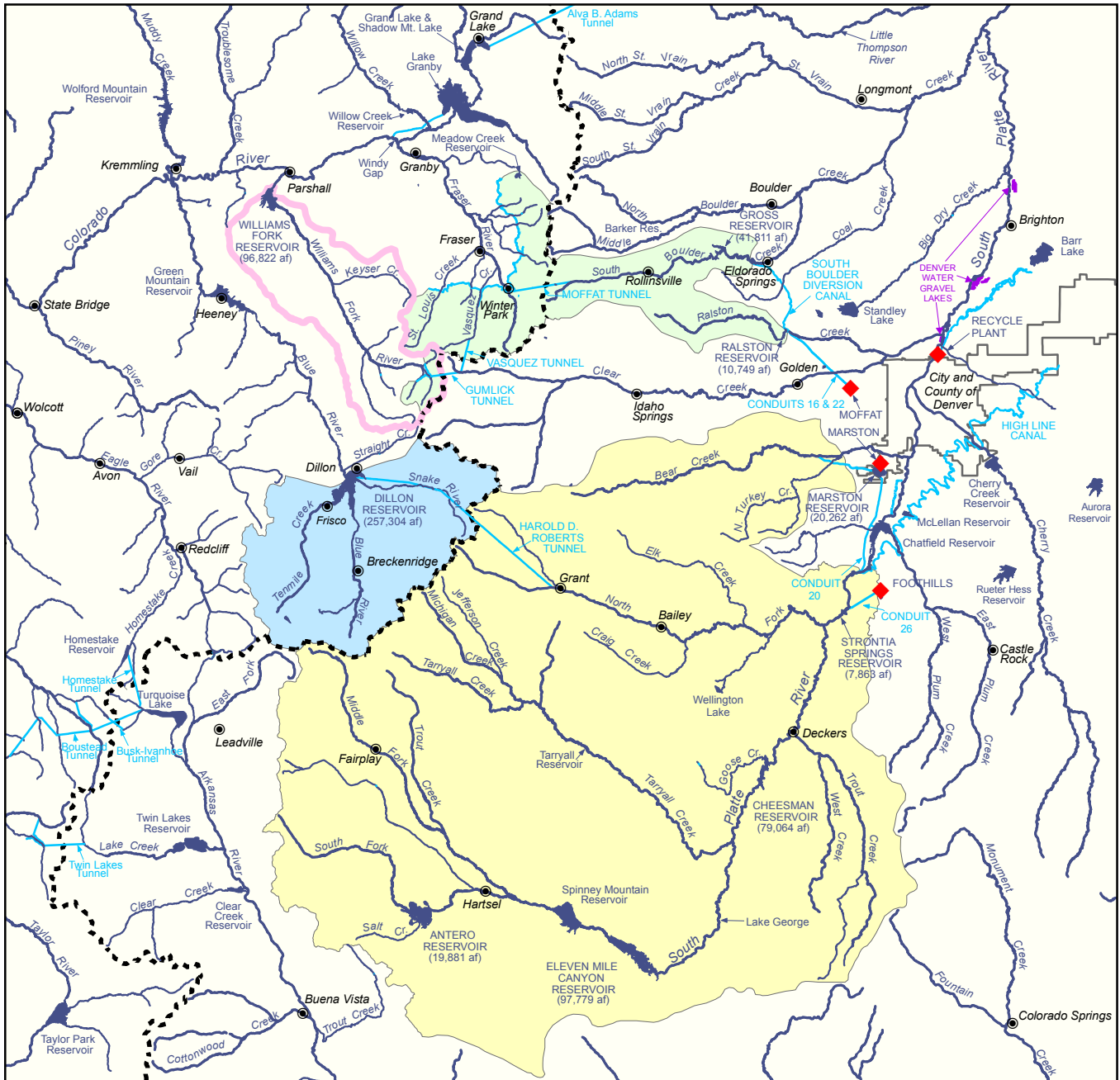
Mitigation Insurance Policy - The mitigation listed above is based on the Draft EIS for the Moffat Collection System Project that was released for public comment in October of 2009. Since that time and based on comments to the Draft EIS, the Corps has conducted additional studies related to the preparation of the Final EIS that in part are designed to further refine the analysis of environmental impacts of the proposed action. If new impacts to fish and wildlife resources are identified in the Final EIS that were not discussed in the Draft EIS and not addressed in this mitigation plan, Denver Water will propose mitigation for these new impacts. The additional mitigation will be developed in cooperation with the CDOW prior to submittal to the Corps for its consideration as a Section 404 Permit condition. Denver Water will reserve \$600,000 for any new impacts to fish and wildlife resources identified by the Final EIS and required by the Corps. If the Corps does not identify new impacts requiring mitigation, Denver Water will have no further obligation to reserve this money.

In addition to the funding identified above, there is significant additional funding in the *Enhancement Plan* for fish and wildlife resources. The goal is to coordinate the actions listed as mitigation and the actions listed as environmental enhancements to assure the environment receives the maximum benefit.

5.0 CONCLUSION

The FWMP presents a broad range of mitigation actions to address the potential fish and wildlife impacts of the Moffat Project. If accepted by the Colorado Wildlife Commission and CWCB, this mitigation plan will represent the official state position on the Moffat Project. Since the state-adopted FWMP is not enforceable by itself, Denver Water anticipates that the Corps and USFS will determine these mitigation measures are adequate and will impose them within their regulatory requirements in the Section 404 Permit and Section 4e conditions of the FERC license, respectively.

City and County of Denver Board of Water Commissioners Water Collection System



LEGEND

South Platte Collection System	Denver Water Treatment Plant
Roberts Tunnel Collection System	Town
Moffat Collection System	Continental Divide
Williams Fork Reservoir Watershed	Major Canal or Tunnel
Major Lake or Reservoir	Major Stream or River

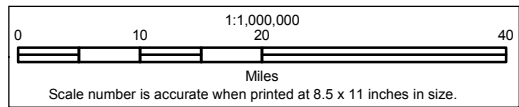


Table 1 - WEST SLOPE - Fraser River		
EIS Impacts	Proposed Mitigation	Mitigation Agency
Surface Water		
<p><u>Surface water flows :</u> Flows in the Fraser River basin would decrease in average and wet years during the runoff months due to Denver Water's additional diversions. Additional diversions would be highly concentrated during the runoff months primarily in May, June, and July and typically would be greatest in wet years following dry year sequences. Average annual flows in the Fraser River at the Granby gage would decrease 9% (12 cfs). Denver Water currently diverts 63,800 AF through the Moffat Tunnel (66,500 AF at full use of existing system). Will increase to 76,800 with the Moffat Project.</p>	<p>Denver Water to provide \$72,500 for cutthroat trout habitat protection/enhancement and \$750,000 for Aquatic Habitat Improvements.</p>	<p>CDOW and Corps</p>
<p><u>Surface Water Quality :</u> The Ranch Creek tributary could experience moderate impacts due to a potential increase in frequency of approaching or exceeding the stream temperature standard.</p>	<p>Install, monitor and maintain a real-time temperature gage on the USGS station (Gage #09032000) on Ranch Creek. Denver Water will forgo up to 250 AF of diversions from its Fraser River Collection System by releasing up to 4 cfs if the Moffat Project is diverting. Continued support of GCWIN monitoring.</p>	<p>CDOW and Corps</p>
<p>The mainstem of the Fraser River downstream of the Town of Fraser could experience negligible to minor impacts due to a potential increase in frequency of approaching or exceeding the stream temperature standard.</p>		
<p><u>Stream Morphology and Sedimentation :</u> Only minor amounts of localized sediment deposition are anticipated. Locations along the Fraser River where traction sand currently increases the natural sediment supply are and would remain the most susceptible to local deposition. Any deposition that occurs should be limited in extent and magnitude and should pose only minor changes to channel morphology.</p>	<p>None</p>	<p>---</p>
Groundwater		
<p>Changes in the Fraser River stream flow would cause indirect impacts to localized groundwater gradients and water levels near the river as the hydrologic system balances the different stream flows with changes in the groundwater input component to the stream. This would likely result in a negligible impact to the groundwater.</p>	<p>None</p>	<p>---</p>
Riparian/Wetland		
<p><u>Upper Fraser River :</u> Considering the small amount of area involved and the likely response of vegetation to the change in stream stage, the impact on riparian vegetation is expected to be negligible.</p>	<p>None</p>	<p>---</p>
<p><u>Lower Fraser River :</u> No measureable impacts to riparian vegetation would be expected in this area.</p>	<p>None</p>	<p>---</p>
Wildlife		
<p>Impacts to wildlife from changes in river flows would not have a noticeable impact on wildlife habitat or wildlife species.</p>	<p>None</p>	<p>---</p>

Table 1 - WEST SLOPE - Fraser River		
EIS Impacts	Proposed Mitigation	Mitigation Agency
Special Status Species		
Flow changes would adversely affect Colorado River system endangered fish species (Colorado pikeminnow, bonytail chub, humpback chub, razorback sucker). Minimal effects to bald eagles, river otter, boreal toad. No effects to Colorado River cutthroat trout are anticipated.	Continued participation in the Upper Colorado River Endangered Fish Recovery Program per the U.S. Fish and Wildlife Service (USFWS) Biological Opinion.	USFWS
Aquatic Resources		
<i>Fraser River - Mainstem :</i> Flushing of fine sediment would continue with the Moffat Project because the flows would be much higher than needed to transport sediment. There would be no increase in sedimentation and no impact to channel morphology.	None	---
<i>Fraser River - Tributaries :</i> In most of the Fraser River tributary streams, the reductions in runoff flows during the runoff months of wet years would result in a minor adverse impact compared to full use of existing system.	See Surface Water Flows.	CDOW and Corps
Recreation		
During average and wet years, the Moffat Project would result in a major long-term effect to boating. On average, the number of days within the optimum flow range of 400-700 cfs would drop from 14 to 9 days. This also equates to an approximate loss of 3-4 days per year within optimum flow levels. In wet years, the impact on boating used would be negligible. In dry years, boating would not be impacted.	None	---
Flow reductions during high flow periods are not likely to adversely affect the quality of the fishing experience. The reductions in flow in North Fork Ranch could have a minor adverse impact on the fish communities, and thus an associated minor adverse impact on the quality of the fishing experience.	None	---

Table 2 - WEST SLOPE - Williams Fork River		
EIS Impacts	Proposed Mitigation	Mitigation Agency
Surface Water		
<p><u>Williams Fork Reservoir surface water elevation fluctuation</u> :</p> <p>The average differences in end-of-month content translates to a drop in elevation of less than 1 foot in any month.</p>	None	---
<p><u>Surface water flows</u> :</p> <p>Below Reservoir: Flows in the Williams Fork basin would decrease in average and wet years during the runoff months due to Denver Water's additional diversions. Additional diversions would be highly concentrated during the runoff months primarily in May, June, and July and typically would be greatest in wet years following dry year sequences. Average annual flows in the Williams Fork River below the reservoir would decrease approximately 2% (equals 2 cfs).</p> <p>Above Reservoir: Four headwater tributaries are affected by Denver Water diversions: Steelman, Bobtail, Jones, McQueary creeks. Average annual flows would decrease due to increased diversions during the runoff months primarily in May, June, and July through Gumlick Tunnel. These diversions would be greatest in wet years following dry years. During dry years no additional water is diverted as Denver Water currently diverts all available water during dry years.</p>	Denver Water to provide \$72,500 for cutthroat trout habitat protection/enhancement and \$750,000 for Aquatic Habitat Improvements.	CDOW and Corps
<p><u>Stream Morphology and Sedimentation</u> :</p> <p>Annual peaks would generally be the same or lower under the Moffat Project, implying the same or reduced areas of inundation for the flood of a given return interval. Lower frequency events (high flows, return intervals greater than 2 to 5 years) are likely to be the same, while higher frequency events are likely to be reduced. Despite the predicted reductions in sediment transport capacity, the sediment transport capacity for the project remains orders of magnitude greater than sediment supply. These results indicate that the system is sediment limited and the morphology of the channel is not expected to be impacted by flow reductions.</p>	See Surface Water Flows.	CDOW and Corps
Groundwater		
<p>Decrease in flows for an average year would occur upstream (i.e., Darling Creek gage) and downstream of the Williams Fork Reservoir. Changes in the Williams Fork stream flow would cause indirect impacts to localized groundwater gradients and water level near the river as the hydrologic system balances the different stream flows with changes in the groundwater input component to the stream. Groundwater quality would result in negligible impacts to the Williams Fork groundwater system.</p> <p>Gaining streams supported by groundwater. There may be localized effects, but minimal.</p>	None	---
Riparian/Wetland		
<p>The area affected by reduction in inundation area would be small (0.02 - 0.18 acres/per mile). This, combined with the higher elevation of these sites where precipitation and hillside runoff is likely to play an important role in supporting riparian vegetation, would result in no measureable adverse impacts to riparian vegetation.</p>	None	---
Wildlife		
<p>Impacts to wildlife from changes in river flows would not have a noticeable impact on wildlife habitat or wildlife species.</p>	None	---

Table 2 - WEST SLOPE - Williams Fork River		
EIS Impacts	Proposed Mitigation	Mitigation Agency
Special Status Species		
Flow changes would adversely affect Colorado River system endangered fish species (Colorado pikeminnow, bonytail chub, humpback chub, razorback sucker). Minimal effects to boreal toad. No effects to Colorado River cutthroat trout are anticipated.	Continued participation in the Upper Colorado River Endangered Fish Recovery Program per the U.S. Fish and Wildlife Service (USFWS) Biological Opinion.	USFWS
Aquatics Resources		
<u>Williams Fork River - Mainstem</u> There would be no changes in water quality, riparian vegetation or channel morphology that would affect fish and invertebrates in the Williams Fork. Minor changes to spawning period for brook trout.	None	---
<u>Williams Fork River - Tributaries</u> The flow reductions during runoff with the project would have a minor adverse on the fish and invertebrate populations in McQueary, Jones, Bobtail, and Steelman creeks. Although there would be no change in the critical winter flow, the project would reduce the flow passing the diversions in wet months and extend the period when these streams are fully diverted.	See Surface Water Flows.	CDOW and Corps
Recreation		
No impacts are expected to occur to the quality of fishing experience along the Williams Fork as a result of the project.	None	---

Table 3 - WEST SLOPE - Colorado River		
EIS Impacts	Proposed Mitigation	Mitigation Agency
Surface Water		
<p><u>Surface water flows :</u> Flows along the Colorado River mainstem would decrease in average and wet years during the runoff months due to changes in surface water flows in Fraser, Williams Fork, and Blue river basins, which would translate downstream and into the Colorado River. Average annual flows in the Colorado River near Kremmling would decrease 2%.</p> <p><u>Stream Morphology and Sedimentation :</u> Annual peaks would be generally the same or lower under the Moffat Project, implying the same or reduced areas of inundation for the flood of a given return interval. Lower frequency events (high flows, return intervals greater than 2 to 5 years) are likely to be the same, while higher frequency events are likely to be reduced. Despite the predicted reductions in sediment transport capacity, the sediment transport capacity for the project remains orders of magnitude greater than sediment supply. These results indicate that the system is sediment limited and the morphology of the channel is not expected to be impacted by flow reductions.</p>	<p>Install, monitor and maintain two real-time temperature gages on the Colorado River (one at Windy Gap and the other upstream of the Williams Fork River confluence). Denver Water will forgo up to 250 AF of diversions from its Fraser River Collection System by releasing up to 4 cfs if the Moffat Project is diverting. Continued support of GCWIN monitoring.</p>	<p>CDOW and Corps</p>
Groundwater		
<p>Decreases in flows for an average year would occur downstream of the Windy Gap gage and the Kremmling gage. These decreases in surface water flow would result in lower river water levels, a narrower width of the river, and the potential for indirect impacts on the groundwater gradient to the river and water levels in the vicinity of the river.</p>	<p>None</p>	<p>---</p>
Riparian/Wetland		
<p>The reduction in inundation area would be 0.002 acres within the 953-foot study segment and 0.01 acre when extrapolated over a 1-mile distance. These impacts along the Colorado River would be negligible.</p>	<p>None</p>	<p>---</p>
Wildlife		
<p>Impacts to wildlife from changes in river flows would not have a noticeable impact on wildlife habitat or wildlife species.</p>	<p>None</p>	<p>---</p>
Special Status Species		
<p>Flow changes would adversely affect Colorado River system endangered fish species (Colorado pikeminnow, bonytail chub, humpback chub, razorback sucker). Minimal effects to bald eagle and river otter.</p>	<p>Continued participation in the Upper Colorado River Endangered Fish Recovery Program per the U.S. Fish and Wildlife Service (USFWS) Biological Opinion.</p>	<p>USFWS</p>
Aquatic Resources		
<p>There would be no changes in water quality, riparian vegetation or channel morphology that would affect fish and invertebrates in the Colorado River.</p>	<p>None</p>	<p>---</p>
Recreation		
<p>Overall, the Project would have a negligible or no impact on boating uses on the Colorado River. No impacts to fishing are anticipated. The optimum flow range for rafting is 700-2,000 cfs. The Project would not affect the number of days within this flow range. There would be a minor beneficial effect on kayaking, slightly increasing the number of days when flow falls within the desired range of 400-1,100 cfs from May through Sept. (98.6 on average to 101.2 days).</p>	<p>None</p>	<p>---</p>

Proposed Mitigation for the Moffat Collection System Project

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Table 4 - EAST SLOPE - GROSS RESERVOIR		
EIS Impacts	Proposed Mitigation	Mitigation Agency
Surface Water		
<p><u>Reservoir Volume and Fluctuation :</u> Gross Reservoir would increase by 72,000 AF to volume of 113,811 AF. Normal high water level would increase by 118 feet and surface area would increase by 400 acres to 818 acres. Gross Reservoir would be at its lowest level at the end of April, reach its highest level in June or July, and be drawn down through the fall and winter. Gross would have a higher outflow during the winter, which would increase flow between Gross and the South Boulder diversion canal compared to Full Use conditions. Although not identified as an impact in the DEIS the Colorado Division of Wildlife (CDOW) has safety concerns for the ice fisherman due to the potential increased void space between the ice and surface water elevation of the reservoir as a result of removing more water in the wintertime.</p>	Expansion would create an additional 400 acres of open water habitat.	CDOW and Corps
<p><u>Reservoir Evaporation (average annual evaporative loss) :</u> Evaporative losses would increase to 991 AF annually (compared to 477 AF under existing conditions).</p>	None	---
<p><u>Reservoir Water Quality :</u> Initial filling operations of Gross Reservoir may increase the organic matter resulting in minor, short-term decrease in water quality.</p>	Denver Water will remove as much debris as possible from the inundation area before filling the reservoir. CDOW will evaluate levels of metals in the fish for 5-years following completion of the first fill of expanded reservoir. DW will continue existing monitoring program to evaluate water quality.	CDOW and Corps
Groundwater		
<p><u>Seepage and Groundwater Mounding :</u> Increase in groundwater levels due to increased seepage from enlarged reservoir. Resulting in a decrease in hydraulic gradients upstream of the reservoir.</p>	None	---
Riparian/Wetlands		
<p><u>Direct impacts to wetlands :</u> Permanent impact to 1.95 acres of wetlands (1.83 acres from reservoir inundation and 0.12 from dam footprint) and 0.12 acres of temporary impact.</p>	Mitigation for these impacts will be determined by the U.S. Army Corps of Engineers either by: Purchase sufficient credits from an approved wetland mitigation bank to offset for lost wetlands, OR Create permittee-responsible mitigation wetlands within the South Boulder Creek watershed, including area around Gross Reservoir.	Corps
<p><u>Direct impacts to other waters of the U.S. :</u> Permanent impact to 3.53 acres (1.58 miles) of tributaries (South Boulder Creek, Winiger Gulch, Forsythe Gulch) and 0.49 acres (453 feet) of temporary impact.</p>	Creation of an Environmental Pool to enhance low flows in South Boulder Creek downstream of Gross Reservoir to the confluence of Boulder Creek per an Intergovernmental Agreement (IGA) with the cities of Boulder and Lafayette.	Corps

Proposed Mitigation for the Moffat Collection System Project

06/09/2011

Table 4 - EAST SLOPE - GROSS RESERVOIR		
EIS Impacts	Proposed Mitigation	Mitigation Agency
<p><u>Direct impacts to riparian habitats :</u> Permanent impact to 4.08 acres of riparian habitat and <0.1 acre of temporary impact.</p>	Identify planting areas around Gross Reservoir that will support native woody riparian vegetation and prepare a riparian vegetation establishment plan. Plantings will be wildlife friendly, directed towards bears. Plan will be reviewed by U.S. Forest Service (USFS).	CDOW, Corps and USFS
Vegetation		
<p><u>Loss of vegetation :</u> Permanent impact to 456 acres of vegetation and 52 acres of temporary impact (456 acres includes 400 acres for reservoir inundation area, plus dam footprint, roads, auxillary spillway, quarries, spoil areas, tree removal).</p>	Implement revegetation, forest management and weed control plans per Federal Energy Regulatory Commission (FERC) license amendment.	FERC, Corps and USFS
<p><u>Loss of sensitive habitats :</u> Loss of 17% of Winiger Gulch Potential Conservation Areas (PCA), 10.5% of South Boulder Creek PCA, and 7% of Winiger Ridge Environmental Conservation Area (ECA).</p>	Incorporate with mitigation for riparian vegetation. Re-establish plant communities lost during construction activities.	CDOW, Corps and USFS
Wildlife		
<p><u>Effects on elk crucial seasonal habitats :</u> Permanent impact to 246 acres of elk severe winter range and 269 acres of winter concentration area. The habitat impacted represents less than 2% of the severe winter range and 3% of the winter concentration area within 3 miles of the reservoir.</p>	See Vegetation.	CDOW, Corps and USFS
<p><u>Effects on other big game species :</u> Loss of non-crucial habitat for mule deer, black bear, and mountain lion. Potential collisions along haul roads and temporary displacement during construction are likely. The impacted area represents a very small percentage of the available habitat in the surrounding area.</p>	See Vegetation.	CDOW, Corps and USFS
<p><u>Habitat fragmentation :</u> Inundation of South Boulder Creek and Winiger Gulch above the reservoir would have a minor effect on big game movement.</p>	None	---
<p><u>Raptor and other migratory birds :</u> Construction-related activities may affect nesting birds. Long-term loss of habitat for forest birds.</p>	Compliance with the Migratory Bird Treaty Act. Pre-construction surveys to identify active nests in Project footprint area and timing of land-clearing activities to avoid breeding season. Include CDOW's Best Management Practices (BMPs) for wildlife into final design.	CDOW, Corps and USFWS

Table 4 - EAST SLOPE - GROSS RESERVOIR		
EIS Impacts	Proposed Mitigation	Mitigation Agency
Special Status Species		
Loss of habitat and possible mortality to dwarf shrew and northern leopard frog during construction. Loss of habitat for several forest bird species. Temporary, minor, indirect impacts to several bird and bat species during construction.	Observe CDOW's BMPs for special status species.	CDOW
Aquatic Resources		
The enlargement of the reservoir would support more fish than the existing reservoir and may provide opportunities for additional species of fish to become established. Construction activities during the enlargement would have a temporary direct moderate adverse impact on the fish and invertebrate community. The impact would last until construction activities are complete.	None	CDOW

Table 5 - EAST SLOPE - South Boulder Creek		
EIS Impacts	Proposed Mitigation	Mitigation Agency
Surface Water		
<u>Surface water flows :</u> Flows in South Boulder Creek upstream of Gross Reservoir would increase in average and wet years during the runoff months due to Denver Water's additional diversions thru the Moffat Tunnel. Average annual flow at the Pinecliff gage would increase 10%.	Creation of an Environmental Pool at Gross Reservoir to enhance winter low flows in South Boulder Creek per an Intergovernmental Agreement (IGA) with the cities of Boulder and Lafayette.	Corps
From Gross Reservoir to the South Boulder Diversion Canal, changes in flow reflect reservoir operations. In general, flows would be higher during winter months as water would be moved out of Gross Reservoir and into Ralston Reservoir in response to the water treatment plant load shift. Average annual flow would increase 8%.		
Downstream of the South Boulder Diversion Canal, flows would generally decrease on average because Denver Water would divert more native South Boulder Creek water. Average annual flow would decrease 2%.		
<u>Stream Morphology and Sedimentation :</u> Increases in flow would result in an increase in sediment transport capacity along South Boulder Creek. It is possible that the transport capacity is orders of magnitude greater than available sediment supply. Reductions in sediment transport capacity resulting from the Moffat Project are expected to have negligible impacts on channel morphology.	Stream channel stability monitoring above Gross Reservoir is a Federal Energy Regulatory Commission (FERC) component and will be continued. Possibly add a photo documentation station on South Boulder Creek near the inlet to Gross Reservoir.	FERC and CDOW
Groundwater		
The impacts to stream flow changes on groundwater are expected to be negligible.	None	---
Riparian/Wetlands		
<u>Indirect Impacts :</u> Flows would both increase and decrease at different times of year, but changes would be within range of variability. Minimal effects, if any, on riparian and wetland vegetation. Slight shift in species composition towards plants that are more tolerant of wetter conditions.	None	---
<u>Direct Impacts :</u> Inundation of 2,575 feet of South Boulder Creek upstream of Gross Reservoir; 4 feet of South Boulder Creek downstream of Gross Reservoir will be lost due to the expanded dam footprint.	See Surface Water Flows.	Corps
Wildlife		
Inundation of South Boulder Creek above Gross Reservoir would have minor effects on big game movement.	None	---
Special Status Species		
Flow changes would contribute to adverse effects on Platte River system threatened and endangered species (whooping crane, piping plover, least tern, and pallid sturgeon). May affect, but not likely to adversely effect Preble's meadow jumping mouse and Ute ladies-tresses and their habitat downstream of South Boulder Diversion Canal diversion point.	Compliance with the Endangered Species Act and Biological Opinion (BO) issued by the US Fish & Wildlife Service (USFWS). Participation in the Platte River Recovery Implementation Program.	USFWS

Table 5 - EAST SLOPE - South Boulder Creek		
EIS Impacts	Proposed Mitigation	Mitigation Agency
Aquatic Resources		
Increases in runoff flows would have minor adverse impacts to fish and invertebrates due to a potential reduction in fish habitat availability in South Boulder Creek upstream of Gross Reservoir. Downstream of Gross Reservoir, the increases in winter flows and reductions in runoff flows would have a moderate beneficial impact to fish and invertebrates due to potential increase in habitat availability.	See Surface Water Flows.	Corps
Recreation		
<p>Boating: Impact on boating above and below Gross Reservoir would be minor/beneficial and negligible, respectively.</p> <p>Fishing: Based on changes in fish habitat availability (see above), there may be a minor, adverse impact on the quality of fishing on the Upper South Boulder Creek due to a potential reduction in fish habitat availability. There may be a minor beneficial impact to the fishing experience on Lower South Boulder Creek.</p>	None	---

Table 6 - EAST SLOPE - North Fork South Platte River		
EIS Impacts	Proposed Mitigation	Mitigation Agency
Surface Water		
Diversions through the Roberts Tunnel during the winter months would be lower on average, which results in equivalent lower flows in the North Fork South Platte in these months. Summer diversions through Roberts Tunnel would generally be higher, and consequently flows would be higher on average from May through September. Average annual flow below Geneva Ck gage would increase 3%. A decrease of winter flow (25-30%) would occur Nov-March (Decrease of 30% equals 30cfs). An increase of summer flow (13-29%) would occur May-Aug (Increase of 29% equals approximately 50 cfs, depending on the month).	Denver Water proposes up to \$1.5 million worth of stream habitat improvements in the North Fork South Platte or the South Platte River. Plan would be developed with U.S. Army Corps of Engineers (Corps), Colorado Division of Wildlife (CDOW), U.S. Forest Service (USFS), and Landowners.	CDOW, Corps and USFS
<u>Water Quality :</u> Changes in the concentrations of copper, iron and nickel are anticipated. Concentrations of these constituents are anticipated to increase during periods of reduced deliveries from the Roberts Tunnel. Concentrations are anticipated to decrease during periods of increased deliveries through the Roberts Tunnel leading to negligible impacts.	Denver Water will continue to participate in the South Platte Protection Plan.	
<u>Stream Morphology and Sedimentation :</u> Flow changes upstream of Shawnee could result in an increase in sediment transport capacity, which could lead to minor amounts of localized bed and bank erosion. Flow changes upstream of Pine are expected to have negligible to no impact on stream morphology.	Denver Water will establish up to 5 stream bank monitoring points on U.S. Forest Service (USFS) lands. If stream bank erosion is observed, Denver Water will allocate up to \$250,000 for stream bank stabilization.	Corps and USFS
Groundwater		
Below the Geneva Creek gage, flows would decrease in winter and increase in the summer in an average year. The maximum expected increases and decreases in flow would have minor effects on groundwater and would be limited to only the areas near the river and are well within normal seasonal fluctuations.	None	---
Riparian/Wetland		
The area affected over the study reach would be less than 0.01 acre, and only 0.01 to 0.02 acre when extrapolated over a 1-mile distance. Therefore, any impacts on riparian vegetation would be negligible.	None	---
Wildlife		
Impacts to wildlife from changes in river flows would not have a noticeable impact on wildlife habitat or wildlife species.	None	---
Special Status Species		
Flow changes would contribute to adverse effects on Platte River system threatened and endangered species (whooping crane, piping plover, least tern, and pallid sturgeon). May affect, but not likely to adversely effect Preble's meadow jumping mouse critical habitat between Waterton Canyon and above Chatfield Reservoir. Minimal effects on bald eagle.	Compliance with the Endangered Species Act and Biological Opinion (BO) issued by the US Fish & Wildlife Service (USFWS). Participation in the Platte River Recovery Implementation Program. Compliance with the Migratory Bird Treaty Act.	USFWS

Table 6 - EAST SLOPE - North Fork South Platte River		
EIS Impacts	Proposed Mitigation	Mitigation Agency
Aquatic Resources		
Increases in runoff flows and higher concentrations of copper would have a minor adverse impact to fish and invertebrates	See Surface Water Flows.	CDOW, Corps and USFS
Recreation		
<p>Boating: Increase in flow in summer months would have a minor beneficial impact on boating use.</p> <p>Fishing: Increases in flow in the summer may make it slightly more difficult to fish during periods of high flows, but overall impact is minor, possibly resulting in a shift in the period of use to later in the season.</p>	See Surface Water Flows.	CDOW, Corps and USFS

Table 7 - EAST SLOPE - South Platte River		
EIS Impacts	Proposed Mitigation	Mitigation Agency
Surface Water		
<u>Antero Reservoir surface water elevation fluctuation :</u> The maximum increase and decrease in reservoir elevation (averaged over the month) for any month over the 45-year study period between Full Use of Existing System and the Project is 9 feet to 7 feet, respectively. Antero is utilized for multi-year droughts, therefore is not affected by the project.	None	---
<u>Eleven Mile Canyon Reservoir surface water elevation fluctuation :</u> The maximum increase and decrease in reservoir elevation (averaged over the month) for any month over the 45-year study period between Full Use of Existing System and the Project is 4 feet to 3 feet, respectively. Eleven Mile is utilized for multi-year droughts, therefore is not affected by the project.	None	---
<u>Cheesman Reservoir surface water elevation fluctuation :</u> The maximum increase and decrease in reservoir elevation (averaged over the month) for any month over the 45-year study period between Full Use of Existing System and the Project is 61 feet to 6 feet, respectively.	None	---
<u>Strontia Springs Reservoir surface water elevation fluctuation :</u> Reservoir evaporation, contents, and elevation changes to Strontia Springs Reservoir would be negligible. No recreation is allowed on Strontia Springs Reservoir.	None	---
<u>Chatfield Reservoir surface water elevation fluctuation :</u> Reservoir evaporation, contents, and elevation changes to Chatfield Reservoir would be negligible. The project has no impact on storage or operations of Chatfield Reservoir.	None	---
<u>Surface water flows :</u> Flow changes along the South Platte would be relatively minor and vary depending on the location. South Platte flows at the Waterton Canyon gage would decrease on average in summer months (max. decrease of 5% in June) due to Denver Water's additional direct diversions and exchanges to Strontia Springs Reservoir and Conduit 20. There would be little change in flows at the Waterton gage in most winter months (1% in Dec and 0% in Jan-March). Flows at the Henderson gage would increase on average during winter months from Oct-Nov (2-9%) and little change in flow May-Sept.	None	---
<u>Stream Morphology and Sedimentation :</u> Given the minor flow changes to the South Platte, impacts to channel morphology under the project are likely to be negligible.	None	---
Groundwater		
Below Chatfield Reservoir and at the Denver gage, flows increase in the winter and decrease in late summer in an average year. The maximum expected increases and decreases in flow would have minor effects on groundwater and would be limited to only the areas near the river and would be well within the normal seasonal fluctuations typical for aquifers along streams in mountainous terrain.	None	---
Riparian/Wetland		
The changes in stream flow associated with the Moffat Project would have no measurable effects to wetlands, other waters, and riparian area along the South Platte.	None	---

Table 7 - EAST SLOPE - South Platte River		
EIS Impacts	Proposed Mitigation	Mitigation Agency
Wildlife		
Impacts to wildlife from changes in river flows would not have a noticeable impact on wildlife habitat or wildlife species.	None	---
Special Status Species		
Flow changes would contribute to adverse effects on Platte River system threatened and endangered species (whooping crane, piping plover, least tern, and pallid sturgeon). May affect, but not likely to adversely effect Preble's meadow jumping mouse critical habitat between Waterton Canyon and Chatfield Reservoir, habitat along South Platte between Cheesman and Chatfield reservoirs. Minimal effects on bald eagle. No effect to other species.	Compliance with the Endangered Species Act and Biological Opinion (BO) issued by the US Fish & Wildlife Service (USFWS). Continued participation in the Platte River Recovery Implementation Program.	USFWS
Aquatic Resources		
More favorable winter flows would have a minor beneficial impact to fish and invertebrates in the section of the South Platte between Chatfield Reservoir and Bear Creek.	None	---
Recreation		
Boating: The impacts to boating on the South Platte resulting from these flow changes would be negligible. Fishing: Minor beneficial effect to fishing due to reduced flows.	None	---