Old Dillon Reservoir Enlargement
Environmental Assessment

October 2009

USDA Forest Service
White River National Forest
Dillon Ranger District

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Environmental Assessment

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Prepared for:

White River National Forest, Dillon Ranger District
Summit County, Colorado

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CHAPTER 1.0 PROPOSED ACTION AND ITS PURPOSE AND NEED

1.1 INTRODUCTION

The White River National Forest (WRNF) has accepted a proposal from Summit County Government to initiate a review under the National Environmental Policy Act (NEPA) for the issuance of a Special Use Permit to construct, operate, and maintain the Old Dillon Reservoir (ODR) Enlargement on National Forest System (NFS) lands. This Environmental Assessment (EA) discloses the environmental effects associated with the construction, operation, and maintenance of the enlarged reservoir.

Old Dillon Reservoir is a 62 acre-foot raw water storage reservoir fed by the Dillon Ditch, which diverts from Salt Lick Gulch. The Dillon Ditch and ODR were constructed by the Town of Dillon in 1939 on approximately 14.5 acres of lands located within the public domain. Those lands in the SW ¼ of the SE ¼ of Section 13, Township 5 South, Range 78 West, were not withdrawn by forest reservation until 1966. The Forest Service, after reviewing evidence provided by the Town, has found that the Town's claim to a right of way for ODR and a portion of the Dillon Ditch has likely been established pursuant to R.S. 2339 of the Act of July 26, 1866, 43 U.S.C. Chapter 15, § 661 (Repealed). The Dillon Ditch is operated and maintained by the Town of Dillon under special use authorization DIL 199 issued on January 13, 2003.

The proposal includes: (1) enlarging the existing reservoir and (2) improving the inlet to and the outlets from the reservoir. The project would provide additional water storage capacity and water supply security to meet existing and future municipal, augmentation, and other water supply needs. Old Dillon Reservoir is located north of Dillon Reservoir between I-70 and the Dillon Dam Road (Summit County Road 7) in the Dillon Ranger District of the WRNF. The site is within Summit County, Colorado in an area known as Lake Hill.

The analysis documentation is located in the project record and is available for public review at the Dillon Ranger District office in Silverthorne, Colorado.

BACKGROUND

Construction of Old Dillon Reservoir and the Dillon Ditch by the Town of Dillon began in 1936 to provide domestic water supply to the town at its original location, at the confluence of Tenmile Creek and the Blue River, prior to construction of Denver's Dillon Reservoir.

Summit County and the Town of Dillon acquired a water right for the Old Dillon Reservoir Enlargement in Case No. 93CW288 in the amount of 150 acre-feet, filled at a rate of up to 10 cfs from Salt Lick Gulch via the Dillon Ditch. An associated Water Agreement gives Summit County the right to enlarge the existing reservoir and gives the Town of Dillon the option to participate in up to 20 percent of the Old Dillon Reservoir First Enlargement should Summit County proceed with the enlargement construction. The Town of Silverthorne would also be a participant in the project. Water rights and agreements associated with the Old Dillon Reservoir Enlargement are:

CA 1806 Original Decree for Old Dillon Reservoir and the Dillon Ditch, Appropriation date of January 9, 1939 for 46.14 acre-feet and 10 cfs direct flow right, respectively.

93CW288 Old Dillon Reservoir First Enlargement - a 150 acre-foot enlargement; an exchange of 53.4 acre-feet of water from Granby Reservoir to the headgate of the Dillon Ditch for storage in Old Dillon Reservoir, and a change of 11.87 acre-feet of Valaer Ditch water for storage in Old Dillon Reservoir.

07CW223 Old Dillon Reservoir Second Enlargement - a 60 acre-foot enlargement.

86CW329 Town of Dillon's Blue River Intake - 5 cfs.

86CW330 Exchange of water from Salt Lick Gulch to the Town of Dillon's Blue River Intake at a rate of up to 3.5 cfs limited to 250 acre-feet.

87CW392 Provides for augmentation of Town of Dillon wells 1 thru 5; Town of Silverthorne wells 1 & 2, Town of Dillon Blue River Intake; Town of Dillon Laskey Gulch diversion; Town of Dillon Straight Creek diversion from "Old" Dillon Reservoir and other sources.

95CW077 Similar to 87CW392 adding Clinton Reservoir as a source of augmentation or exchange.

95CW122 Provides for augmentation of depletions in Summit County using, among other sources, Old Dillon Reservoir.

07CW226 Application by Summit County to exchange water released from Clinton Reservoir, Upper Blue Reservoir or Dillon Reservoir to which Summit County is entitled into Old Dillon Reservoir as enlarged, at 8 cfs.

07CW232 Application by Town of Dillon to exchange water from Old Dillon Reservoir as enlarged to Town of Dillon's Blue River Intake, Laskey Gulch Diversion, and from the Dillon Reservoir to the Dillon Ditch.

08CW16 Application by the Town of Silverthorne to exchange water from Clinton Reservoir and Dillon Reservoir to the Dillon Ditch and Old Dillon Reservoir as enlarged.

08CW201 Application by Summit County for the Old Dillon Reservoir Third Enlargement to adjudicate 30 acre-feet of the enlarged storage capacity disclosed in this document and a refill of 45 acre-feet to account for gross evaporation from the Reservoir.

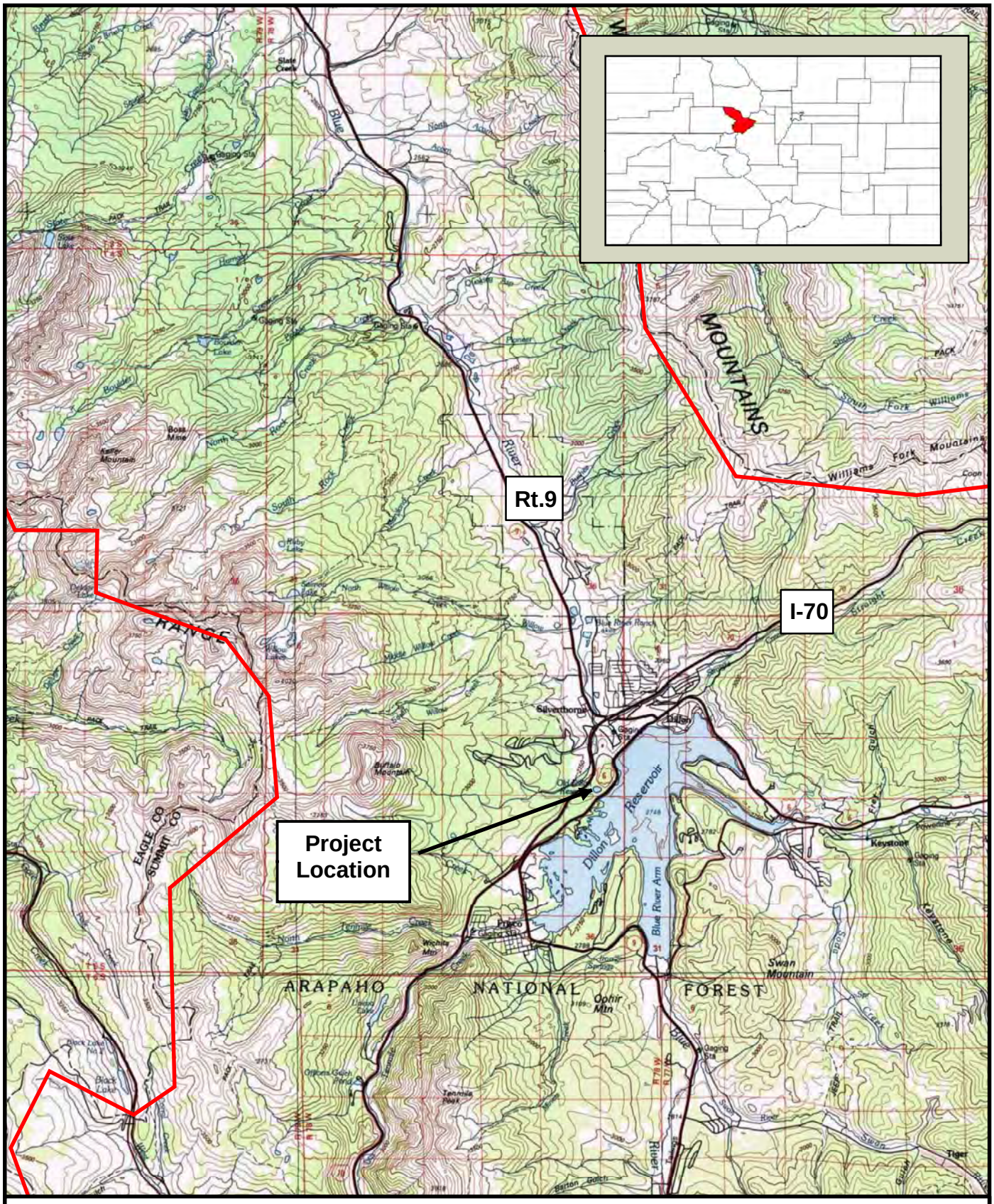
08CW202 Application by Summit County to adjudicate the exchange of up to 300 acre-feet of water stored in Wolford Mountain Reservoir to the headgate of the Dillon Ditch on Salt Lick Gulch or to a pump station in the Blue River at Dillon Reservoir.

PROJECT AREA DESCRIPTION

The legal description for the site is the SW1/4 of the SE1/4 of Section 13 Township 5 South, Range 78 West of the 6th Prime Meridian, Summit County, Colorado. The project area is within Management Area 8.21, Developed Recreation Complexes, which contain developed recreation sites

that provide an array of recreational opportunities and experiences in a forested environment. The proposed enlargement is portrayed in Figure 1.1, "Project Location."

The project area is located in Southern Rocky Mountain eco-zone at an elevation of approximately 9,200 feet above mean sea level (msl). The area is within the juncture between the upper portions of the montane ecosystems and the lower subalpine forest ecosystem. The dominant forest type is lodgepole pine (*Pinus contorta*). Portions of the project area are developed with Interstate 70 on the north, Dillon Dam Road (County Road 7) on the southern edge and a large water supply reservoir and dam, Dillon Reservoir, to the south and east. The ODR Enlargement project area is a subset of the Dillon Reservoir Forest Health EA project area, which encompassed approximately 26,000 acres of lands requiring mountain pine beetle mitigation work on NFS lands. In the summer of 2008, the State Engineers Office issued an order to the Town of Dillon to drain Old Dillon Reservoir due to concerns over the integrity of the north dam. This order was accomplished in July 2008, and the reservoir is currently dry. This is a temporary situation; under the No Action Alternative, the Town of Dillon would repair the north dam according to the State Engineer's requirements and continue to operate the reservoir. This EA considers that the reservoir is still intact and operating.



Old Dillon Reservoir

Project Location

May 2009 *Claffey Ecological Consulting, Inc.* *GIS Prepared by S. Claffey* **Figure 1.1**

Salt Lick Gulch
Salt Lick Gulch is a small, alpine and subalpine watershed located in the Upper Blue River Basin. It is a tributary to the Blue River at a point approximately ½ mile downstream of Dillon Reservoir.

Dillon Ditch
Old Dillon Reservoir is fed by the Dillon Ditch, which diverts water from Salt Lick Gulch north of I-70 into the reservoir. Water in Dillon Ditch is conveyed below I-70 in an inverted siphon. The ditch has fallen into disrepair and the ditch embankments are in need of reshaping to restore operational capacity. The ditch embankments have been overtopped by water at several places in the past. The ditch also has accumulated dense vegetation within the ditch prism, and ditch maintenance is required.

Old Dillon Reservoir
The existing reservoir has a surface area of about 8 acres and is impounded by two embankments of about 5 to 7 feet high. It has a capacity of approximately 62 acre-feet. Current operations by the Town of Dillon maintain relatively stable water levels in ODR. The reservoir and surrounding area currently support a variety of recreation opportunities, including fishing, hiking, mountain biking, and sightseeing.

Outlet to Salt Lick Gulch
This outlet discharges into a gully and is conveyed under 1-70 by a CDOT culvert back to Salt Lick Gulch. The outlet channel appears as a steep gradient stream channel with large rock armoring the channel substrate. The outlet channel enters a culvert under I-70, and from I-70 flows north through a deeply incised ditch to the wetlands adjacent to Salt Lick Gulch where the flow braids into several smaller channels.

Outlet to Dillon Reservoir
The old outlet from ODR to the Town of Dillon (now under Dillon Reservoir) has not been used since the Town of Dillon was relocated to the east shoreline of Dillon Reservoir, in the mid 1960s. The outlet pipe has been cut off and is believed to have no current utility.

1.1.1 Proposed Action

The Towns of Dillon and Silverthorne, and Summit County Government propose to enlarge ODR to store additional water and serve water needs in their respective jurisdictions. The Town of Dillon constructed the reservoir in 1939 as a domestic water supply and still maintains the diversion and the reservoir. Since the town was relocated for the construction of Denver's Dillon Reservoir, the town has maintained ownership of ODR for water supply.

Design of the project responds to the goals and objectives outlined in the White River National Forest (WRNF) Land and Resource Management Plan (LRMP; 2002). The Proposed Action is designed to be consistent with the standards and guidelines of Management Area 8.21, and would allow for continued recreation in the area as well as natural resource management, while meeting the purpose of water storage and water security required by the proponents.

The existing reservoir has a surface area of about eight acres and is impounded by two embankments of about 5 to 7 feet high in a saddle on an east-west trending ridge; and, water is supplied by the Dillon Ditch via a diversion from Salt Lick Gulch, located approximately 1 mile west of the reservoir. The ditch flow is conveyed under Interstate 70 in an inverted siphon. Salt Lick

Gulch is tributary to the Blue River. Currently, flows are diverted to ODR and returned to Salt Lick Gulch approximately 0.9 miles downstream of the diversion via an outlet channel and culvert under I-70. The proposed project is shown on Figure 1.2, "Project Proposal."

Construction Access - Tree and Brush Cutting Only
Toe of Dam Buffer - Tree and Stump Removal/
No Woody Vegetation
Excavated/Grading Areas - To be Restored to Native Habitats
North and South Dams & Expanded Reservoir - Permanent Habitat Changes

Salt Lick Gulch

Existing Diversion on Salt Lick Gulch

Old Dillon Reservoir

Dillon Reservoir

N

July 2009

Old Dillon Reservoir

Project Proposal

400 200 0 400 Feet

1 Inch = 400 Feet

Datum: NAD_1983_StatePlane_Colorado_Central_FIPS_0502_Feet
Source: Summit County 2004 Orthophoto
GIS Prepared by S. Claffey

Claffey Ecological Consulting, Inc.

Legend

- Disturbance-Boundary
- Expanded Reservoir
- Wetland Trail
- Wetland Mitigation
- Relocated Diversion
- Access Road Impacts
- Toe of Dam Buffer
- Buried Pipeline
- North and South Dams
- Excavated Areas_Restored
- Road on Proposed Dams
- Construction Access

Figure 1.2

The proposed project includes seven elements: 1) enlarging the existing reservoir from 62 acre-feet to 288 acre-feet; 2) restoring the outlet from ODR to the south to the Blue River (now Dillon Reservoir), 3) reconstructing the headgate on Salt Lick Gulch and piping the entire length of the Dillon Ditch to serve the enlarged reservoir and improving the siphon under I-70; 4) rehabilitating the outlet to Salt Lick Gulch; 5) temporary road access improvements; 6) burying existing overhead utility lines around ODR; and 7) wetland creation. Approximately 20 acres would be impacted by the reservoir enlargement, the Dillon Ditch piping and the rehabilitation of the outlet to the Blue River to the south of Old Dillon Reservoir. Also proposed at the reservoir is the creation of wetlands to compensate for wetland impacts derived from the project. The wetlands would be constructed on the southwest shorelines of the reservoir. The existing recreational trails in the project area around the shoreline of ODR would be reconstructed. The proposed action would use and extend the temporary timber haul roads approved for the Dillon Reservoir Forest Health and Fuels Project. Under the proposed action, the trail/road that parallels Salt Lick Gulch (National Forest System Road (NFSR) 1260W.2) would be used for temporary construction access and for long term maintenance access. A more detailed description of the Proposed Action is included in Chapter 2.

1.1.2 Purpose and Need

Because portions of the reservoir enlargement project are outside the scope of the existing Old Dillon Reservoir potentially valid right-of-way, a new special use authorization is needed. The purpose is to issue a special use authorization, consistent with Forest Plan goals and objectives for construction and maintenance of an expanded water storage facility.

Summit County Government and the Towns of Dillon and Silverthorne have identified the need for additional water supplies to meet future water demands within their service areas. Each entity requires the increased water storage capacity and water supply security. The purpose of this project is to provide additional water storage capacity and water supply security to meet existing and future domestic water supply needs.

Additionally, the Town of Dillon's current water supply from Straight Creek is susceptible to contamination from several sources including I-70, and there is an identified need to maintain an alternative water supply. The purpose of this project is also to improve the utility of Old Dillon Reservoir as an alternative water supply for the Town of Dillon, thereby increasing the water supply security for the town.

1.2 DECISION TO BE MADE

This EA is not a decision document. Its main purpose is to disclose the potential consequences of implementing the Proposed Action and alternatives to that action. However, the EA is prepared on the premise that certain decisions must be made, and that those decisions would be documented in a Decision Notice (DN). The DN would document the selection of an alternative, which could be No Action, the Proposed Action, or a combination of the two. This EA focuses on providing analysis sufficient for the Forest Service to make the following decision:

- whether or not to issue a special use authorization to allow the construction, operation, and maintenance of the proposed enlargement of Old Dillon Reservoir and allow for improvements to the Dillon Ditch as discussed in this EA

1.2.1 Public Involvement

NEPA requires that Federal agencies provide the public and other agencies the opportunity to be involved in agency decision-making. An important part of this process is called "scoping". CEQ Regulations refer to scoping as an internal and public involvement process to determine the "scope of the issues to be addressed and for identifying the significant issues related to a proposed action" (40 CFR 1501.7). This section describes the scoping process to date and the issues to be addressed within this EA.

The proposal for the Old Dillon Reservoir Enlargement Project was first listed in the January through March 2008 Schedule of Proposed Actions report for the White River National Forest. A scoping letter for the proposed project was mailed to a list of 49 interested and affected parties on January 24, 2008. The February 8, 2008 issue of the Summit Daily News had an article about the project. The scoping letter and newspaper article contained the following information: 1) introduction, background, and location of the proposed project; 2) the purpose of, and need for, the proposed project; 3) the proposed action; and 4) the decision to be made. Additionally, the project was presented before the Snake River Planning Commission on February 21, 2008. Comments were requested on the proposed project for a 30-day period ending on February 22, 2008. Seven (7) written and verbal comments were received offering support and/or potential issues for the proposed project.

1.3 ISSUES

At the conclusion of the scoping period, the Forest Service Interdisciplinary Team (ID Team) reviewed the comments and compiled a list of issues to be used in the development of alternatives and design criteria and to assist in the focus of the analysis. The issues were first determined to be key or non-key. Non-key issues are those that are outside the scope of the proposal, have already been decided by existing law, regulation, and policy, or are addressed in other decision documents such as the Forest Plan. Key issues are relevant concerns about the proposal that can be addressed through the implementation of forest plan standards and guidelines, by developing specific project design criteria, by tracking the issue through the analysis in the EA, or by developing alternatives to the Proposed Action.

Several of the concerns were identified as not key or outside the scope of this proposal. A comment synthesis and disposition of comments is included in the project record.

Comments identified as key issues were then addressed by asking the following questions:

- Could the concern be addressed through implementation of Forest Plan Standards and Guidelines as well as project-specific design criteria, best management practices, or mitigation measures including avoidance, minimization and compensation?

- Could the concern be addressed during the analysis conducted by the ID Team?

- Could the concern be used to drive or partially drive an alternative?

Based on interdisciplinary review of all information received from the scoping process, the project ID Team determined that all key issues for the project, including resource concerns and impacts,

could be resolved or mitigated through design criteria and proper implementation of the proposed action. Key concerns that were identified by the public, by the ID Team and third-party consultant team, and incorporated in the analysis of the Proposed Action are summarized below and addressed in Chapters 2 and 3.

Stream Health – impacts may occur to stream health (including riparian and wetland vegetation) due to changes in historic diversions on Salt Lick Gulch

> *Impacts to stream health would be addressed through design criteria, which include Forest Plan Standards & Guidelines*

Wetlands – impacts would occur with rehabilitation of the Dillon Ditch, a new diversion in Salt Lick Gulch, and with enlargement of the reservoir.

> *Impacts to wetlands would require a USACE 404 permit and compensatory mitigation. Impacts would adhere to the Forest Plan Standards & Guidelines.*

Water Rights – The applicant has the necessary water right under Colorado Water Law, and would complete the required actions in Water Court for this project. Under Colorado Water Law, the project could not impact senior water rights.

> *Water rights would be addressed under Colorado Water Law. Impacts would adhere to the Forest Plan Standards & Guidelines.*

Aquatic Resources – impacts may occur to fisheries, macroinvertebrates, and other aquatic resources in Salt Lick Gulch from changes in historic diversions. Old Dillon Reservoir would operate as a water supply reservoir and fluctuating reservoir levels could impact fish habitat and fishing opportunities in the reservoir.

> *Impacts to aquatic resources would be addressed through the effects analysis and by addressing in-stream flows which would include implementation of Forest Plan Standards & Guidelines.*
>
> *Impacts to Threatened and Endangered (T&E) species would require consultation with the US Fish and Wildlife Service.*

Wildlife – impacts to wildlife habitat may occur with expansion of the reservoir. The reservoir and dams would permanently impact 10.1 acres of forest and meadow habitat in the project area.

> *Impacts to wildlife would be addressed through Forest Plan Standards & Guidelines and site specific design criteria.*
>
> *Impacts to Threatened and Endangered (T&E) species would require consultation with the US Fish and Wildlife Service.*

Vegetation – Project implementation would impact both native and non-native plant communities.

> *Impacts to vegetation would be addressed through design criteria, which include Forest Plan Standards & Guidelines. A vegetation management plan would be developed for the project.*

Weeds – potential exists for noxious weeds to spread due to soil disturbance.

Noxious weed infestation would be addressed with a risk assessment and a mitigation plan, likely using biological controls and tracked through the effects analysis, which includes Forest Plan Standards & Guidelines.

Recreation – temporary impacts to recreation opportunities would occur during construction of the project. Future recreation experiences may also be affected by operations of the reservoir.

Impacts to recreation would be addressed through design criteria, which include Forest Plan Standards &Guidelines. Temporary trail closures and signage would be used during construction.

Scenery Resources – the dam embankments may affect the scenic integrity of the area.

Impacts to scenery resources would be addressed through design criteria, which include Forest Plan Standards & Guidelines.

Cultural Resources – project construction, operation, and maintenance may affect any identified cultural resources.

A cultural resource inventory has been conducted for proposed ground-disturbing activities. State Historic Preservation Office concurrence is required with the findings of the cultural resource inventory and the effects analysis.

Public Lands – project construction, operation, and maintenance may affect other permit holders in the project area.

The project would coordinate with other special use permit holders for access to and from the site during construction, operation, and maintenance.

1.4 PERMITS AND AGENCY APPROVALS REQUIRED

The following permits, approvals, and consultations are required prior to project construction:

- **U. S. Army Corps of Engineers 404 permit**
  - Required for dredge and fill activities within waters of the United States.

- **Water Rights - State of Colorado**
  - The point of diversion, location of use, and type of use of a water right would be reviewed via the appropriate water court.

- **Construction plan review**
  - USFS review for consistency with operating plan standards and with the terms of the decision notice.

- **State Engineer's Dam Safety Permit**
  - Review by the state to ensure dam and reservoir design meets safety standards.

- **Consultation with U.S. Fish ands Wildlife Service – Endangered Species Act compliance**
    - For potential impacts to Threatened and Endangered species.

- **Consultation with State Historic Preservation Office – Section 106 compliance**
    - For protection of cultural resources

- **Summit County 1041 permit review**
    - Required to ensure that growth and development in Summit County are consistent with legitimate environmental concerns and occur in a safe and coordinated manner in areas or activities of State Interest.

- **Colorado Department of Public Health and Environment**

  Storm Water Control Permit
  Construction Dewatering Permit
  401 Water Quality Certification

CHAPTER 2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

This analysis considers in detail a No Action alternative and the Proposed Action. The intent of this chapter is to describe and compare the differences between the alternatives, especially how the environmental effects of each differ. This chapter also briefly describes alternatives considered but not analyzed in detail, and the criteria used to screen alternatives. This chapter contains a summary of the effects that are described in Chapter 3. This comparison clearly frames the issues, informs the public, and provides a clear basis for choice among options for the decision maker.

2.1.1 Formulation of Alternatives

The scoping process resulted in key issues that were grouped by common resource. These issues, described in Chapter 1, are:

- Stream Health
- Wetlands
- Water Rights
- Water Quality
- Aquatic Resources
- Wildlife
- Vegetation
- Weeds
- Recreation
- Scenery Resources
- Cultural Resources
- Land Uses

The ID Team determined that no other action alternatives were necessary to respond to key issues. The FS ID Team provided design criteria to achieve Forest Plan Standards and Guidelines. Some alternatives were eliminated from detailed study because they did not meet the purpose and need or were infeasible, speculative, or not achievable or possible under Colorado Water Law.

2.2 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

The NEPA process requires that alternatives evaluated in detail be reasonable. Reasonable alternatives include those that are practical or feasible from a technical and economic standpoint, and those that use common sense. A discussion of the alternatives considered and the rationale for eliminating them are presented below.

ALTERNATIVES IDENTIFIED BY THE UPCO STUDY

The Upper Colorado River Basin (UPCO)/ Summit County Water Supply Study (Boyle 2004) study was initiated in 1998 to identify and investigate water quantity and quality issues in Grand and Summit Counties. The study proceeded in phases. Significant work was done in Phase II of the UPCO study to identify the amount, location, and seasonality of water supply shortages in Summit County. There are a number of possible alternatives identified in the UPCO Study Phase II that would meet some of the needs of this proposed project, but which do not have the unique capability of ODR as described above. The alternatives for Summit County are found on pages 69 to 75 of the UPCO report. Many of these other alternatives are larger projects with greater environmental impacts, permitting requirements and costs; several would require significant cooperation from Front Range water providers.

The UPCO/Summit County participants identified four possibilities for new storage above new Dillon Reservoir and several new or reconfigured projects below new Dillon Reservoir that could provide replacement water.[1]

Although other potential storage sites and alternative supplies of water may be helpful to Summit County in the future, they do not meet the Purpose and Need for the proponents of this proposed project as 1) they are located upstream of Dillon Reservoir and thus subject to a water right "call" by Denver and 2) they do not provide the Town of Dillon with an alternative water supply; it would not allow Dillon to use its direct flow right from the Dillon Ditch.

ON SITE ALTERNATIVE-EXCAVATION ONLY

This alternative would expand the reservoir to 288 acre-feet (AF) but accomplish that expansion by excavation only into the existing substrate, and into adjacent uplands. The general idea would be to deepen the existing reservoir, rather than use larger embankments to increase storage. This alternative would create approximately the same footprint as the proposal; but, the height of the existing dams would remain the same or relatively close to the existing height. This alternative was primarily driven by the desire to reduce the scenery impacts of the enlarged dams from both near and far viewsheds. All other resource impacts would remain the same.

This alternative was not practical due to the geology in the area and the substantial increased costs of implementation. ODR lies on top of a glacial moraine and large boulders resulting in high permeability underlying the existing substrate. That substrate has sealed over time. An Excavation Only alternative would require massive excavation to achieve the required storage capacity, including removal of large boulders, and transport of that excavated

[1] The four possibilities for new water storage included: 1) a reservoir on Middle Fork Swan River, 2) a reservoir on the Swan River just below the confluence of Middle and North Forks, 3) a reservoir on Indiana Creek, and 4) re-operation of the existing Clinton Reservoir. The reconfigured projects that could provide replacement water included: 1) the Straight Creek Project, 2) the Blue River diversion to Everist Materials gravel pit north of the Town of Silverthorne and pumpback to Dillon Reservoir (Everist pumpback), and 3) a gravity collection system from tributaries draining the east side of the Gore Range (Gore Range Collection System (GRCS).

material by truck from the site, to an as yet unknown receiving site. Excavation and trucking costs, assuming a receiving site could be located, would be prohibitive for the project proponents. The trucking would create substantial traffic impacts on County Road 7 (Dillon Dam Road) and for the Town of Frisco, assuming the trucks would not be permitted to cross the Dillon Dam.

After excavation, due to the porous nature of the substrate, the reservoir would need to be lined with a synthetic liner, adding to the overall costs. The existing dams would still have to be reconstructed to meet current State mandated dam safety requirements.

ON SITE ALTERNATIVE – SMALLER RESERVOIR

Another alternative design involves expansion of the existing reservoir but with less storage capacity. The project proponents have design plans for expansion to a 190 AF reservoir. The proponents have considered a range of alternatives from over 110 AF up to the 288 AF expansion proposed. This alternative would result in potential reduction to impacts of the diversion on the Salt Lick Gulch fishery as less storage could lead to somewhat lower diversion rates. Smaller reservoir design ameliorates scenery impacts to some degree as the height of the dams would be reduced.

The smaller reservoir design does not meet the project purpose. Storage capacity of less than 288 AF does not provide alternative water source for the Town of Dillon in the event of contamination of Straight Creek due to a massive fire or spill from an accident on I-70. A smaller reservoir does not provide sufficient space for the proponents to meet their water needs and operate the reservoir to satisfy demand.

2.3 ALTERNATIVES CONSIDERED IN DETAIL

2.3.1 Alternative 1 – No Action Alternative

The "No Action" alternative is required by the National Environmental Policy Act (NEPA) (40 CFR 1502.12). This alternative provides a point of reference for evaluating the environmental effects of Alternative 2.

No reservoir expansion would take place. The Dillon Ditch would not be piped. The north dam would need to be re-engineered to meet current dam safety standards, and the existing reservoir would be dewatered to accomplish this reconstruction. The Town of Dillon drained the reservoir in the summer of 2008 per State Engineer direction. Under the No Action alternative, the Town of Dillon would complete this maintenance and modification in 2009. This dam reconstruction work would be completed under the PVOR, and drainage of the reservoir would be completed regardless of the status of the ODR Enlargement Project. The reservoir would continue to operate after the rehabilitation is completed and would provide water supply opportunities for the Town of Dillon and recreation opportunities to the public in the future. The proponents would not attain increased water storage capacity or water supply security.

2.3.2 Alternative 2 – Proposed Action

The project is summarized in Chapter 1. The following describes different aspects of the proposed project. The resources affected by this proposal are discussed in detail in Chapter 3 including the existing conditions and the consequences if this project would be approved.

1) Reservoir Enlargement

The enlarged reservoir would be expanded from 8.1 surface acres to about 15.4 acres. The proposal would expand the existing reservoir to 288 acre-feet capacity by reconstructing the north and south dams from 5 feet and 7 feet, respectively to 28 and 38 feet high respectively. Construction of the reservoir enlargement would require about 120,000 cubic yards of excavation, 80,000 cubic yards of embankment fill, 10,000 cubic yards of imported riprap, and 1,000 feet of 24-inch pipe for the outlet to the Blue River (new Dillon Reservoir) to the south. Material for the dams would be excavated to the east and west of the current shorelines.

2) Restoring the outlet from Old Dillon Reservoir to the south to the Blue River (Dillon Reservoir)

A 24-inch diameter pipe would be installed under the reservoir and through the south dam, down the slope separating Old Dillon Reservoir from Dillon Reservoir, under the Dillon Dam Road (Summit County Road 7), and into Dillon Reservoir. This pipe would deliver water to Dillon Reservoir to allow the project proponents to utilize stored water for augmentation or exchange purposes and to allow the Town of Dillon to utilize water from Salt Lick Gulch for domestic water in the event the Straight Creek water supply becomes contaminated. A concrete wing wall would be constructed in Dillon Reservoir to protect the pipe, and rock riprap would be installed to dissipate energy.

3) Rehabilitation and modification of Dillon Ditch and its headgate on Salt Lick Gulch to serve the enlarged reservoir

The water transmission along the Dillon Ditch and diversion at Salt Lick Gulch would be reconstructed. Approximately 6,100 feet of the Dillon Ditch would be converted to a 24-inch buried pipe to the reservoir using the existing alignment of the ditch. The pipe proposed is high density polyethylene (HDPE), which is flexible and would allow for placement of the pipe in the current ditch alignment. Placement within the ditch alignment allows for reduced construction impacts along the pipeline alignment as it would follow the existing disturbed prism of the Dillon Ditch. The pipeline would pressurize the system for efficient delivery of water to the proposed expanded reservoir. The open channel would be converted to an upland landscape blended into the existing hillside to appear as natural as possible. Upon completion of the installation, the entire area would be seeded with native grasses and forbs, and covered with weed-free straw mulch. The existing trail that parallels the ditch would be reconstructed.

The headgate would be relocated approximately 190 feet upstream in Salt Lick Gulch to provide more hydraulic head to deliver water more efficiently to the proposed expanded reservoir. In addition to the diversion, discharge measuring weirs would be installed in the channel upstream and downstream of the diversion structure to monitor diversions.

The inverted siphon under I-70 would be slip lined with a flexible plastic sleeve to create a continuous pipeline for the Dillon Ditch. Installation of the slip line would require a work site that would temporarily disturb approximately 0.10 acre of ground on the north edge of I-70 where the Dillon Ditch enters the inverted siphon. The temporary impact site would be re-graded to natural contours and seeded with a native seed mix. An access vault would be constructed on the south edge of I-70 to allow maintenance of the siphon.

4) Rehabilitating the outlet to Salt Lick Gulch

A pipe would be installed through the north dam to convey water back to the existing outlet channel that returns flow to Salt Lick Gulch. The outlet of the pipe would be protected with concrete baffling, and riprap would be installed at the outlet of the pipe for approximately 15 feet downstream of the pipe. The remainder of the outlet channel would remain undisturbed.

The Colorado Department of Transportation (CDOT) replaced the culvert under I-70 on the westbound lanes with a new concrete culvert in the summer of 2008 due to failure of the existing culvert. The culvert section under the eastbound lanes was sealed with a process of lining in place. No additional improvements are needed to the outlet water transmission piping under I-70 for the foreseeable future.

5) Temporary road access improvements

Construction access to the reservoir site at Lake Hill is via Lake Hill Communication Site Road (Forest Development Road 45.1) and Old Dillon Reservoir Road (Forest Development Road 45.1A) from the Dillon Dam Road. Both roads are existing Forest Development Roads open to administrative use only for operation and maintenance of the facilities located at Lake Hill. Minor improvements of the roads would be needed to accommodate construction vehicle traffic and improve road drainage. The roads would remain open to administrative use at the completion of the project.

The project requires a temporary access road for construction of the new diversion structure in Salt Lick Gulch and piping of the Dillon Ditch north of I-70. The principle access to the Salt Lick Gulch diversion and Dillon Ditch north of I-70 is the existing Lower Salt Lick Gulch Road (FSR 1260W.2). Minor improvements would be needed on the road surface of 1260W.2 to accommodate construction vehicles and improve road drainage. Upon completion of the project, the road prism would be reseeded and allowed to develop into a singletrack trail, which is the preferred management use for 1260W.2 in the Forest Travel Management Plan. The road would remain open to administrative uses by the Forest Service as well as future operation and maintenance of the Dillon Ditch pipeline and Salt Lick Gulch headgate.

6) Burying overhead power and cable lines

The Forest Plan requires that overhead power lines less than 33kV in a project area must be buried as part of the project. The project would bury the overhead line that carries Xcel power and Comcast cable through the project area. The line would be buried in the crest of the south dam and along the existing alignment a short distance on either side of the dam.

7) Wetland creation

The project would impact wetlands due to the loss of wetlands around the existing reservoir shoreline, work in Salt Lick Gulch for the new diversion, and installation of a pipeline in the Dillon Ditch. To replace the functions performed by those wetland habitats, the project proponents propose a compensatory mitigation plan that creates wetlands in the project area. This replacement of wetland functions is required through the Forest Service approval process, the US Army Corps of Engineers Section 404 permit, and the Summit County 1041 approval.

2.4 Design Criteria

Design criteria are specific project design features that are incorporated within the Proposed Action and alternatives. They provide specific guidance on project implementation above and beyond Forest Plan Standards and Guidelines and those other required regulations that must be met and become part of the decision made and the project implementation plan. Project-specific design criteria include:

Water Resources

To avoid significant impacts to soils, floodplains, wetlands, or municipal watersheds, site specific criteria would be incorporated into the project design. The use of WCP design criteria and standard BMPs for general stream health, stream crossings, stream flow management, and management of diversion facilities would maintain stream health, and protect beneficial uses of water. Project-specific design criteria and mitigation measures are included here:

Water Conservation Measures

1. If direct flow diversions cause Salt Lick Gulch to drop below 1.0 cfs during the months of July through September, the Town of Dillon would implement a water conservation plan designed to effectively reduce its irrigation demand by 30%. This may be achieved, for instance, by applying an even/odd watering schedule, eliminating park and open space irrigation, limiting the number of days that irrigation water can be applied, or other measures as determined by the Town.
2. If at any time during the year direct flow diversions under emergency operations cause Salt Lick Gulch to flow below the minimum flow target of 0.5 cfs, the Town of Dillon would reduce its water needs by using a more restrictive conservation plan that reduces irrigation demand to approximately 10% of the normal irrigation requirements. However, the Town may use alternative sources of water supply and water rights as available to supplement its irrigation needs during this period.
3. The Town of Dillon would deliver its Old Dillon Reservoir water, previously accrued when water was available for storage, during the winter months to supplement the Town's direct flow demand.

Phosphorus Discharge – Dillon Reservoir

1. Develop mitigation strategies in cooperation with Summit County Water Quality Committee, the CDPHE, and Denver Water to effectively mitigate, pound for pound, the projected phosphorus loads discharged to Dillon Reservoir.

Aquatic Resources

1. The project proponent has committed to a 0.5 cfs target flow as the minimum flow in Salt Lick Gulch downstream of the Dillon Ditch diversion during emergency operations. During normal operations, the project proponent has committed to a minimum flow of 1.0 cfs in Salt Lick Gulch downstream of the Dillon Ditch diversion in July -November. This minimum flow would provide a beneficial impact to aquatic resources in Salt Lick Gulch.

2. As a measure to reduce diversion needs during emergency operations, the Town of Dillon has committed to conservation measures for landscape irrigation. The conservation measures would restrict landscape irrigation during summer and fall growing seasons when the emergency operations were needed.

3. The new diversion structure would be designed to allow fish passage.

Wildlife

Forest Plan direction and the design criteria incorporated for aquatic resources, wetlands, and vegetation would protect wildlife resources in the project area. Additionally, the project would use native seed and plant materials on any revegetation efforts. Specifically, native grass seed and forbs would be used on the pipeline installation in the Dillon Ditch and in the borrow area on the east side of ODR.

Vegetation

A revegetation plan is included as part of the Proposed Action to address a variety of resource issues. Revegetation efforts should only include species common to this forest ecosystem. A native seed mix would be used in all disturbed areas. Weed control would be required following project implementation. Any work needed on the northern side of I-70 should be revegetated as quickly as possible to prevent weeds from establishing in this area. This project should maintain and enhance the long-term productivity of soils within the wetland ecosystem so there would not be significant or permanent damage.

Recreation

1. Trail and area closures would require signage to inform the public. Forest Service personnel would approve all signage.

2. At completion of the project the road prism for Lower Salt Lick Gulch Road (Forest Development Road 1260W.2) would be reseeded and allowed to develop into a single track trail, which is the recommended management use for 1260W.2 in the Forest Travel Management Plan (Alternative G).

3. At completion of the project the trail around ODR would be reconstructed to allow similar recreation opportunities available currently to continue.

Scenery Resources

Public health and safety override scenic integrity; therefore, the dams must be designed to comply with state regulations. However, to the extent possible, the following design criteria related to Scenery and Facility Design have been incorporated into the design of this project to minimize the impacts to the scenic quality of the area:

1. The existing power lines through the project area would be buried.

2. The contrast created by the linear edges of the dam embankments has been reduced by placing large boulders along the top edges of the dam abutment or the reservoir edges. Any large boulders found in the excavation should be used to soften the dam abutments, ditch rehabilitation and other disturbed areas by randomly placing to help soften the disturbed area. Boulders should be planted with 2/3 of the boulder below the surface and 1/3 of the boulder above the surface for a more natural appearance. Suggestion is to randomly place in groups and individually.

3. Any exposed structures, including headgates, need to meet reflectivity guidelines and color guidelines.

4. Root wads generated from construction activity shall be buried or removed.

5. Any stumps generated from this project should be cut as low as possible to the ground to avoid safety hazard and reduce scenic impact.

Cultural Resources

Appropriate design criteria would be determined in consultation with SHPO and tribal representatives.

Public Lands

No specific design criteria to avoid significant impacts to authorized activities and facilities and access needs to be incorporated into the project design. Collaboration between SUP holders for access to the Lake Hill area is ongoing.

2.5 Monitoring Requirements

As appropriate, the Forest Service and the proponents would develop a plan to monitor the project and its effects on natural resources. Monitoring may include habitat surveys, permanent cross sections in Salt Lick Gulch, and biological sampling. Pre-project data has been collected on the resources evaluated in this document. Post-project monitoring may be required depending on the potential impacts for each resource and the design criteria identified to mitigate those impacts. Revegetation efforts would be monitored for at least three years after treatment, including monitoring for noxious weeds. Wetland creation areas would be monitored for five years to document the successful replacement of wetland habitats lost, which is consistent with USACE permitting. The amount of water diverted to ODR and the amount of water in Salt Lick Gulch downstream of the diversion would also be monitored via installation of measuring devices in the Dillon Ditch and/or the headgate structure.

2.6 Comparison of Alternatives

Tables 2.1 and 2.2 include descriptions and comparisons of the alternatives discussed in this EA.

Table 2.1. No Action and Proposed Action Alternatives.

Alternative	Action	Alternative Description
1	No Action	No reservoir expansion would take place. The Dillon Ditch would not be piped. The reservoir would continue to operate in its current condition and would continue to provide recreation opportunities to the public. The north dam would be repaired in accordance with requirements of the state. The Town of Dillon would complete maintenance operations discussed above but those are under a potentially valid outstanding right (PVOR) for ODR, and maintenance operations for portions of the Dillon Ditch under Special Use Permit from the Forest Service.
2	Proposed Action	Under the Proposed Action, the existing reservoir would be expanded to 288 acre-feet, and the outlet to the Blue River (now Dillon Reservoir) would be restored. The Dillon Ditch and its diversion on Salt Lick Gulch would be modified by replacing the diversion structure and piping the Dillon Ditch. The enlarged reservoir would have a surface area of about 15.4 acres and would be impounded by two embankments of about 28 to 38 feet high. Approximately 20 acres would be impacted by the reservoir enlargement, the piping of the Dillon Ditch and the rehabilitation of the outlet to the Blue River to the south of Old Dillon Reservoir. Construction of the reservoir enlargement would require about 120,000 cubic yards of excavation, 80,000 cubic yards of embankment fill, 10,000 cubic yards of imported riprap, and 1,000 feet of 24-inch pipe for the outlet to the Blue River to the south. About 6,100 feet of the Dillon Ditch would be piped and buried in the existing alignment. Approximately 1,700 feet of existing overhead utility lines would be buried on the south end of the project area.

Table 2.2 Comparison of Alternatives.		
	Impact Indication	
Resource	**Alt 1 - No Action**	**Alt 2 - Proposed Action**
Stream Health	No impact, existing diversions would continue	Proposed diversions would not alter stream health
Wetlands	No new impacts; impacts to wetlands in the Dillon Ditch would occur under maintenance operations previously authorized	1.37 acres of permanent impact and 1.37 acres of wetlands would be created at the project site to replace wetland functions.
Water Rights	No impact	Proposed use of water rights would adhere to Colorado law
Aquatic Resources (Fisheries and Macroinvertebrates)	No new impacts, existing diversions would continue	Proposed normal operations would not alter aquatic resource presence or reproduction. Proposed emergency operations would affect aquatic resources temporarily, but rapid recovery is anticipated due to populations in Ryan's Gulch.
Wildlife		
Threatened, Endangered, and Candidate Species		
Four endangered Colorado River fish	No impact	May adversely affect due to depletions; however, participation in the recovery program results in mitigation of those effects.
Canada lynx	No impact	May affect, not likely to adversely affect
R2 Sensitive Species	No impact	May adversely impact individuals, but is not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability range-wide.
MIS	No impact	Proposed Action would affect the species or its habitat. Proposed Action would not affect Forest-wide population or habitat trends.
Vegetation		
Threatened, Endangered, and Proposed Species	No impact	Proposed Action would not affect any federally-listed or proposed plant species
Noxious Weeds	No impact	Noxious weeds would be managed via the vegetation management plan and in conjunction with the Summit County Noxious Weed program.
Recreation	No impact	Temporary trail closures around ODR, on lower Salt Lick Gulch trail, and on trail along Dillon Ditch to accommodate construction. Recreation opportunities at ODR would be temporarily lost during reservoir expansion. Potential change in recreational fishing opportunity and experience at ODR due to proposed reservoir operations.
Scenery Resources	No impact	The project area would continue to meet the SIO for MA 8.21 and be consistent with Forest Plan direction.
Cultural Resources	No impact	No impact to cultural resources; confirmed via consultation with SHPO dated March 6, 2009.

Table 2.2 Comparison of Alternatives.		
	Impact Indication	
Human Health and Safety	State Engineer's Office requires redesign of north dam to meet current standards. In an emergency event, the Town of Dillon would not have a reliable alternative water supply.	Public safety would be managed via trail and area closures during project construction. State Engineer's dam safety issue would be addressed. In an emergency event, the Town of Dillon would have a reliable alternative water supply.

2.7 Implementation

Implementation of the Old Dillon Reservoir Enlargement project would likely begin in calendar year 2010, and it is anticipated that construction could last two seasons. There would be a closure for public access during construction around the reservoir, the Salt Lick Gulch diversion, and along the Dillon Ditch in 2010 and potentially 2011, if the project is approved.

CHAPTER 3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

This section summarizes the physical, biological, social and economic environments of the affected project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives presented in Chapter 2. All alternatives are consistent with the Forest Plan Standards and Guidelines. Technical reports for each resource were prepared to analyze effects associated with the alternatives as well as identified issues. Those reports are located in the project record and hereby incorporated by reference. The reports are summarized by topic in this section.

3.1 WATER RESOURCES

This section describes water resources within the Salt Lick Gulch watershed and surrounding areas including a summary of watershed characteristics, stream flow hydrology, stream health, and water quality. This section also discloses the effects of the Proposed Action on Salt Lick Gulch.

3.1.1 Issues and Indicators

The enlargement of ODR would increase the duration and volume of water diverted into storage from Salt Lick Gulch. The increased storage would be subsequently released back to Salt Lick Gulch or Dillon Reservoir for direct use and augmentation by the proponents or to facilitate further upstream storage through a water rights exchange. These actions have potential to affect the stream flow runoff and stream health of Salt Lick Gulch. In addition, these actions could affect the water quality of Dillon Reservoir.

The following indicators are used to measure impacts to the water resources.

- Changes to the duration and volume of water diverted from Salt Lick Gulch compared to existing conditions.
- Impact on stream health as it relates to the maintenance of physical and aquatic habitat along Salt Lick Gulch downstream of the point of diversion (Dillon Ditch).
- State water quality standards for total phosphorus established specifically by the Colorado Department of Public Health and Environment for Dillon Reservoir.

3.1.2 Forest Plan Direction

The WRNF, through its Forest Plan efforts, has developed specific goals and objectives specific to water resources.

Goal: Promote ecosystem health and conservation using a collaborative approach to sustain the nation's forests, grasslands and watersheds.

Objective: Improve and protect watershed conditions to provide the water quality and quantity and soil productivity necessary to support ecological functions and intended beneficial uses.

To help achieve these goals and objectives, the Forest has developed standards and guidelines designed to protect the water, soil and riparian resources. The Forest Plan standard applicable to the Proposed Action is described as:

> *In each stream capable of supporting a self-sustaining fishery, ensure that projects maintain sufficient habitat, including flow, for all life history states of native and desired non-native aquatic species. In streams where reproduction does not occur but supports a recreational fishery, sufficient habitat would be maintained to ensure recreational values.*

In support of the Forest Plan Standards and watershed goals and objectives, the Forest Service has developed a series of guidelines consisting of watershed conservation practices that if used properly, would help insure protection of the water resources. The guidelines referred to as Management Measures (MM), are described in the Forest Service's Watershed Conservation Practices Handbook, FSH 2509.25 (WCP Handbook). Attainment of the MMs help the Forest Service meets applicable Federal and State laws and regulations. Relevant MMs include 3-8, which are listed below and described in more detail in the WCP Handbook.

MM 3 In the water influence zone next to perennial and intermittent streams, lakes, and wetlands, allow only those actions that maintain or improve long-term stream health and riparian ecosystem condition.

MM 4 Design and construct all stream crossings and other instream structures to provide for passage of flow and sediment, withstand expected flood flows, and allow free movement of resident aquatic life.

MM 5 Conduct actions so that stream pattern, geometry, and habitats maintain or improve long-term stream health.

MM 6 Maintain long-term ground-cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological function.

MM 7 Manage stream flows under appropriate authorities to minimize damage to scenic and aesthetic values, fish and wildlife habitat, and to otherwise protect the environment.

MM 8 Manage water-use facilities to prevent gully erosion of slopes and to prevent sediment and bank damage to streams.

3.1.3 Geographic and Temporal Scope

The geographical analysis area for watershed and aquatic resources consists of the Salt Lick Gulch watershed and Dillon Reservoir located above the Dillon Dam. Short term impacts are considered for the period immediately following implementation. Long term effects consist of full utilization of the Project water and are considered to be approximately 50 years.

3.1.4 Affected Environment

Watershed characteristics

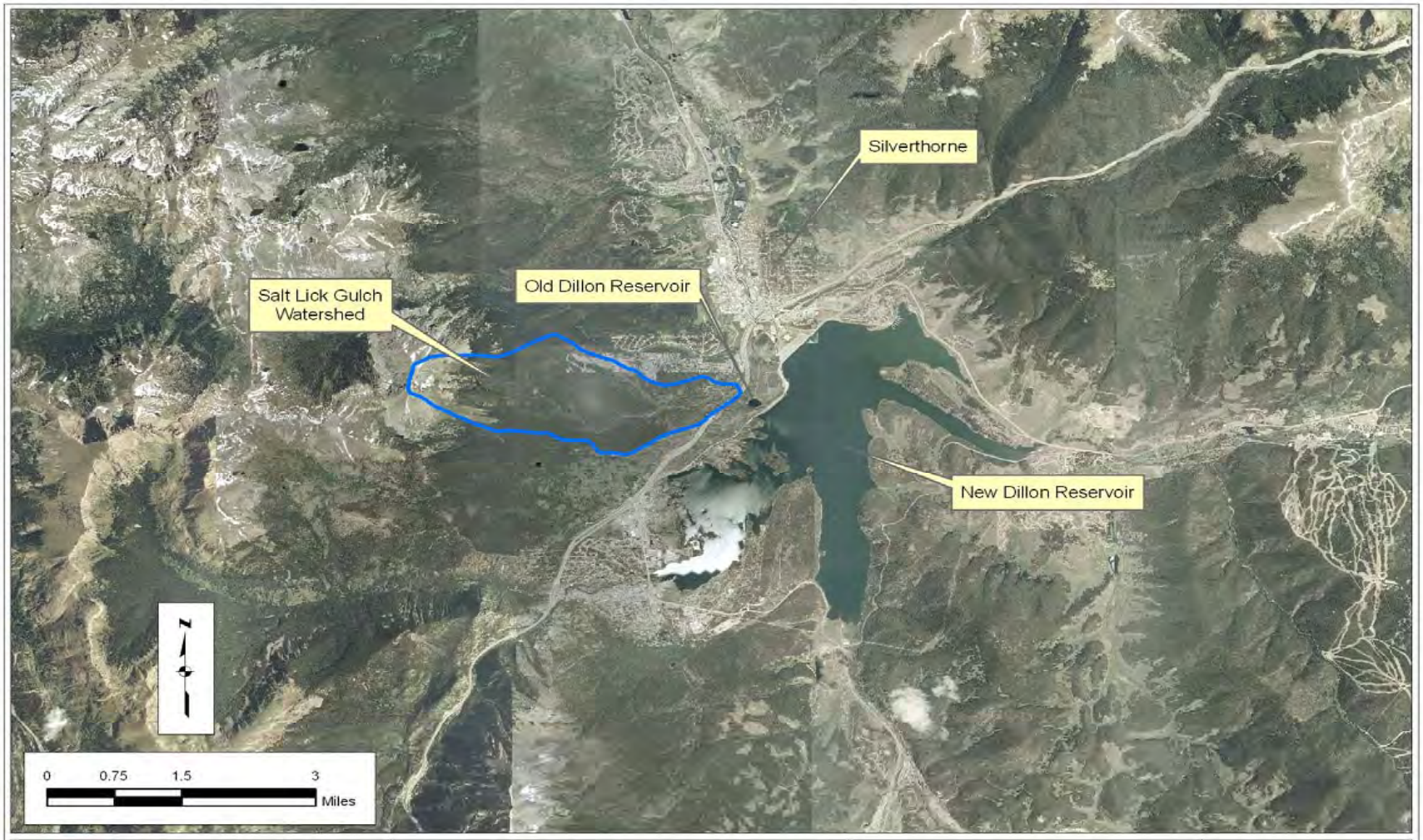
Salt Lick Gulch drains a small, high alpine watershed located in the Lower Blue River basin. The Salt Lick Gulch watershed consists of approximately 2,000 acres as shown in Figure 3.1. It is tributary to the Blue River at a point immediately downstream from Denver's Dillon Reservoir and Dam. The Salt Lick Gulch watershed drains the eastern flanks of Buffalo Mountain and spans an elevation range from 8,770 feet to 12,777 feet. The longitudinal profile of Salt Lick Gulch is typical of high elevation, mountain streams. The upper elevations have an extremely high gradient while the lower elevations have a modest gradient. These lower gradient reaches, near the gulch's confluence with the Blue River, are inhabited by a beaver population. This has resulted in extensive ponding within the wetland complexes in the lower segment of Salt Lick Gulch. Annual discharge patterns for Salt Lick Gulch are dominated by spring snowmelt and typical of high elevation, montane climates. The peak runoff hydrograph typically shows a significant increase in discharge in April, a peak in discharge in May or June, and a steady reduction in flow in June through August. Discharge during the remainder of the year remains relatively constant.

Water Quality

All surface waters in the project area have been assigned the following beneficial uses by the Colorado Water Quality Control Commission:

- Aquatic life – Class I Cold Water
- Water Supply
- Recreation 1
- Agriculture

In addition, Dillon Reservoir is the subject of Colorado Department of Public Health and Environment (CDPHE) Regulation No. 71. Regulation No. 71 establishes controls of point and nonpoint phosphorus sources within the Dillon Reservoir watershed. Specifically, the regulation requires that owners of new point source phosphorus discharges implement best management practices or other methods of phosphorus control that result in 1 to 1 mitigation of the new phosphorus source. The new proposed releases from Old Dillon Reservoir to Denver Water's Reservoir would be subject to this requirement.



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Old Dillon Reservoir Environmental Assessment
United States Forest Service

Figure 3.1
Vicinity Map

Date: 05/16/2008
File: 542-7.6
Drawn by: RP
Approved by: GJG

The concentration of total phosphorus in Salt Lick Gulch and ODR was measured four times over the March through June 2008 period. The measurements indicate that the phosphorus concentration varies seasonally with typically lower concentrations in the winter and higher concentrations during the summer high-flow period. Table 3.1 displays the projected monthly concentration of total phosphorus in Salt Lick Gulch and ODR based upon the recent sampling.

Table 3.1 Projected Phosphorus Concentrations, Salt Lick Gulch and ODR.

Month	Total Phosphorus Concentration (µg/L)*
January	12.5
February	12.5
March	12.5
April	27.2
May	41.8
June	30.1
July	25.7
August	21.3
September	16.9
October	12.5
November	12.5
December	12.5
*Monthly projections based on 10 water quality samples collected on March 8, May 21, June 4, and June 18, 2008.	

Stream Health

Stream health is measured using stream health classes. Stream health classes are based on measurements of the physical habitat condition as a percent of the reference. Habitat condition is quantified by measuring the channel features needed to support aquatic life, such as streambed sediment, pools, large woody debris and channel stability.

To evaluate stream health in Salt Lick Gulch for the Dillon Reservoir Forest Health and Fuels (DRFHF) project, Forest Service personnel surveyed the stream in two locations using standard Forest Service methods. The two sampled reaches were located where lower gradients or fine grained bank material make them responsive to watershed disturbance. The reference stream was surveyed high in the watershed and is considered to be in good condition. The second site was located in Lower Salt Lick Gulch below the Dillon Ditch diversion. This site describes stream conditions historically impacted by the existing conditions and operation of ODR. The results indicate that both reaches on Salt Lick Gulch have high geomorphic and hydrologic integrity and were classified as "robust."

3.1.5 Environmental Effects by Alternative

Introduction

This section examines the direct and indirect effects of the two alternatives on water resources within the study area. The key issues examined include; stream flow hydrology, stream health, and water quality. The cumulative effects of each alternative are also addressed.

The environmental effects of the two alternatives were analyzed using two numeric water resource models. The first model predicts change in Salt Lick Gulch stream flows below the Dillon Ditch headgate and lower in the basin downstream of the return flow releases from ODR. The model estimates monthly yield in Salt Lick Gulch based on historic discharge measurements of nearby gaged streams exhibiting comparable watershed characteristics. Additional technical detail describing the hydrology model can be found in the technical hydrologic report that was prepared in support of this study in the project file.

The second model used in this analysis was developed to describe in detail the projected water demand of each participating government entity including: the Town of Dillon, the Town of Silverthorne, and Summit County. The two models were combined to analyze the hydrologic effects of each alternative on diversions through the Dillon Ditch, storage in ODR, and subsequent releases to Dillon Reservoir or back to Salt Lick Gulch.

These two models assess diversion under what would be a typical operations plan for the reservoir. However, the reservoir may not be operated in the manner modeled in every year. In the myriad of scenarios possible under different water years and the various operations of the other water supply facilities in the Upper Colorado River Basin, the full use of available water rights may not be achieved in early June as modeled, and diversions to meet water demands and refill reservoir capacity may continue later into the summer and fall. Those diversions later in the season would generally be at a lower rate than the spring reservoir fill period modeled, and mitigation measures have been developed which minimize the effect on the aquatic environment.

3.1.5.1 Alternative 1 – No Action

Effects on Stream Flow Hydrology

Stream diversions from Salt Lick Gulch to ODR would continue under historic operations and use patterns. The water would be used to fill and refresh Old Dillon Reservoir and continue to be used for fishery and recreation purposes. Water diverted into and through the reservoir would return to Salt Lick Gulch approximately 0.9 miles downstream of the Dillon Ditch headgate. The diversions have been totally consumptive to Salt Lick Gulch within this reach of the stream. In total approximately 573 acre-feet (AF) of water would be diverted from Salt Lick Gulch into ODR during an average water year. Although the water is consumptive for the first 0.9 miles below the headgate, it is non-consumptive (less evaporation loss) in the lower reach and is returned to Salt Lick Gulch via the ODR outlet channel.

Effects on Stream Health

The historic diversions and stream depletions below the Dillon Ditch headgate have not adversely affected the stream health of Salt Lick Gulch. Stream channel surveys of lower Salt Lick Gulch conducted by the U.S. Forest Service describe the stream's environment as "robust." Therefore, under the No Action alternative, historic diversions into and through ODR would not reduce the stream health of Salt Lick Gulch downstream of the diversions.

Effects on Water Quality

Continued operation of ODR under the No Action alternative is not expected to adversely affect stream water quality or the water quality of Dillon Reservoir. Lower Salt Lick Gulch would remain "robust" under the No Action alternative. The high integrity of the geomorphic, hydrologic and biotic conditions that remain after the existing diversions suggest that State assigned water quality (beneficial, designated or classified) uses would continue to be supported (FSH 2509.25 – WCP Handbook – Zero Code, page 15).

Under the No Action alternative, water diverted from Salt Lick Gulch would not be delivered to Dillon Reservoir. Therefore, there would be no effect on the phosphorous concentrations of Dillon Reservoir under State Regulation No. 71.

3.1.5.2 Alternative 2 – Proposed Action

Effects on Stream Flow Hydrology
The historic operation for the Dillon Ditch and ODR would change as a result of the Proposed Action. The Proposed Action considers two operating scenarios. Under "normal operations" the water would be used by the project proponents to directly offset (augment) municipal, domestic, irrigation, and other depletions attributed to various surface and ground water sources of supply. Under this operation, water would be released to either Salt Lick Gulch or to Dillon Reservoir, and would be used directly to augment the proponents' depletions or to allow storage by exchange into alternative storage sites in the upper Blue River basin. The exchanges would only occur during periods when other water rights owners are not affected.

The Proposed Action also includes a defined "emergency operation" under which diversion patterns and amounts are temporarily increased to provide needed supply to the Town of Dillon during periods when it has lost its primary source of supply. The environmental effects of both "normal" and "emergency" operations are outlined below.

Normal Operations: Depending upon the advent of spring runoff, the Dillon Ditch would begin to fill ODR in late April or early May. The ditch would divert at a rate of up to 10.0 cfs subject to a required minimum flow of 0.5 cfs below the diversion point (flow rates above the diversion point at or below 0.5 cfs would result in no diversion by the Dillon Ditch). The water would begin to be used immediately and would be released to augment the domestic and irrigation uses. The water would be released either in Salt Lick Gulch or to Dillon Reservoir depending upon the individual user. As the water is released from storage, it is replaced immediately by new diversion from Salt Lick Gulch. Diversions from Salt Lick Gulch would continue until such time minimum flow levels are reached or water rights have been fully exercised by the proponents. At this time, diversions to ODR would cease. Through this fill and refill process during the summer, the proponents are able to beneficially utilize water beyond the physical capacity of the enlarged reservoir.

As explained above, the operations plan described in the preceding paragraphs describes what is expected as a typical operations scenario for Normal Operations. Due to the hydrology of specific water years, the administration of other water rights in the Upper Colorado River Basin, or specific needs by the proponents in the future, that operations plan may not be followed in practice. The full water rights for storage and exchange of 421.14 AF may not be diverted entirely during the spring runoff period as modeled. In some years it is possible diversions may continue past the

periods modeled (late June in a dry and average year, and early June in a wet year, see Figures 3.2-3.4). Those diversion rates would generally be lower than the 10 cfs modeled due to available stream flow.

All possible operation plans cannot be modeled due to the number of scenarios. To protect the aquatic environment and maintain stream health, the following design criteria have been developed and included in Chapter 2.

- Under Normal Operations, during the spring reservoir fill period of April, May and June a minimum flow of 0.5 cfs would be maintained in Salt Lick Gulch downstream of the diversion.

- Under Normal Operations, if the full water right of 421.14 AF has not been diverted by late June, and diversions continue into the summer and fall; a minimum flow of 1 cfs would be maintained for July, August, September, October and November.

- Under Normal Operations, no diversions would occur in December, January, February and March.

The operations plan estimates annual diversions from Salt Lick Gulch for the proponents' use would be 421.4 AF plus an additional 28.72 AF for net evaporative losses for a total of 450.12 AF. The Town of Dillon would utilize 88.1 AF (20.9 %), the Town of Silverthorne would utilize 22.4 AF (5.3 %), and Summit County would utilize 310.9 AF (73.8 %). Approximately 399.0 AF of the water utilized by the proponents would be released to Denver's Dillon Reservoir, and 22.4 AF would be released back to Salt Lick Gulch. The actual amount of water used by each party and the location of discharge may vary depending upon their level of participation in the project and their individual water needs each year.

Table 3.2 displays the amount and distribution of the proponents' demand. The demand schedule was assumed for this analysis and model, and that demand schedule may vary in practice. The Town of Dillon would utilize its share of project yield to replace municipal year round and summer irrigation depletions accruing to the Blue River. The water would be released from the reservoir to Denver's Dillon Reservoir or on some occasions back to the Blue River via Salt Lick Gulch. The amount and distribution of the Town's demand is shown in Table 3.2.

The Town of Silverthorne would also utilize its share of project yield to replace municipal year round and summer irrigation depletions accruing to the Blue River below Denver's Dillon Reservoir. Because the stream depletions occur below Denver's Dillon Reservoir, the water released from Old Dillon Reservoir would be routed to Salt Lick Gulch. The amount and distribution of the Town's demand is shown in Table 3.2.

Table 3.2 ODR Water Demand Under Normal Operations (AF) Water Released To Salt Lick Or Dillon Reservoir				
Month	Town of Dillon	Town of Silverthorne	Summit County	Total Demand
January	6.6	1.1	10.5	18.3
February	5.8	1.1	10.5	17.5
March	6.6	1.1	10.5	18.3
April	5.1	1.1	10.5	16.8
May	6.9	2.0	68.5	77.3
June	10.4	3.4	81.8	95.6
July	11.7	3.5	33.1	48.3
August	11.3	3.0	28.3	42.5
September	7.9	2.4	23.0	33.4
October	5.2	1.4	13.0	19.5
November	4.6	1.1	10.5	16.3
December	6.0	1.1	10.5	17.7
Total	88.1	22.4	310.9	421.4

Summit County would use its water to serve a variety of domestic and irrigation uses. Releases would be made to Dillon Reservoir year-round, with the maximum demand occurring during the summer irrigation season, or releases could potentially be made to Salt Lick Gulch. Additionally, the County's demand schedule includes 100 AF of releases evenly distributed between May and June. These releases would allow Summit County to divert and simultaneously store water in various upper Blue River basin reservoirs through a water rights exchange. That is, Summit County would release its water from ODR to Dillon Reservoir in amounts necessary to offset the effects of limited upstream storage. The amount and distribution of Summit County's demand that is assumed for this analysis (which may vary in practice) is shown in Table 3.2.

The hydrologic and operations models described earlier indicate that diversions into ODR would generally take place over the period mid-April through mid-June. After this period in most years, the ODR has been filled to capacity and the proponents' 421.4 AF of water rights use has been fully utilized. Water available to the proponents after the mid-June period would originate from storage release in most years. In total, the proponents would divert approximately 450 AF of water from Salt Lick Gulch annually. This includes the 421.4 AF of water right use plus approximately 28.8 AF of evaporation loss from the reservoir surface. Figures 3.2 through 3.4 depict existing and proposed stream flow hydrographs for dry, average, and wet years respectively at a location just downstream from the Dillon Ditch headgate based on the numeric water resource models developed for typical operations. The figures also display the changing reservoir storage content in ODR over the various water years as well as historic and proposed peak flows in Salt Lick Gulch.

The projected total diversion of 450 AF from Salt Lick Gulch under Normal Operations is less than what is currently being diverted from Salt Lick Gulch under existing conditions (No Action Alternative). Approximately 573 AF of water is currently being diverted. Thus, during an average water year 123 AF less water would be diverted at the headgate under the Proposed Action. During wet years, approximately 59 AF less water would be diverted annually. In contrast, the Proposed Action would increase the amount of water diverted at the Dillon Ditch headgate by approximately 226 AF during dry year conditions.

Figure 3.2: Modeled Flow in Salt Lick Gulch Immediately Below Dillon Ditch.
Alternative 2, Normal Operations and 0.5 CFS Minimum Flow Target, During a Dry Year.

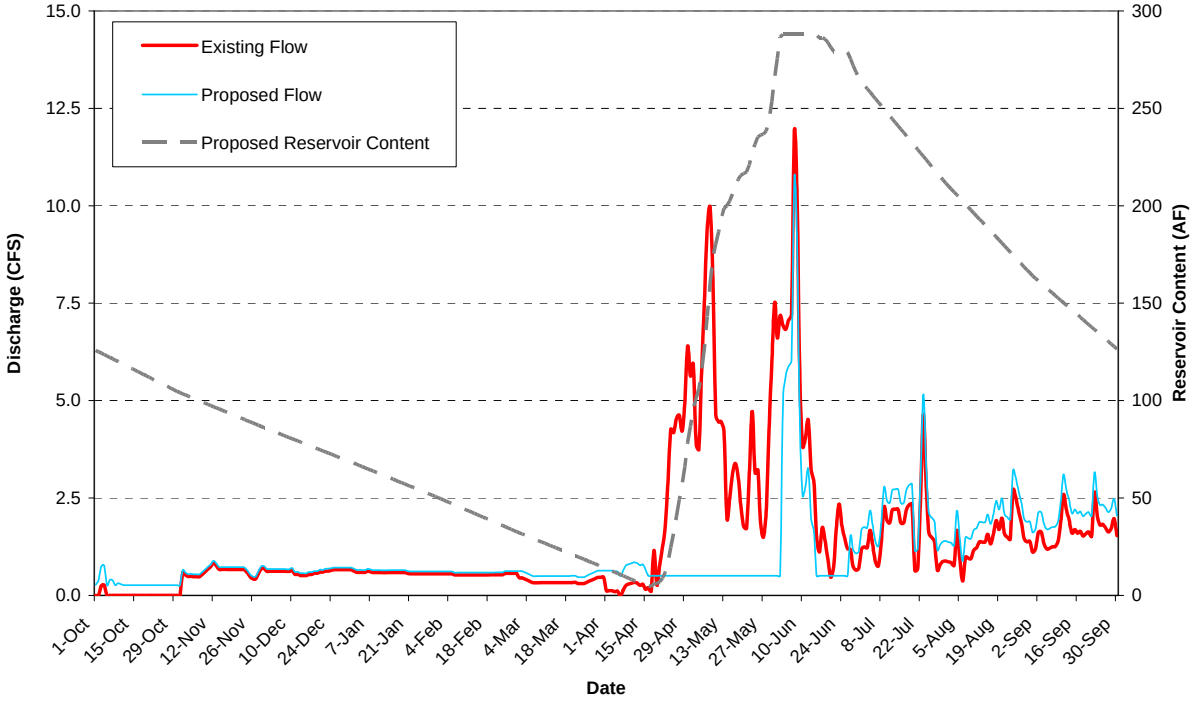


Figure 3.3: Modeled Flow in Salt Lick Gulch Immediately Below Dillon Ditch.
Alternative 2, Normal Operations and 0.5 CFS Minimum Flow Target, During an Average Year.

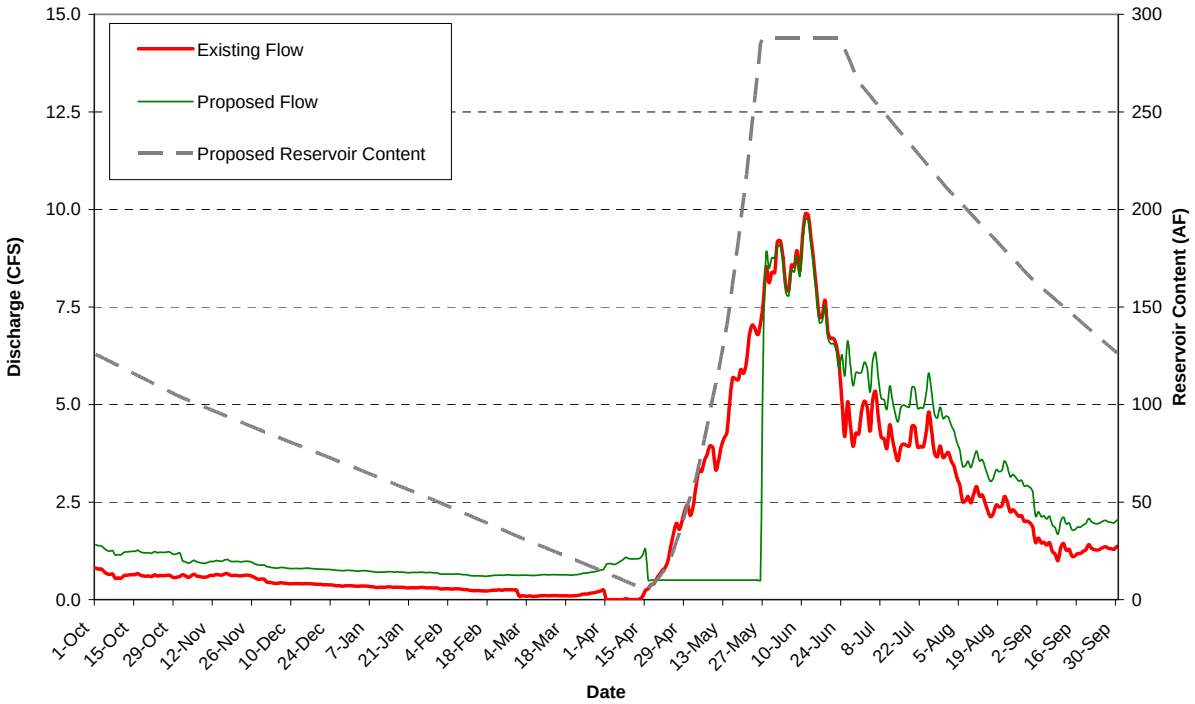
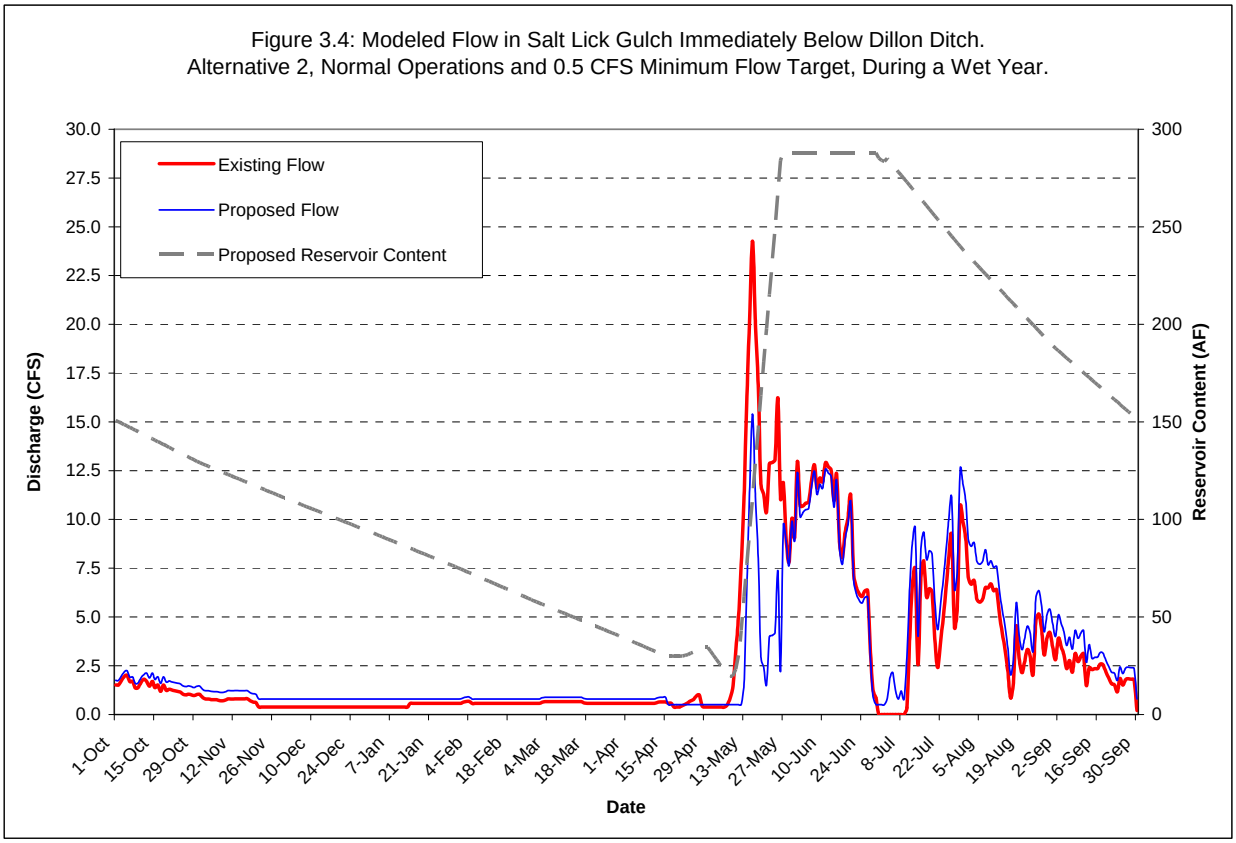


Figure 3.4: Modeled Flow in Salt Lick Gulch Immediately Below Dillon Ditch.
Alternative 2, Normal Operations and 0.5 CFS Minimum Flow Target, During a Wet Year.



The effects of the potential diversions on Salt Lick Gulch stream flow were also assessed at a second, downstream site. Approximately 0.9 miles downstream of the Dillon Ditch the release of water from ODR re-enters Salt Lick Gulch. There is also approximately 0.5 square miles of watershed area below Dillon Ditch that is tributary to this site. However, due to the relatively modest amount of project water returned to Salt Lick Gulch and limited watershed area, the resultant stream flows at the lower site are not substantially higher than that projected for the upstream location below the Dillon Ditch. The plan of operations specifies that 22.4 AF, or about 5%, of the proposed 421.4 AF of annual diversions be returned to Salt Lick Gulch. When distributed over the course of the year, this equates to daily releases of between 0.02 cfs and 0.06 cfs.

Emergency Operations. Under defined "emergency" conditions, the proposed Plan for Operations would change to allow increased diversions to the Town of Dillon. It is considered critical to the Town's long term water security to have additional reliable water supply available for use. The direct diversions to the Town of Dillon would continue until such time that the contamination or degraded watershed condition above the intake has been abated. Water quality monitoring at the Town of Dillon's Straight Creek intake would be used as the indicator for the need to use Salk Lick Gulch as the Town's alternative water supply. The Town of Dillon's water treatment plant is capable of treating water with clarity of 60 nephelometric turbidity units (NTUs) or less. For other contaminants, the state's Safe Drinking Water Standards would be used to determine when the Emergency Operations are required.

During emergency conditions, diversions from Salt Lick Gulch would be made according to the following hierarchy: up to the first 2.0 cfs available in the stream would be diverted by the Town to satisfy its direct water needs. After diversion by the Town, a 0.5 cfs minimum flow would be

required below the Dillon Ditch headgate. Any water available after the fulfillment of the instream flow requirement would be available for storage in ODR.

In order to minimize impacts to aquatic resources in Salt Lick Gulch, the Town of Dillon would implement the following water conservation measures included in design criteria detailed in Chapter 2:

- If direct flow diversions cause Salt Lick Gulch to drop below 1.0 cfs during the months of July through September, the Town of Dillon would implement a water conservation plan designed to effectively reduce its irrigation demand by 30%. This may be achieved, for instance, by applying an even/odd watering schedule, eliminating park and open space irrigation, limiting the number of days that irrigation water can be applied, or other measures as determined by the Town.
- If at any time during the year direct flow diversions under emergency operations cause Salt Lick Gulch to flow below the minimum flow target of 0.5 cfs, the Town of Dillon would reduce its water needs by using a more restrictive conservation plan that reduces irrigation demand to approximately 10% of the normal irrigation requirements. However, the Town may use alternative sources of water supply and water rights as available to supplement its irrigation needs during this period.
- The Town of Dillon would deliver its Old Dillon Reservoir water, previously accrued when water was available for storage, during the winter months to supplement the Town's direct flow demand.

Table 3.3 summarizes the Town's projected diversions from Salt Lick Gulch during emergency conditions. Diversions resulting in Salt Lick Gulch flows less than 0.5 cfs may be necessary for the protection of the health and safety of the Town of Dillon and would only occur when needed and following implementation of conservation measures.

Table 3.3. Estimated Direct Flow Demand of Town of Dillon during an Average Year under Emergency Operations with Water Restrictions and System Improvements in Place

Month	Direct Flow Requirement (cfs) *-Includes irrigation-*	Estimated Direct Flow Diversions (cfs) -Includes Water Conservation Measures-	Estimated Direct Flow Diversions (AF)
Jan	1.12	0.99	43.59
Feb	1.09	0.97	35.03
Mar	1.13	1.00	40.35
Apr	0.90	0.80	47.38
May	1.18	1.04	63.62
Jun	1.83	1.62	96.01
Jul	2.00	1.77	108.35
Aug	1.91	1.69	103.94
Sep	1.40	1.23	72.79
Oct	0.87	0.77	47.30
Nov	0.81	0.71	42.17
Dec	1.02	0.90	48.56
Total			**745.92**

The combination of direct flow diversions and storage into ODR during Emergency Conditions increase the rate and duration of water diverted from Salt Lick Gulch. In general, annual diversion volumes would increase from approximately 450 AF under normal operations to up to approximately 1,200 AF under Emergency Conditions. Under these conditions, the Town's water demand exceeds available stream flow during the December through March period potentially causing limited periods of no stream flow below the Dillon Ditch headgate. Figures 3.2-A through 3.4-A display the projected stream flow in Salt Lick Gulch immediately below the Dillon Ditch headgate during Emergency Operations for a dry, average and wet year respectively. ODR would still be able to fill each year under the emergency operations. Peak flows remaining in Salt Lick Gulch below the headgate in average and wet years remain at 8.0 cfs to 15.0 cfs for limited periods during the height of the runoff. During dry years, peak flows below the Dillon Ditch would approach 2 to 3 cfs for a few days and then generally drop below 1.0 cfs.

Figure 3.2-A: Modeled Flow in Salt Lick Gulch Immediately Below Dillon Ditch.
Alternative 2, Emergency Operations and 0.5 CFS Minimum Flow Target, During a Dry Year.

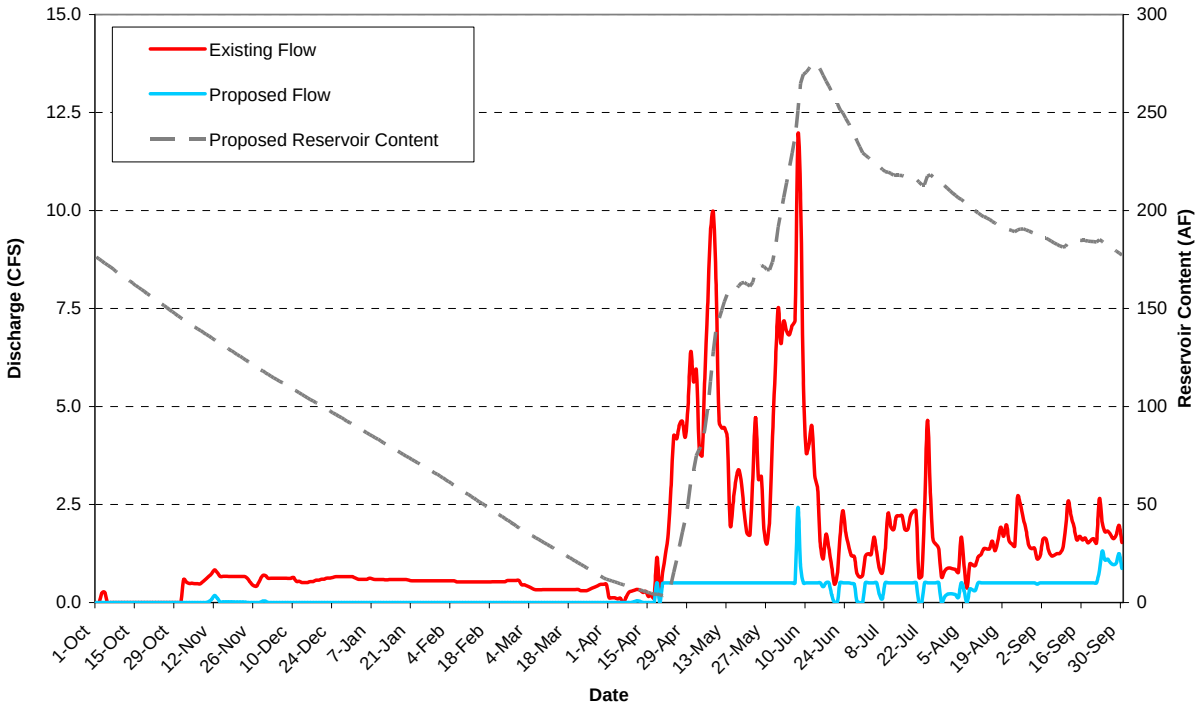


Figure 3.3-A: Modeled Flow in Salt Lick Gulch Immediately Below Dillon Ditch.
Alternative 2, Emergency Operations and 0.5 CFS Minimum Flow Target, During an Average Year.

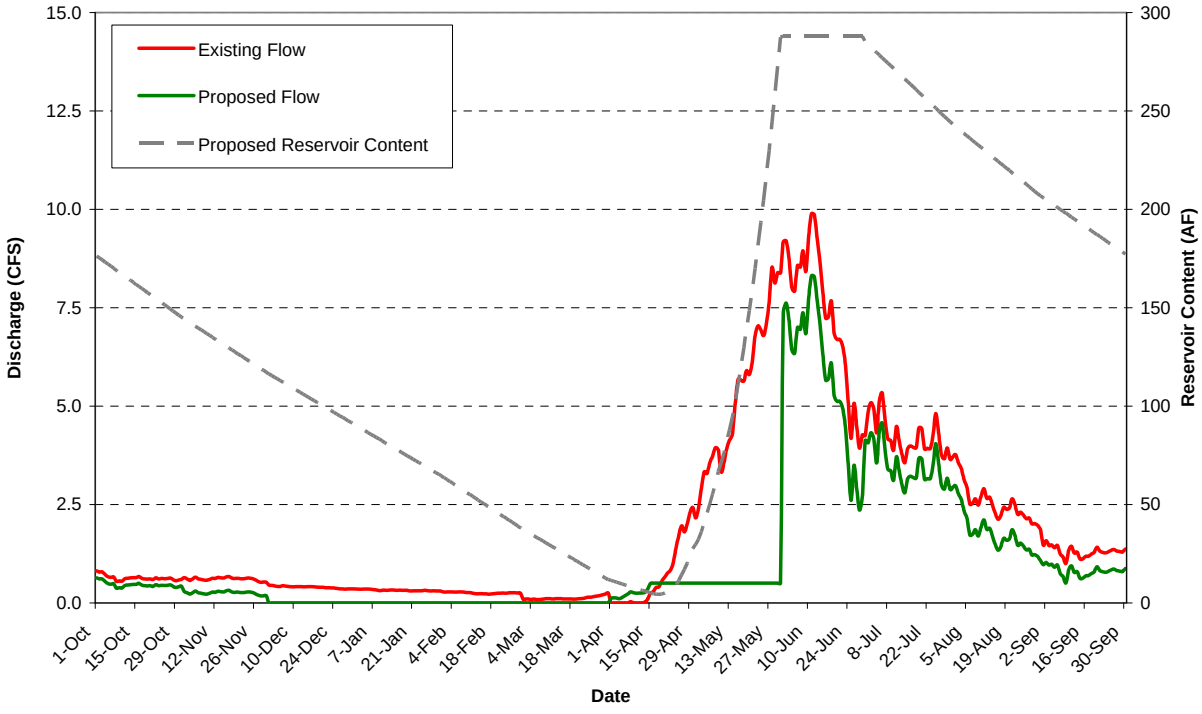
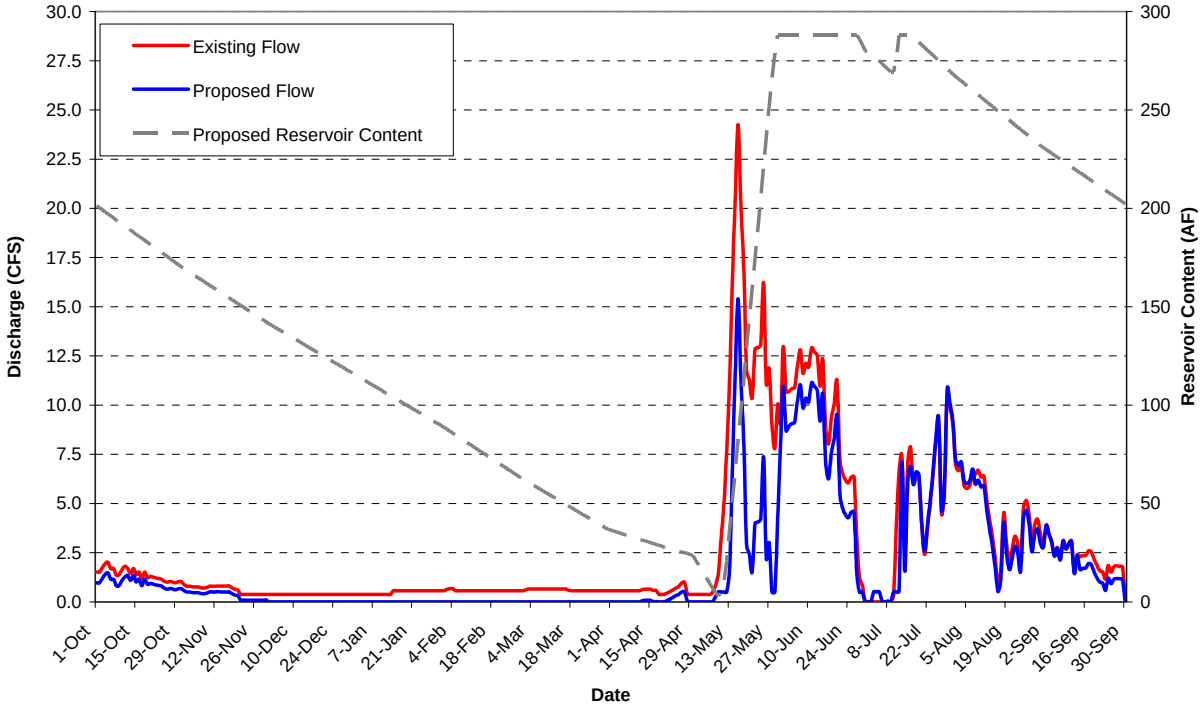


Figure 3.4-A: Modeled Flow in Salt Lick Gulch Immediately Below Dillon Ditch.
Alternative 2, Emergency Operations and 0.5 CFS Minimum Flow Target, During a Wet Year.



Effects on Stream Health

The Forest Service desires to maintain favorable flow conditions on NFS lands and rivers, including those impacted by existing or proposed diversion structures. A stream should retain sufficient flows and associated energy such that it is able to pass sediment load downstream in equilibrium with its watershed. Reduced flow can cause channel degradation which reduces the formation of the adjoining floodplain and adversely effects aquatic species. The concept of maintaining an essential water flow regime has become known as "channel maintenance instream flow."

The annual, long term depletions in Salt Lick Gulch associated with the normal operations Proposed Action are calculated to be 17.7 percent of total flow in wet years, 22.5 percent of total flow in average years, and 36.2 percent of total flow in dry years (Figures 3.2 through 3.4). Moreover, peak stream flows below the diversion structure remain near or above bankfull conditions for extended periods during average and wet years (bankfull = the discharge which just begins to inundate the floodplain). Miller (2008) noted that based upon channel survey information, Salt Lick Gulch bankfull conditions generally occur at a near 10.0 cfs. Bankfull flows are required to maintain channel stability and health.

The conclusion that the Salt Lick Gulch stream channel below the Dillon Ditch headgate would remain in good condition following diversions under the Proposed Action is supported by recent Forest Service studies of stream health completed on Salt Lick Gulch (Laurie, 2007). The WCP Handbook provides direction to Forest Managers concerning management of the Forest's water resources. The WCP Handbook contains measures that strive to maintain or improve the stream health of Forest streams. Stream health is defined as the condition of a stream compared to the

condition of a reference that is pristine or minimally disturbed (WCP Handbook, Chapter Zero Code). Reference streams represent natural conditions that are the most attainable for a given channel type, climate, and geology.

Diversions under the Proposed Action alternative would also not adversely affect the stream health of Salt Lick Gulch. The planned diversions under Normal Operations actually reduce the amount of water diverted at the Dillon Ditch headgate from that which has occurred under historic operations during average and wet years. During average years approximately 123 AF less water would be diverted at the headgate under the Proposed Action. During wet years, approximately 59 AF less water would be taken annually. It is these average and wet years that are important in providing channel maintenance flows and overall stream health; and, the proposed Normal Operations maintains stream flow at historic flows which are at or above bankfull flows from late May through June during an average to wet year.

In summary, the channel characteristics below the diversion structure should not visually change and would remain in good condition. Specifically, the downstream channel should retain its robust stream health and its integrity due to the maintenance of bankfull conditions together with Salt Lick Gulch's steep gradient (6 percent +) and relatively modest annual depletion volumes (17.7 percent to 36.2 percent).

During emergency conditions when the Town of Dillon is diverting up to an additional 2.0 cfs of water for municipal use, the calculated annual depletion would increase and the duration of bankfull conditions decrease, particularly if it occurs during dry to average years. However, these conditions would not be prolonged and would be relatively infrequent. Therefore, diversions under the defined emergency conditions are not considered significant in assessment of long-term channel maintenance flows.

Effects on Water Quality

The discharge of water from Salt Lick Gulch and/or ODR into Dillon Reservoir would increase the amount of phosphorus entering the reservoir's storage pool. Due to the sensitivity of Dillon Reservoir and the requirements of CDPHE Regulation No. 71, both point and nonpoint discharge sources of total phosphorus into Dillon Reservoir are controlled. Accordingly, the Operations Model was designed to estimate the amount of total phosphorus that would be imported to Dillon Reservoir under both normal and emergency conditions.

Of the 450.12 AF of water diverted under normal operations, approximately 399.0 AF would be released into Dillon Reservoir. The following information is derived from three recent water quality samples taken at the outlet of ODR in March, May and June of 2008. Under normal operations, the import of 399 AF into Dillon Reservoir would contain approximately 27.5 pounds of phosphorus. During emergency conditions, the proposed operations have potential to import a total of 69.6 pounds of phosphorus to Dillon Reservoir during average year conditions. However, the analysis indicates that this increased amount of phosphorus under emergency conditions could be reduced by approximately 65 percent if the Town of Dillon's diversions would be conveyed directly to the Town's water plant rather than routed through Dillon Reservoir to the Town's intake. As discussed in Section 3.1.4, CDPHE's Regulation No. 71 would require mitigation of this new phosphorus impact into Dillon Reservoir. Monitoring of the completed project would assist in assessment of actual impacts.

Cumulative Effects

The cumulative effects of past, present and reasonably foreseeable actions combined with the Proposed Action that would divert water from Salt Lick Gulch and/or would affect stream health are disclosed in this section. The Town of Dillon's historic and current operations of Old Dillon Reservoir comprise a past and present action. The projected diversions and water use described under the Proposed Action for the ODR enlargement (450.12 AF) would replace the historic and ongoing diversions by the Town of Dillon. The cumulative effects on Salt Lick Gulch stream flows are described at two locations; at a point immediately below the Dillon Ditch headgate and at a point immediately below the Old Dillon Reservoir Return Ditch.

Table 3.4 displays the cumulative impact on both historic diversions (No Action alternative) and proposed diversions (Proposed Action) at a location immediately below the Dillon Ditch headgate. The cumulative effects are best described under the parameter row entitled "Total Annual Stream flow Volume (AF)." The table compares the resultant stream flows to the "native" flows estimated to have occurred in the basin without construction of the Dillon Ditch headgate and ODR. During average water years, the Town of Dillon's historic diversions have reduced Salt Lick Gulch's native stream flows from an annual yield of approximately 2,000 AF down to 1,427 AF. This historic impact describes the existing condition. Under the Proposed Action alternative, the resultant stream flows at this location would slightly increase from 1,427 AF to approximately 1,550 AF, a gain of 123 AF per year. A similar modest increase in stream flow below the Dillon Ditch headgate is projected to occur in wet years. In contrast, the Proposed Action would decrease stream flows below the Dillon Ditch headgate during dry years. The dry year native flows at this site have been historically reduced from 1,243 AF to 1,019 AF under existing operations. Under the Proposed Action alternative, the flows would be reduced further, to approximately 793 AF.

Table 3.5 displays the cumulative effects of the historic and proposed diversions on Salt Lick Gulch at a location immediately below the ODR return ditch, 0.9 miles downstream of the Dillon Ditch headgate. Under historic operations (No Action alternative), stream flows at this location have been slightly higher than what was in Salt Lick Gulch under native conditions. The slight increase is attributed to the increased watershed area above ODR and Dillon Ditch that was historically routed through the ODR return ditch. For instance, during average water years, stream flows increased from 2,089 AF per year to 2,137 AF (Table 3.5). With the proposed change in reservoir operations as described under the Proposed Action, the stream flows in Salt Lick Gulch below the return ditch would decrease in average, wet and dry years. The cumulative effects during each year type are shown in Table 3.5. In average water years, stream flows would decrease from 2,137 AF under historic operations to 1,736 AF under the Proposed Action. Similar comparisons can be found in Table 3.5 for dry and wet years.

Considering stream health, the past impacts in Salt Lick Gulch include degradation of the landscape that affects stream health through sedimentation, channel stability and increased runoff include hydraulic mining in the lower watershed, residential development and attendant infrastructure, the development of I-70 on the southern slope of the watershed, and extensive physical alterations (long culverts and fill) of the channel for both I-70 and the commercial development in Silverthorne. The hydraulic mining denuded the slopes of vegetation south of the channel in the project area and the effects of these activities conducted in the late 1800s and early 1900s are visible today.

Today, Salt Lick Gulch exhibits robust stream health which may be due to a number of factors including the nature of the wetlands system that surrounds the channel; a groundwater driven system that is mostly independent of stream discharge, and which remains stable over time despite radical changes in the watershed. Large groundwater driven wetlands (slope wetlands) exist in the middle sections of the watershed and buffer the stream from the effects of residential development and roads in upper Ryan Gulch. The robust stream health condition in the lower watershed despite the modifications to that landscape could also be attributed to the fact that the upper watershed is a wilderness area: an ecosystem free of anthropogenic modifications; due to the fact the stream system has recovered from the historic hydraulic mining activities.

The Proposed Action would not degrade stream health to lower the robust classification due to the fact that channel maintenance flows would remain during average and wet year flows. Thus, there would be no cumulative effects of the Proposed Action related to past actions.

There are not any reasonably foreseeable future actions that would affect stream health through increased diversions of water in Salt Lick Gulch. The DRFHF project is a present and future action that could affect stream health through the removal of the majority of the lodgepole pine stands in portions of the lower watershed (Laurie 2007). There is an expected increase in the magnitude of peak stream flow rates in the watershed due to the DRFHF project, as there would have been for the No Action alternative to that action due to the fact that 95% of the lodgepole pine would die in the next few years from the mountain pine beetle epidemic (Laurie 2007). The DRFHF project does not extend into the Eagles Nest Wilderness Area, and the beetle epidemic has, and would continue to, kill trees in the middle parts of the watershed within the wilderness area where lodgepole pine stands are present. Substantial increases in the magnitude of peak stream flow rates can degrade stream health by causing channel bed scour and/or stream bank erosion. The large wetland systems would help ameliorate the effect of increased runoff to some degree by detaining and storing overland flow for a delayed release to the stream.

Table 3.4: Model Results, Salt Lick Gulch Immediately Below Dillon Ditch Headgate, Normal Operations (0.5 cfs Minimum Flow)

Parameter	Scenario								
	Dry			Average			Wet		
	Native Salt Lick Gulch Flows	Historic Salt Lick Gulch Flows	Salt Lick Gulch Flows Under the Proposed Action	Native Salt Lick Gulch Flows	Historic Salt Lick Gulch Flows	Salt Lick Gulch Flows Under the Proposed Action	Native Salt Lick Gulch Flows	Historic Salt Lick Gulch Flows	Salt Lick Gulch Flows Under the Proposed Action
Peak Streamflow (cfs)	12.42	11.91	10.73	11.44	9.89	9.75	25.40	24.26	15.40
Total Annual Streamflow Volume (AF)	1243.47	1019.22	793.26	2000.66	1427.84	1550.45	2540.72	2031.52	2090.51
Oct. Average Streamflow (cfs)	0.31	0.02	0.31	1.23	0.63	1.23	1.75	1.39	1.75
Nov. Average Streamflow (cfs)	0.67	0.61	0.67	0.97	0.61	0.97	1.05	0.63	1.05
Dec. Average Streamflow (cfs)	0.66	0.60	0.66	0.79	0.40	0.79	0.80	0.38	0.80
Jan. Average Streamflow (cfs)	0.64	0.58	0.64	0.71	0.32	0.71	0.80	0.49	0.80
Feb. Average Streamflow (cfs)	0.60	0.54	0.60	0.63	0.25	0.63	0.80	0.57	0.80
Mar. Average Streamflow (cfs)	0.53	0.36	0.53	0.66	0.12	0.66	0.84	0.61	0.84
Apr. Average Streamflow (cfs)	1.99	1.48	0.60	1.65	0.63	0.76	0.89	0.58	0.66
May. Average Streamflow (cfs)	4.86	4.35	0.50	6.97	5.29	1.76	9.77	8.96	4.33
Jun. Average Streamflow (cfs)	4.05	3.59	2.37	8.84	7.29	7.53	10.31	8.98	8.66
Jul. Average Streamflow (cfs)	2.18	1.67	2.18	5.22	4.23	5.22	6.07	4.28	5.99
Aug. Average Streamflow (cfs)	1.93	1.42	1.93	3.43	2.53	3.43	5.79	4.43	5.79
Sep. Average Streamflow (cfs)	2.19	1.68	2.19	1.98	1.31	1.98	3.10	2.25	3.10

Table 3.5: Model Results, Salt Lick Gulch Immediately Below Old Dillon Reservoir Return Ditch, Normal Operations (0.5 cfs Minimum Flow)

Parameter	Scenario								
	Dry			Average			Wet		
	Native Salt Lick Gulch Flows	Historic Salt Lick Gulch Flows	Salt Lick Gulch Flows Under the Proposed Action	Native Salt Lick Gulch Flows	Historic Salt Lick Gulch Flows	Salt Lick Gulch Flows Under the Proposed Action	Native Salt Lick Gulch Flows	Historic Salt Lick Gulch Flows	Salt Lick Gulch Flows Under the Proposed Action
Peak Streamflow (CFS)	12.99	12.83	10.83	11.99	11.46	9.90	32.36	31.64	21.72
Total Annual Streamflow Volume (AF)	1343.39	1397.21	984.95	2088.85	2137.06	1736.49	2637.02	2781.88	2356.78
Oct. Average Streamflow (cfs)	0.32	0.52	0.38	1.40	1.33	1.41	2.05	1.99	2.06
Nov. Average Streamflow (cfs)	0.78	0.76	0.80	1.14	1.11	1.15	1.22	1.19	1.24
Dec. Average Streamflow (cfs)	0.82	0.83	0.85	0.94	0.94	0.96	0.94	0.94	0.96
Jan. Average Streamflow (cfs)	0.81	0.82	0.84	0.85	0.86	0.88	0.94	0.94	0.96
Feb. Average Streamflow (cfs)	0.75	0.76	0.78	0.76	0.76	0.78	0.95	0.95	0.97
Mar. Average Streamflow (cfs)	0.65	0.66	0.67	0.78	0.78	0.80	1.01	1.01	1.03
Apr. Average Streamflow (cfs)	2.08	2.28	0.94	1.86	1.95	1.09	1.06	1.03	0.85
May. Average Streamflow (cfs)	5.67	5.67	1.39	7.72	7.82	2.69	10.80	11.16	5.80
Jun. Average Streamflow (cfs)	3.58	4.02	2.48	8.55	8.93	7.76	10.04	10.83	9.31
Jul. Average Streamflow (cfs)	2.07	2.22	2.37	4.62	5.23	5.38	5.03	6.57	6.22
Aug. Average Streamflow (cfs)	2.09	2.01	2.14	3.72	3.52	3.65	6.09	6.09	6.22
Sep. Average Streamflow (cfs)	2.63	2.60	2.71	2.22	2.10	2.21	3.44	3.24	3.35

3.1.6 Monitoring Recommendations

1. An on-the-ground monitoring of reconstruction activities related to the Dillon Ditch headgate and canal pipeline by an interdisciplinary team is recommended. The team would assess the implementation and effectiveness of the design criteria.
2. Monitor the water quality of Salt Lick Gulch above and below the reconstruction activities on a weekly basis. The purpose of the monitoring would be to quantify the effectiveness of the design criteria. Parameters to monitor include: pH, conductivity, and turbidity.
3. Interdisciplinary Team, or a selected Team member, would review the temporary stream crossing to check stability and grade of crossing, capacity of temporary structure, sediment deposits in the streambed, and ability of aquatic biota to pass the structure.
4. Install measuring devices in the Dillon Ditch and/or the headgate structure to accurately measure the amount of water diverted to ODR and the amount of water in Salt Lick Gulch.
5. Visually inspect the integrity of the diversion and conveyance system at least weekly during operation to insure that no break or ditch failure have occurred.
6. Town of Dillon to monitor the turbidity and other contaminants of its Straight Creek water supply for the purpose of defining "emergency conditions." Emergency conditions exist if there is insufficient water available in Straight Creek of adequate quality to meet Town of Dillon demands.

3.1.7 Irreversible and Irretrievable Commitment of Resources

Irreversible commitments of resources represent permanent or essentially permanent resource use or losses; they cannot be reversed, except in the extreme long term. Irretrievable commitments are losses of production or use for a period of time.

In this instance, there are no irreversible commitments of the water resources. If necessary, diversions could cease and the existing flows left in Salt Lick Gulch. The Proposed Action, however, represents an irretrievable commitment of resources due to the ultimate dependence on the water use by the project proponents. Alternate sources of physical and legal water supply in this area are limited and would take extremely long periods to develop. A swift reversal of approvals under the Proposed Action could jeopardize the health and welfare of the participating governments. Therefore, if approved, the Proposed Action would take considerable time to reverse and for this reason is considered irretrievable.

3.1.9 Forest Plan Consistency

Both alternatives would maintain robust stream health in Salt Lick Gulch below the Dillon Ditch headgate and therefore are consistent with Forest Plan standards for water and aquatic species. Consistency with Forest Service WCP Handbook standards for sediment control,

and riparian conditions, and water purity would be attained through the use of design criteria and adherence to best management practices.

3.2 WETLANDS

3.2.1 Issues and Indicators

This section uses acres of wetlands impacted as an indicator for the amount of impact and compensatory mitigation required.

The Colorado Division of Wildlife commented on the littoral zone in the existing reservoir and the beaver pond complex in Salt Lick Gulch, which provide habitat for a variety of aquatic species. These issues are discussed briefly here and in more detail in the technical report.

3.2.2 Forest Plan Direction

Forest Plan Standards related to wetlands are found in the Forest Service Handbook, Rocky Mountain Region, FSH 2509.15 (Watershed Conservation Practices Handbook). Management measures (analogous to standards) related to wetlands include:

MM 3 In the water influence zone next to perennial and intermittent streams, lakes, and wetlands, allow only those actions that maintain or improve long-term stream health and riparian ecosystem condition.

MM 6 Maintain long-term ground-cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological function.

MM 7 Manage stream flows under appropriate authorities to minimize damage to scenic and aesthetic values, fish and wildlife habitat, and to otherwise protect the environment.

MM 10 Construct roads and other disturbed sites to minimize sediment discharge into streams, lakes, and wetlands.

MM 12. Reclaim roads and other disturbed sites when use ends, as needed, to prevent resource damage.

MM 15. Place new sources of chemical and pathogenic pollutants where such pollutants will not reach surface or ground water.

MM 16 Apply runoff controls to disconnect pollutant sources from surface and ground water.

MM 17. Apply chemicals using methods that minimize risk of entry to surface and ground water.

No specific direction for water/riparian resources is included in MA 8.21, Developed Recreation Complexes.

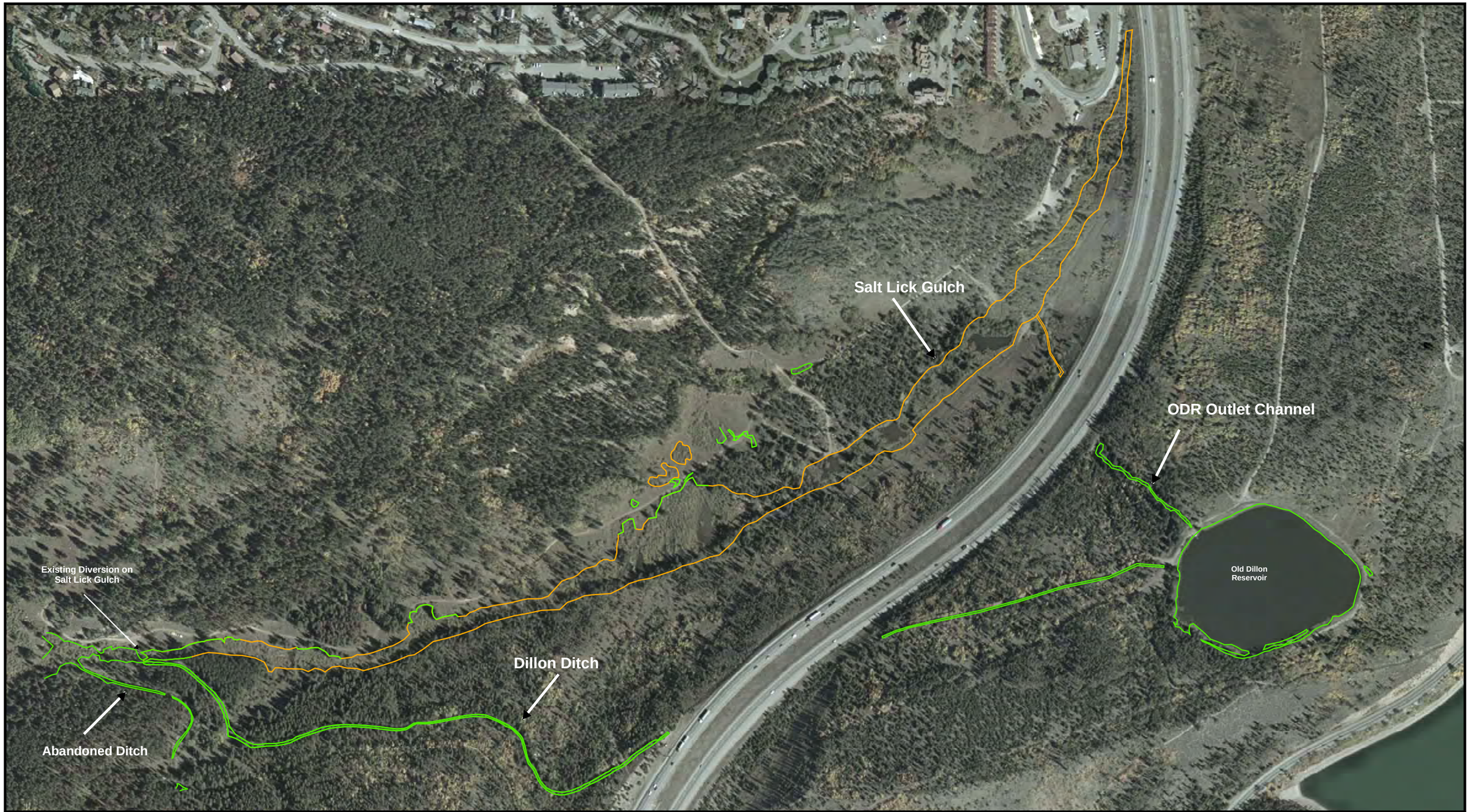
3.2.3 Geographic and Temporal Scope

Claffey Ecological Consulting, Inc (CEC) evaluated the wetlands at the project site and within the project area in 2006, 2007, and 2008. This work included delineation of all wetlands potentially directly affected by the project in 2007 using the US Army Corps of Engineers 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Wetlands were flagged in the field and surveyed with GPS: at the reservoir, along the Dillon Ditch, at the outlet channel, adjacent to Salt Lick Gulch at the diversion site.

In 2008, CEC delineated wetlands within 50 feet of the temporary access road along Salt Lick Gulch using the Corps of Engineers Interim Supplement to the 1987 Manual for Western Mountains, Valleys, and Coast Region (Corps 2008). Wetlands delineated in the project area are shown in Figure 3.5.

3.2.4 Affected Environment

Old Dillon Reservoir sits on a saddle on a glacial moraine ridge that trends east-west. The southern slope of this ridge is a steep gradient falling towards Dillon Reservoir, and the northern slope is more gradual towards I-70. The ridge, locally known as Lake Hill, is developed with a network of trails, access roads, power and communication lines, and cellular towers. Salt Lick Gulch generally has an eastern aspect. The project area has been divided into several smaller areas for descriptions of the affected environment for riparian areas and wetlands.



N

Old Dillon Reservoir

Riparian and Wetland Resources

April 2009

400 200 0 400 Feet

1 Inch = 400 Feet

Datum: NAD_1983_StatePlane_Colorado_Central_FIPS_0502_Feet
Source: Summit County 2004 Orthophoto

GIS Prepared by S. Claffey

Claffey Ecological Consulting, Inc.

Legend

- Wetlands Flagged and Surveyed
- Wetlands Aerial Delineation

Figure 3.5

Old Dillon Reservoir

Wetlands affected by the project consist of lacustrine (Brinson et al 1995, Hauer et al 2002) emergent and scrub/shrub wetlands associated with the current reservoir shoreline and forested lacustrine wetlands adjacent to a remnant ditch along the southwestern shoreline. All of these classify as artificial lacustrine wetlands due to the genesis of the water body, but nevertheless perform wetland functions at a moderate to high function. These lacustrine wetlands exist as fringes around the shoreline in some locations only 2-3 feet wide to bands 8 to 10 feet wide in other locations, with one location in the northwest corner that is approximately 40 feet wide. The lacustrine wetland functions performed include nutrient and pollutant removal, aquatic food chain support, and wildlife habitat (SAIC 2003). The wetlands also provide refuge habitat for forage fish in the reservoir.

The plant communities of the lacustrine fringe are dominated by beaked sedge (*Carex utriculata*), which exists in dense stands along much of the shoreline. Mixed with the beaked sedge are other gramminoid such tall manna grass (*Glyceria grandis*), tufted hairgrass (*Deschampsia cespitosa*), Canada reedgrass (*Calamagrostis canadensis*), water sedge (*Carex aquatilis*), and Merten's rush (*Juncus mertensianus*). Shrubs found within the lacustrine fringe were primarily willow with some alder (*Alnus tenuifolia*), shrubby cinquefoil (*Pentafloides floribunda*) and saplings of narrowleaf cottonwood (*Populus angustifolia*). The trees within the forested sections were primarily cottonwood and Engelmann spruce (*Picea engelmanni*). Also present within the reservoir at depths of several feet was a floating aquatic species, pondweed (*Potamogeton spp.*).

Dillon Ditch

The Dillon Ditch, which delivers Salt Lick Gulch water to the reservoir, contains wetlands in the subclass of artificial riverine. Plant communities along the Dillon Ditch vary by location but include many of the species referenced above. From Salt Lick Gulch to I-70, the ditch flows across a steep forested slope; velocity and cross-section of the ditch varies based on the gradient of the slope. In some sections where the slope and construction methods allowed, wider sections exist with lower velocities. In these locations, the wetland fringe is 10-15 feet wide and dominated by beaked sedge. In others, the wetland fringe is only 1-2 feet wide on either side of the channel and is dominated by Canada reedgrass and Geyer's willow.

The wetlands along the Dillon Ditch from I-70 south to the reservoir are a narrow fringe along a fairly steep gradient channel. Water sedge, Canada reedgrass, and Geyer's willow are the dominant plant species. Approximately 0.58 acre of wetlands is present within the Dillon Ditch.

Wetlands adjacent to the Dillon Ditch perform nutrient and pollutant removal functions in the wider depositional areas discussed above. These wetlands also perform bank stabilization functions which along a ditch help prevent excess sediment delivery to the reservoir. The riverine wetlands also provide aquatic food chain support for the reservoir.

Outlet to Salt Lick Gulch

The outlet channel that returns flow to Salt Lick Gulch is a steep gradient, incised channel. The channel gradient would indicate a Rosgen A channel (A3), but the channel incision is unusual, forming almost an arroyo-like system. It appears both the active channel and the

parallel outlet channel (no flow or wetland communities) formed during a major dam failure sometime during the last century. The channel invert is as much as 15-20 feet below the surrounding terrain, and there is no evidence of heavy equipment excavation such as side cast berms except in the upper reaches of the outlet near the reservoir. The wetland community along the outlet channel is a narrow fringe of Canada reedgrass, cow parsnip (*Heracleum lanatum*), monkshood (*Aconitum columbianum*), mountain willow, alder, and Engelmann spruce. The outlet channel north of I-70 is within an excavated channel. Side-cast material is evident on both sides of the channel with dense cover of narrow-leaf cottonwoods. Where the outlet channel approaches within 200 feet of Salt Lick Gulch, it is no longer in the incised condition and braids into several smaller channels before reaching a beaver pond in Salt Lick Gulch.

Wetlands adjacent to the outlet channel would provide nutrient and pollutant removal to a lower degree due to the steep gradient. These wetlands would also perform stream bank stabilization and aquatic food chain support to a moderate degree.

Two events occurred that affected the project area in 2008. First, during runoff, the culvert that returns flow from Old Dillon Reservoir outlet channel under I-70 failed under the westbound lanes. A portion of the highway collapsed, and the Town of Dillon ceased diversions from Salt Lick Gulch. Second, on July 17, 2008, the Town of Dillon received an order from the Colorado Division of Water Resources to drain the reservoir. The state's concerns related to the north dam and noncompliance with current safety regulations. Diversions ceased and the Town drained the reservoir shortly after receiving the letter. The lacustrine wetlands relied entirely on the reservoir water level, thus impacts from dewatering occurred in the summer of 2008. The artificial riverine wetlands along the Dillon Ditch were also dewatered. These events allowed for observations of natural un-diverted hydrology in Salt Lick Gulch for much of the season in 2008.

Salt Lick Gulch

Wetlands adjacent to Salt Lick Gulch at the diversion points, downstream, and upstream of the diversion points are a mixture of both riverine and slope wetlands under the HGM classification system (Brinson 1995, Hauer 2002). The slope wetland classification is the more dominant wetland type. Johnson (2001) described reference conditions for slope wetlands in the southern Rocky Mountains. Laurie (2007) assessed Salt Lick Gulch below the diversion and classified the stream as Robust Stream Health.

Although Salt Lick is a stream channel, the majority of the wetland system is a slope wetland supported primarily by groundwater, not overbank flows or stream discharge typical of riverine wetlands. Hauer (2002) describes this typical situation where riverine wetlands interface with slope wetlands. We observed soils saturation in these wetlands in late summer of 2007 when the majority of the stream flow was being diverted to the reservoir, and the channel invert was 6 to 7 feet below that soil sample. This situation exists throughout the wetland downstream of the diversion. Groundwater input is fairly continuous along the toe of slope but more concentrated in seeps and springs.

Wetland plant communities in the Salt Lick Gulch wetlands included beaked sedge, water sedge, tufted hairgrass, Swordleaf rush (*Juncus ensifolius*), spikerush (*Eleocharis palustris*), Canada reedgrass, monkshood, tall mannagrass, cowparsnip, large leaf avens (*Geum macrophyllum*),

fowl bluegrass (*Poa palustris*), elephant head lousewort (*Pedicularis groenlandica*), willowherb (*Epilobium angustifolium*), wood rush (*Luzula parviflora*), saxifrage (*Saxifraga sp.*), and marsh marigold (*Caltha leptosepala*). This is not an all inclusive species list. The shrub component included Geyer willow, Drummond willow, mountain willow and planeleaf willow (*Salix planifolia*). Other shrubs included alder, shrubby cinquefoil (*Pentaphylloides floribunda*), and twinberry (*Lonicera involucrata*). Along the edge of the wetland Engelmann spruce, subalpine fir and occasionally lodgepole pine trees were within the wetland boundary. Reed canary grass (*Phalaris arundinacea*), which is a non-native aggressive invasive species, is also present in the system near the road/trail. The Salt Lick Gulch wetland downstream of the diversion to I-70 is approximately 15 acres. One of the prominent features of the Salt Lick Gulch wetland system is the large beaver dams on the channel.

The wetland system in Salt Lick Gulch south of I-70 is different than described above. The channel is in a more incised valley and beaver dams cross the entire valley bottom with large open water areas of beaver ponds. Wetland plant communities persist at the upper end of the ponds and in short sections between ponds.

The wetland system within Salt Lick Gulch performs the entire suite of wetland functions. Functions performed include nutrient and pollutant removal, aquatic food chain support, flood-flow attenuation, dynamic water storage, streambank stabilization, and wildlife habitat both terrestrial and aquatic. Functions would be performed at a high rate. The wildlife habitat function is reduced somewhat by the proximity of I-70 and development in the lower sections of the wetland.

Soils in the lacustrine wetlands around the reservoir were silty clay loams and were saturated to the surface during the spring and early summer. Hydrology for these wetlands was entirely from the reservoir water surface elevations. Soils in the wetlands adjacent to the Dillon Ditch were gravely loams and sandy loams. Soils in the wetlands adjacent to the outlet channel were mostly non-existent as the wetland vegetation persisted within a large cobble and small boulder environment adjacent to the channel. The soils in the Salt Lick Gulch wetland between the diversion and I-70 were silty clay loams with high organic content in the upper horizons. We did not find fens with histosols (16 inches of organic soil in the upper horizons) (Forest Service 1998); however, we found areas of wetlands with a histic epipedon (8-16 inch layer of organic soil in the upper horizon) (NRCS 1996). These histic epipedons occurred at the toe of slope in the upper part (eastern) of the Salt Lick Gulch wetland system at localized areas at springs and seeps.

3.2.5 Environmental Effects by Alternative

3.2.5.1 Alternative 1 – No Action

Under the No Action alternative, the proposed enlargement would not occur. The Town of Dillon would rebuild the north dam according to the state of Colorado requirements. Diversions from Salt Lick Gulch would be continued at historic rates, and the reservoir levels would be maintained.

Direct and indirect effects

Under the No Action alternative, the direct impacts to wetland resources would not occur. It is likely that a minor impact to the outlet channel and its adjacent wetlands would be required by the reconstruction of the north dam.

The lacustrine wetlands at the reservoir and the wetlands within the Dillon Ditch would be dewatered from mid 2008 through 2009. Above ground plant material would die off, but the fine textured soils (silty clay loams) in the lacustrine wetland would maintain some viability of the sedge root systems due to moisture retention from snowmelt and summer precipitation. In addition, a viable seed source would remain. The lacustrine wetlands would likely regenerate fairly quickly when the reservoir refills. The wetlands within the Dillon Ditch contain coarse textured soil (gravely loam). The substrate is small cobble in many locations. The root systems would likely desiccate due to the lack of flow in the ditch, and regeneration of the wetlands in the Dillon Ditch would rely on the seed bank in the substrate and delivery of seed from ditch water. Regeneration would require more time.

3.2.5.2 Alternative 2 – Proposed Action

The proposed enlargement would directly impact 1.21 acres of wetlands from reservoir expansion, dam construction, piping the Dillon Ditch, construction of a new diversion structure, and the construction access road. The project also indirectly affects 0.16 acre of the wetlands adjacent to the outlet channel due to a reduction in flows. The total wetland impact for the project is 1.37 acres. Table 3.6 depicts the wetland impacts by feature and wetland type. Figure 3.6 depicts wetland impacts from the project at Old Dillon Reservoir, south of I-70. Figure 3.7 depicts wetland impacts north of I-70.

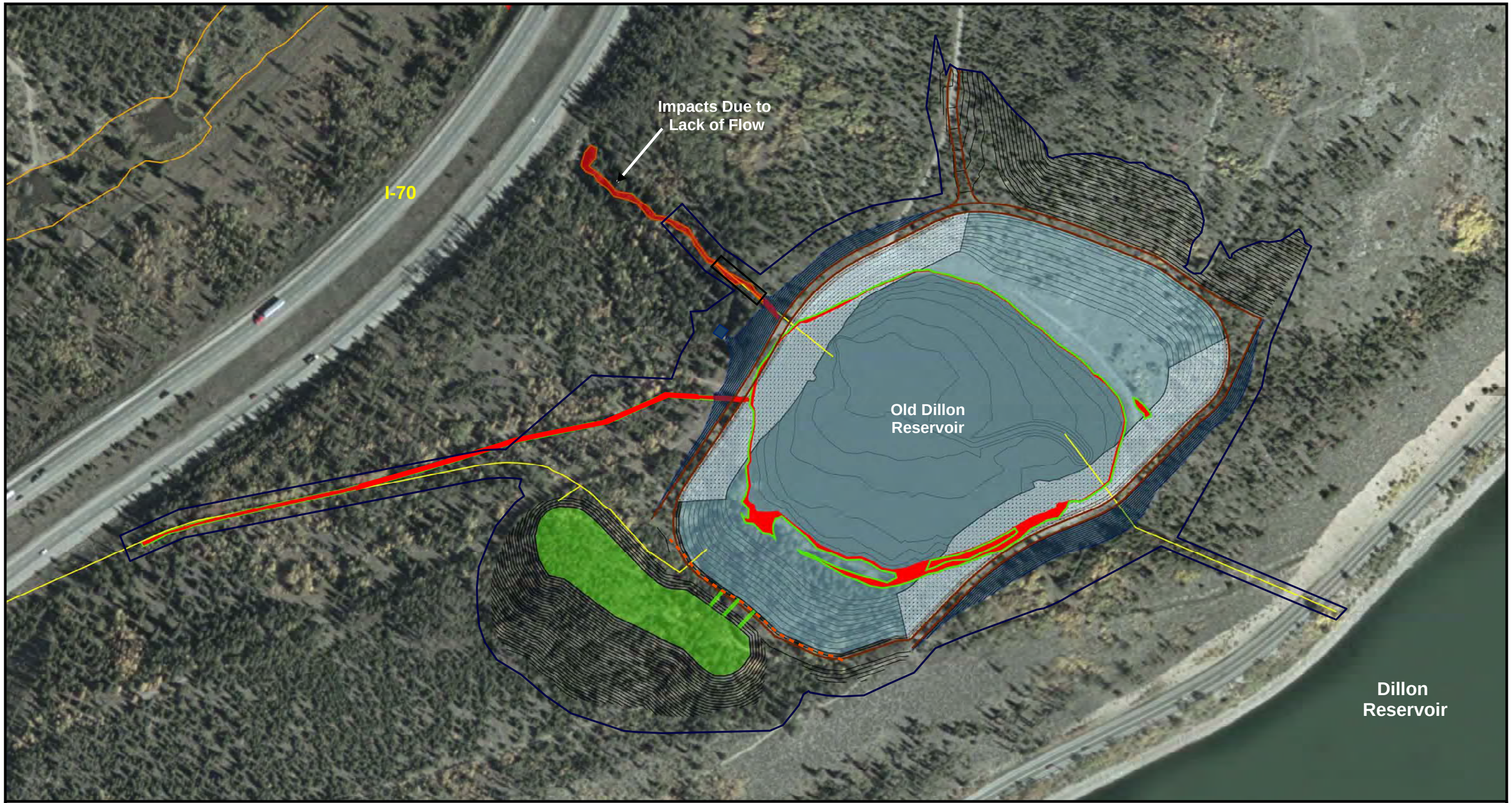
Table 3.6 Wetland Impacts (acres) from the ODR Enlargement Project

Impact type/ Wetland type	Dam	Reservoir Expansion	Dillon Ditch to pipeline	Diversion Structure	Temp. Impacts At Diversion	Construction Access
Dillon Ditch South	0.02		0.08			
Dillon Ditch North			0.46			
Outlet Channel	0.03					
Lacustrine wetlands at ODR		0.43				
Riverine/ slope wetlands Salt Lick Gulch				0.18	0.05	0.01
Permanent Impact by Impact	0.05	0.43	0.54	0.18		0.01
Total Direct Permanent Impact	**1.21**					

Direct effects

Reservoir Enlargement

The reservoir expansion would affect the 0.43 acre of lacustrine wetlands at the existing reservoir. The wetlands would be inundated by the proposed reservoir. This is an unavoidable impact for the action alternative. Due to their location on the existing shoreline, any reservoir enlargement would inundate these wetlands.



N

Old Dillon Reservoir

Wetland Impacts East of I-70

May 2009

200 100 0 200 Feet

1 Inch = 200 Feet

Datum: NAD_1983_StatePlane_Colorado_Central_FIPS_0502_Feet

Source: Summit County 2004 Orthophoto

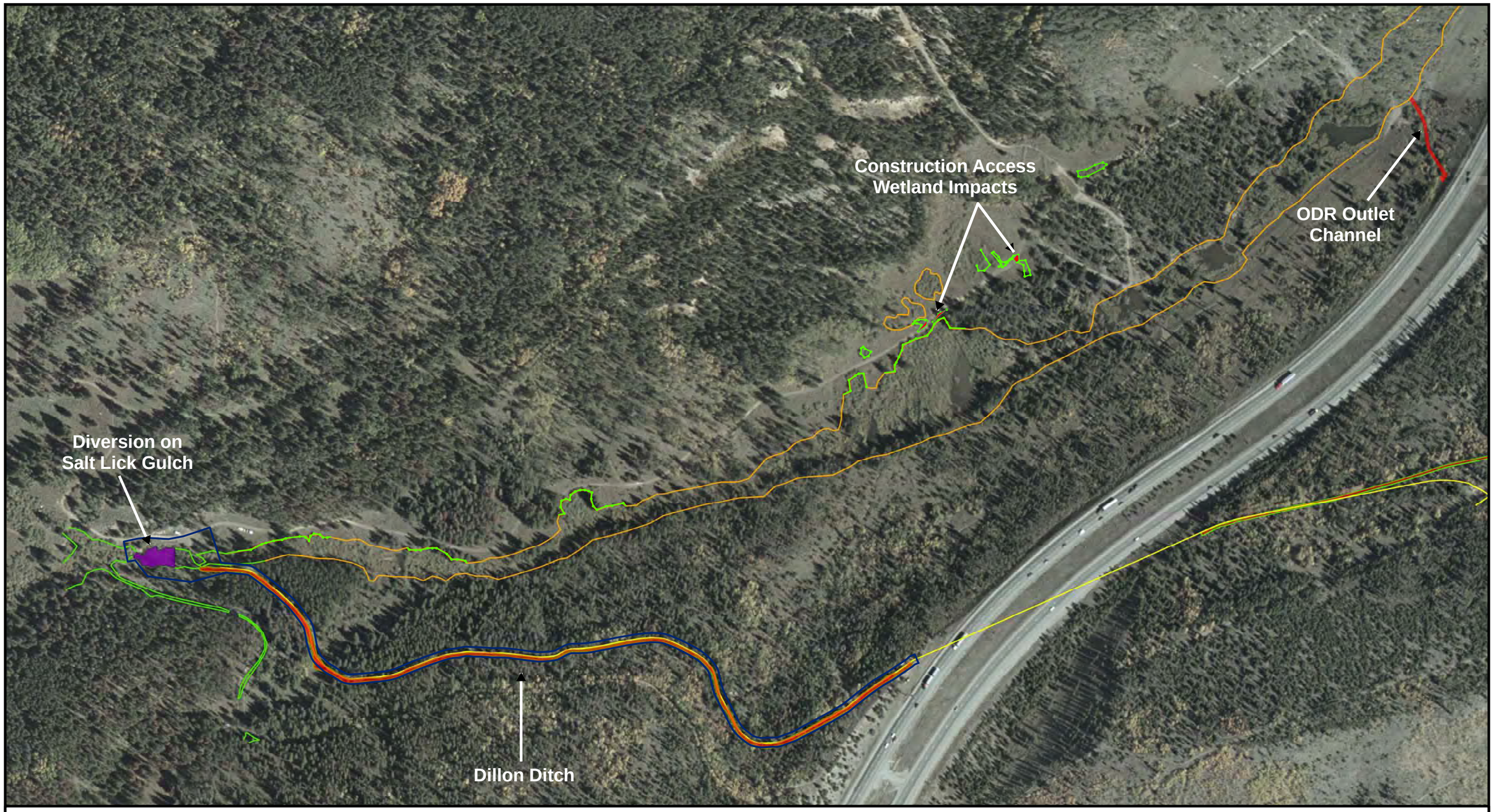
GIS Prepared by S. Claffey

Claffey Ecological Consulting, Inc.

Legend

- Disturbance-Boundary
- Wetland Boundaries
- Wetland Mitigation
- Wetland Trail
- Wetland Impacts
- North and South Dams
- Dam Road
- Outlet Structure
- NewHighWaterLine
- Riprap
- Pipeline
- Proposed Contours

Figure 3.6



N

Old Dillon Reservoir

Wetland Impacts West of I-70

May 2009

300 150 0 300 Feet

1 Inch = 300 Feet

Datum: NAD_1983_StatePlane_Colorado_Central_FIPS_0502_Feet

Source: Summit County 2004 Orthophoto

GIS Prepared by S. Claffey

Claffey Ecological Consulting, Inc.

Legend

- Wetlands Flagged and Surveyed
- Wetlands Aerial Delineation
- Disturbance-Boundary
- Wetland Impacts
- Diversion Impact

Figure 3.7

North Dam

The north dam impacts wetland resources in the outlet channel (0.03 acre) and in the Dillon Ditch (0.02 acre). The wetland lost would be replaced by the compensatory mitigation plan proposed.

Dillon Ditch

The conversion of the Dillon Ditch to a buried 24 inch pipeline would impact 0.54 acre of wetlands adjacent to the Dillon Ditch. Piping the Dillon Ditch cannot avoid these wetlands. A pipeline route could be developed that avoids the ditch but the alignment would have additional resource impacts as it would cross a steep slope north of I-70. A new alignment is not practicable as without the flow in the ditch from the diversion, the wetlands would not persist.

Diversion Structure

The project proposes a new diversion structure located approximately 190 feet upstream of the existing diversion structure on Salt Lick Gulch. The diversion is located upstream to gain elevation to provide hydraulic head to move water through the pipeline in Dillon Ditch and through the inverted siphon under I-70. The diversion structure would require temporary construction impacts and permanent impacts. The location of the proposed diversion structure would utilize the previously disturbed area of an old wooden diversion structure as well as grading that was completed for that structure.

The structure permanently would impact 0.18 acre of wetlands adjacent to Salt Lick Gulch for the headgate and pool upstream of the headgate. Impacts are also derived from the reconstruction of the channel downstream of the diversion to provide for fish passage. To provide an adequate channel gradient to allow fish to move up through the diversion, the channel is reconstructed approximately 80 feet downstream. The pipeline is located on the south side of the headgate and is aligned outside of the wetland boundary to reduce wetland impacts. As an additional mitigation measure, the existing diversion and fill associated with that diversion would be removed and a stable channel reconstructed in this reach. Trail access across the channel would be maintained.

Construction Access to the Diversion

The proponent proposes to use the Lower Salt Lick Gulch Road (Forest Development Road 1260W.2) for construction access to the diversion and pipeline construction north of I-70. Improvements to the road would be required for construction access; when construction is complete, the road would be reseeded and restored to a single track trail while maintaining the road prism for long term maintenance access, and Forest Service administrative access.

A minor impact to wetlands would be required for road improvements in three locations (0.01 acre) (Figure 3.7). These are low quality wetlands formed in a dip in the road where a culvert is blocked and runoff flows over the road, and on the edge of the road where runoff collects. The substrate is road gravel. One of the wetlands is dominated by reed canary

grass, and as such is actually a detriment to the Salt Lick Gulch wetland system as it could spread further. At this location road base and a new 12 inch culvert would be installed. The reed canary grass would be treated with an aquatic approved herbicide (*Rodeo*) both within the road prism, and south of the road where this weed extends for approximately 50 feet.

Indirect effects

The proposed project would result in significantly reducing flows in the outlet channel and impacting 0.16 acre of wetlands and riparian habitat. Those impacts would be mitigated by the creation of wetlands at the project area.

The change in diversions could potentially indirectly affect the Salt Lick Gulch wetland. This wetland system is primarily a slope wetland under the HGM classification, and as such, the system is not as dependent on stream flow as a riverine wetland. The groundwater input from the adjacent toe of slope discharge supports wetland plant communities, even when stream flow is minimal. This has been directly observed in the field. However, stream discharge affects the wetland through over bank flows and a hydraulic connection between the stream and adjacent wetlands; and the storage of this water during peak flows supports the wetland to some degree through the summer.

During Normal Operations with average and wet year flow, there would be little if any effect on the wetland as diversions would occur either prior to the growing season or at the very beginning, and those diversions decrease early enough that the historic hydrograph is returned during runoff. During Normal Operations with a dry year flow, there would be a minor effect due to the decrease in stored water in the wetland; however, a change in wetland plant communities would not be expected as the dry year flow conditions do not persist, and the slope wetland hydrology would maintain the system. The recurrence interval for a dry year event is 1 in every 80 years (Resource Engineering 2008), thus any minimal effect would be inconsequential to the wetland plant community over the long term. In all flow events the proposed flow for Normal Operations would return to above historic conditions, which would benefit the system.

During a dry year flow, Emergency Operations would exacerbate the effects of the dry year flow. Emergency Operations occur when the Town of Dillon uses their direct flow water right through the summer, and deplete flows through the summer longer than Normal Operations. There would be little stored water, and the wetland system would rely primarily on the groundwater/slope wetland hydrology. The low flow event occurs only once in every 80 years, and the effects of the depletion of flows on the wetland plant community at that recurrence interval would be immeasurable. If Emergency Operations lasted for two or more full growing seasons when there were concurrent low flow years for those seasons, the effects could manifest as changes in plant communities to more mesic species. Two low flow events in a row would indicate a low snow pack for two winters, and the slope wetland groundwater input would likely also be diminished. The probability of low flow events occurring for two or more growing seasons, and concurrent Emergency Operations required during that same period is very low.

Cumulative effects

Cumulative effects to wetland resources are evaluated in the context of the project watershed, Salt Lick Gulch. A small part of the project area drains to Dillon Reservoir, but there would not be any wetland impacts associated with those parts of the project. Cumulative effects consider past and current actions, and reasonably foreseeable actions that would affect wetland resources. These include both Federal and non-Federal actions.

Past activities in the watershed included historic placer mining north of the channel and the effects of those activities are still visible in the upland areas north of the channel. Interstate-70 was constructed on the slopes south of the channel. The Wildernest Subdivision is located north and east of the channel, and roads and units impacts wetlands directly in Ryan Gulch, a tributary to Salt Lick Gulch. Interstate-70 crosses over the channel in two locations downstream of the diversion, and the lower sections of the channel north of I-70 is encased in culverts for the factory outlet stores and the roads. These past activities eliminated wetlands in the Salt Lick Gulch watershed but the extent of that loss is not known. All direct and quantified indirect wetland loss from the project (1.37 acres) would be mitigated by the creation of wetlands on site, and indirect or secondary effects in Salt Lick Gulch are expected to be minimal to non-existent.

A current action in the Salt Lick Gulch watershed is the DRFHF project. The potential for excess sediment delivery to the channel from the timber removal combined with the depleted stream flows from the ODR project could affect channel stability and thus wetland resources. However, the design criteria incorporated into the DRFHF project and the fact that the ODR project maintains bankfull flows for sufficient duration to maintain stream health in its current condition should mitigate any potential cumulative effect of the two projects. Furthermore, the numerous beaver ponds within the wetland system on Salt Lick Gulch function to trap sediment.

3.2.6 Monitoring Recommendations

1. Monitor the wetland creation proposed as compensatory mitigation to ensure a viable wetland is established. Performance standards for the wetland creation are included in the mitigation plan. The wetland creation would be monitored for 5 years as a requirement of the Section 404 permit; and the Corps would require the applicant to provide that monitoring. Those monitoring reports would be submitted to the Dillon Ranger District.

2. Monitor the plant community in Salt Lick Gulch below the diversion. Prior to project implementation, a series of transects could be developed across the wetland and vegetation sampling completed through the point intercept method or quadrate sampling. A transect would also be placed upstream of the diversion to document natural or other anthropogenic changes. The number and location of the transects, as well as the sampling method, would be developed with the Forest Service. The transects would be permanently marked and the sampling could be replicated in the future to document changes in the plant community.

3.2.7 Mitigation Recommendations

The following is a summary of the conceptual mitigation plan. The 1.37 acres of wetland impact from the Proposed Action would be mitigated by the creation of 1.37 acres of wetlands at the enlarged Old Dillon Reservoir. The wetland would be constructed on the west side of the reservoir as shown on Figure 3.6. Construction techniques and plant species diversity established would allow the created wetland to perform the same functions as the impacted wetlands when the full grown-in period is complete: approximately three growing seasons. The wetland would be supplied by a separate pipe connected to the reservoir supply line (piped Dillon Ditch).

The wetland type of this created wetland would be a hybrid of riverine and lacustrine under the HGM classification system; however, the critical element in mitigation is the replacement of wetland functions impacted by the proposed project. Although adjacent to the reservoir, it is not all a lacustrine wetland as the water source for a lacustrine wetland should be the lake or reservoir (Brinson et al 1995). Although adjacent to the reservoir, the water supply would be from Salt Lick Gulch via the pipeline and a separate dedicated water supply line to the wetland. The water supply would be independent of reservoir levels during drawdown periods, thus supply to the wetland would be maintained through the summer.

Rough grading for the wetland would be completed during the grading for the reservoir. Wetland soils from the lacustrine wetland around the reservoir would be excavated and stockpiled separately for use in the mitigation area. A wetland consultant would manage final grading in the creation area. Microtopography and macrotopography would be created during final grading to improve wetland function and a diversity of hydrologic regimes in the wetland. Wetland topsoil would be spread over the wetland at depths of 4 inches. Additional depth of topsoil would be created if possible, but based on a 12 inch depth of material excavated from the lacustrine wetlands at the reservoir; a 4 inch depth may be the maximum achievable. The substrate under the topsoil would be compacted to reduce permeability. A narrow, low berm (2 feet) would be left between the wetland and the expanded reservoir to accommodate a trail. Two breaks in the trail would be left open to allow hydrologic connection between the wetland and the reservoir; and, each 15-20 foot break would be spanned with a rough timber bridge.

Final elevations in the wetland would be based on a design/ build effort. Basically the wetland edge near the reservoir would be at or slightly below the full pool elevation. The wetland would rise up slightly to the west but the grade would not be uniform. Water from the supply line would enter the wetland in the northwest edge of the creation area. A water spreader channel would be constructed along the western edge of the wetland creation to deliver flows uniformly to the wetland. The grade of the wetland would be low, approximately 0.25%, and water would seep towards the reservoir. Water would pond in low depressions created (macrotopography); and, based on a design/build approach additional water spreader channel may be created across the wetland. The water spreader channels would be shallow (8-12 inches) and narrow (2-3 feet), and eventually covered with wetland vegetation after the plant community fully develops. A variation of this could be an over-wide meandering channel with grade controls constructed with minor variations in grade that replicate beaver dam/ponds.

Water would be delivered at a maximum rate during the reservoir fill period, April to late June. The rate of flow would be determined later and is partially dependent on the compaction levels in the substrate beneath the wetland topsoil. The water supply to the wetland would not normally start in average years until early May when the growing season starts. If snow is still on the ground in early May, the water supply to the wetland would start later. A 6 inch pipe would be used but the expected maximum fill rate in the spring should not exceed 0.25 cfs to 0.33 cfs. Overflow from the wetland would flow into the reservoir to become part of the storage. Following the reservoir fill period, approximately 50-80 gallons per minute would be delivered to the wetland with flows decreasing to zero in late August. In a dry year flow event, flows delivered to the wetland would be reduced.

The entire wetland would be seeded with a native grass seed mix at a rate of 35 lbs per acre. The wetland would be planted with live wetland plugs (primarily 10 cubic inch stock) of the species found in the impacted wetlands. Final species list would depend on availability from native plant nurseries. The plant spacing would be on 2 foot centers for a total number of 16,421 plants. Six hundred containerized stock (gallons and quarts) of willow and alder would be planted throughout the wetland in clumps of 4-5.

The wetland creation would be monitored for a period of five years or until the creation is considered successful. Success criteria would be developed with the Forest Service and the US Army Corps of Engineers through the Section 404 of the Clean Water Act permit. Success criteria would include a measure to document a viable native plant community and that wetland functions are being performed. Weed control would be an important part of the monitoring, and it is expected that weed control would be required for the first three years.

Wetland creation is a difficult process; however, the probability of success with the wetland creation techniques proposed is high. First, the site would have a reliable water source which would be managed. While water supply management is not always desirable in wetland creations as human management often leads to failure due to an eventual lack of interest in the wetland creation; in this case, the management actually leads to greater chance of success. The water delivery system would be part of an ongoing operation by the joint entity that would manage Old Dillon Reservoir, and after the wetland becomes established the water management required would be minimal, and that management written into the operating plan. The water supply would be turned on in the spring, reduced in the late summer to mimic natural conditions for the wetland type developed, and shut off in the fall after the growing season ceases. More frequent water supply management may be conducted in the first years to accelerate the establishment of a wetland plant community throughout the site.

The retention of the hydric soils from the wetlands and topsoil from uplands adjacent to the wetland impact sites, and subsequent use of that material in the creation sites also promotes the establishment of a viable wetland by providing organic matter, the correct soil texture, and a seed source. The use of native plant material both woody and herbaceous obtained from a reputable native plant nursery improves the chance of success in creating a diverse plant community, reducing the spread of weeds in the site, and re-establishing a community similar to the impact sites.

The design features and similar techniques for the design/build process explained have been applied at a number of successful wetland creation sites in Summit County as well as other locations on the western slope of Colorado, Wyoming and Montana. Although the design/build process requires a certain level of experience in wetland creation, many of the same techniques and/or modifications of those techniques, are used by professionals creating wetlands throughout the country.

3.2.8 Irreversible and Irretrievable Commitments of Resources

The direct loss of wetland due to the project is not an irreversible or irretrievable commitment of resource; the compensatory mitigation plan creates an equal acreage of wetlands and wetland functions lost would be replaced. Therefore, there would be no irreversible or irretrievable commitment of riparian or wetland resources with selection and implementation of the Proposed Action.

3.2.9 Forest Plan Consistency

Both the proposal and the No Action alternative are consistent with Forest Plan standards and guidelines. Salt Lick Gulch would remain at Robust Stream Health which reflects wetland conditions, and the functions of the 1.37 acres of wetlands lost to development would be replaced by wetland creation at the project site. The monitoring plan would ensure the wetland mitigation successfully replaces wetland functions.

3.3 AQUATIC RESOURCES

Aquatic resources analyzed in this section include fisheries and macroinvertebrates and their habitats. The Proposed Action could potentially impact aquatic resources from changes to the hydrology in Salt Lick Gulch and physical and operational changes to Old Dillon Reservoir.

3.3.1 Issues and Indicators

Issues that were identified by scoping and the Forest Service ID team include concerns regarding:

- Effects of the diversions from Salt Lick Gulch on the aquatic communities within Salt Lick Gulch
- Fluctuating water levels in Old Dillon Reservoir due to proposed reservoir operations, and the effects of those operations on the aquatic communities in the reservoir
- Effects of the diversion structure on fish in Salt Lick Gulch including fish passage upstream and downstream through the diversion, and the entrainment of fish in the Dillon Ditch pipeline.
- Effects of the project on public fishing opportunities at the Old Dillon Reservoir and in Salt Lick Gulch

3.3.2 Forest Plan Direction

Forest Plan direction that relates to aquatic resources includes:

Goal: Promote ecosystem health and conservation using a collaborative approach to sustain the nation's forests, grasslands, and watersheds.

Objective: 1a: Improve and protect watershed conditions to provide the water quality and quantity and soil productivity necessary to support ecological functions and intended beneficial uses.

The Forest Plan specifies standards and guidelines that address water and riparian resources that affect aquatic species. These standards and guidelines are:

Water and Riparian Resources Standards and Guidelines

Standard

1. *In each stream currently supporting a self-sustaining fish population, ensure that projects maintain sufficient habitat, including flow, for all life history stages of native and desired non-native species.*

Watershed Conservation Practices Handbook Management Measures (MM) and Design Criteria (FSH 2509.25)

MM 3. *In the water influence zone next to perennial and intermittent streams, lakes, and wetlands, allow only those actions that maintain or improve long-term stream health and riparian ecosystem condition.*

MM 4. *Design and construct all stream crossings and other instream structures to provide for passage of flow and sediment, withstand expected flood flows, and allow free movement of resident aquatic life.*

MM 7. *Manage stream flows under appropriate authorities to minimize damage to scenic and aesthetic values, fish and wildlife habitat, and to otherwise protect the environment.*

3.3.3 Geographic and Temporal Scope

Salt Lick Gulch is the main perennial stream included in the study since the Dillon Diversion is located on this stream. Three study sites were established on Salt Lick Gulch for macroinvertebrate and fish inventories (Figure 3.8). Four additional sites for fish inventories were added on Ryan Gulch in August to determine the presence of reproducing populations of trout. The study area also includes Old Dillon Reservoir (Figure 3.8).

Figure 3.8 Sampling locations in Salt Lick Gulch and Ryan Gulch.

The Proposed Action would affect the geographic area year round. The Proposed Action includes the potential to divert water all 12 months of the year, particularly if emergency operations were in place.

3.3.4 Affected Environment

Salt Lick Gulch and Ryan Gulch

Habitat – Stream Survey and Flow Evaluation

Habitat in streams is a function of the physical characteristics and the flow regime over a period of time. Stream habitat was quantified using a White River National Forest protocol (WRNF 2003). This protocol was applied by WRNF personnel in 2006 and follows the standard inventory approach for characterizing habitat types in streams on the WRNF. Two stream reaches were surveyed. Reach One, which would be affected by the Proposed Action, was immediately downstream of the Dillon diversion on Salt Lick Gulch. Reach Two, which would not be affected by the Proposed Action, was approximately three quarters of a mile upstream (Figure 3.9).

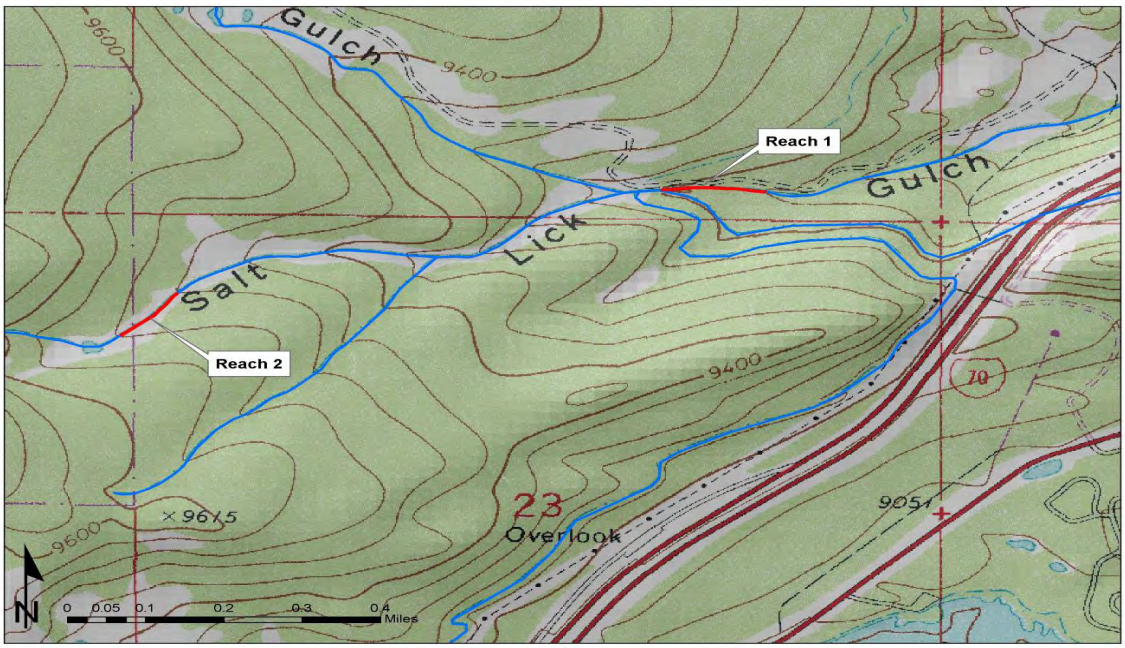


Figure 3.9 Salt Lick Gulch Stream Survey Sites.

The evaluation tool used for flow evaluation was a portion of the Incremental Flow Methodology (IFIM). The component of IFIM that simulates stream habitat is known as the Physical Habitat Simulation System (PHABSIM) (Milhous et al. 1989). PHABSIM consists of channel structure, hydraulic simulation and habitat suitability criteria. The channel structure is gathered at stream cross sections that represent different habitat types (e.g., pools, riffles, etc). The hydraulic simulation programs produce water depth and velocity predictions for a range of stream flow conditions. The habitat suitability criteria for the species being studied are then applied to determine how the usable habitat changes with each flow. Application of PHABSIM requires site selection, field data collection and hydraulic and habitat simulations.

The PHABSIM site selection process was completed during the initial site visit. One PHABSIM site was used to represent the stream habitat potentially affected by the change in stream flow associated with the Proposed Action. The PHABSIM site was chosen in consultation with FS personnel and in the same location of Stream Survey Reach 1 to obtain habitat data for various flow regimes that was concurrent with the stream survey data. The site is immediately downstream of the Dillon Ditch diversion on Salt Lick Gulch. The site consists of pool, riffle and run habitat, and multiple cross sections were placed to represent these habitat types. Transect placement followed the criteria proposed by Bovee (1982) and Bovee (1997). The windows based PHABSIM version 1.10 software (USGS Mid-continent Ecological Science Center 2001) was used to create the hydraulic modeling runs. The hydraulic and habitat simulations followed standard protocols for IFIM. The species used for the habitat simulations was brook trout since it is only fish species present in most of Salt Lick Gulch. The criteria were from existing habitat criteria developed in the 1970s by the U.S. Fish and Wildlife Service (Bovee 1978).

Several analysis techniques were used to interpret the PHABSIM output. Habitat time series (Bovee 1982), Weighted Usable Area (WUA) versus discharge (Bovee 1982), and wetted perimeter (Wesche and Rechard 1980; Leathe and Nelson 1986) techniques were used to analyze the effect of flow regime modification on trout habitat. The specific details of the methodology are presented in the aquatic resource technical report (Miller 2008). The hydrology for the habitat time series was developed by Resource Engineering and was comprised of the existing flow regime and two additional flow regimes. These flow regimes were; 1) the proposed operating criteria for normal diversion operations (i.e., normal operations), and 2) the proposed operating criteria for emergency operations when flow regime associated with the use of Salt Lick Gulch as the primary water supply for the Town of Dillon (i.e., emergency operations, Dillon direct flow), which is a temporary, short term condition.

The habitat in both reaches is dominated by riffles. Reach 1 has 78% riffle habitat and Reach 2 has 89% riffle habitat. The remainder of the habitat in Reach 1 is divided among three habitat types: 8% pool, 4% Cascade and 10% glide/run. Reach 2 has 11% pool habitat comprised of plunge pools and step pools (WRNF unpublished data).

Wetted channel width

Water surface elevations were simulated for a range of discharges to determine wetted perimeter at low flows. Discharges of 0.1, 0.2, 0.5, 1.0, 1.5 and 2 cubic feet per second (cfs), were simulated and plotted for each cross section. There is little difference between the wetted channel width at 0.5 cfs and 2.0 cfs. Based on these water surface results, which indicate that the wetted channel width remains relatively constant for the range of flow from 0.5 cfs to 2.0 cfs, a minimum flow of 0.5 cfs threshold was used in the habitat simulations.

Macroinvertebrates (Aquatic Management Indicator Species)

Benthic macroinvertebrate sampling was conducted during spring on May 13, 2008 at three sites. Site SLG 1 was downstream of the beaver pond complex and the return flow from Old Dillon Reservoir. Site SLG 2 was immediately downstream of the Dillon Ditch diversion. Site SLG 3 was approximately 0.5 miles upstream of the Dillon Ditch diversion.

The analysis of the macroinvertebrate samples shows that the macroinvertebrate community at site SLG 3 is different from the community in sites as SLG 1 and SLG 2. Site SLG 3 has higher diversity, more taxa present and higher densities of invertebrates than the downstream sites. Functional feeding groups for the sites are also different. All sites were dominated by the collector-filterer feeding group, but Site SLG 3 has more shredders than any of the other sites. Shredders are typically species such as stoneflies that feed on the leaf and other organic matter.

Trout (Aquatic Management Indicator Species)
Fish inventories were conducted on July 30 and August 19, 2008 in Salt Lick Gulch and Ryan Gulch, respectively. Fish were collected with a Smith-Root 15B backpack electrofishing unit. A stream section approximately 100-200 feet long was sampled at each site. A multiple pass removal method was used to obtain population estimates.

Two species of fish were documented in Salt Lick Gulch, brook trout (*Salvelinus fontinalus*) and fathead minnow (*Pimephales promelus*). Fathead minnow were collected from a beaver pond and not in the main stream. Neither species are native to the drainage. Brook trout were the dominant species at all locations.

The highest number of brook trout was captured at Site SLG 1 and the number captured decreased at the upper sites as the stream size decreased. Population estimates ranged from 21 fish at Site SLG 1 to 3 brook trout at Site SLG 3. The number of brook trout per hectare also was highest at the lower site.

The brook trout size classes ranged from less than 80 mm to over 210 mm total length. The largest brook trout were captured at Site SLG 1 and SLG 3. The smallest brook trout were found at Site SLG 2. There are at least three age classes of brook trout downstream of the Dillon Diversion but only one age class documented upstream of the diversion in Salt Lick Gulch. Estimates of brook trout density in Salt Lick Gulch are: 2,260 fish/hectare at SLG 1, 1,262 fish/hectare at SLG 2, and 633 fish/hectare at SLG 3. Fathead minnow sizes ranged from less than 40 mm (young of the year) to adult (over 80 mm). The likely source of this species is Old Dillon Reservoir since the capture location was downstream of the Old Dillon Reservoir outfall, and this species was visually observed in Old Dillon Reservoir.

Ryan Gulch was electrofished at four sites to determine species and life stages present. Multiple pass removal was used to make population estimates at all sites. A total of 28 brook trout were captured in Ryan Gulch. Population estimates ranged from 5 brook trout per site to 11 brook trout per site. Brook trout density in Ryan Gulch ranges from approximately 3,000 to just over 5,100 fish per hectare. The density of brook trout in Ryan Gulch is higher than in Salt Lick Gulch in the sampled reaches.

Several age classes of brook trout were captured in Ryan Gulch. The age classes ranged from young of the year to adult. A comparison of brook trout size classes for Salt Lick Gulch downstream of Dillon Diversion shows that all age classes except young of the year were present. This same size class range plus young of the year was present upstream of the Dillon Diversion. Brook trout populations varied more by site in Salt Lick Gulch than in Ryan Gulch with the highest population in the farthest downstream site. Ryan Gulch populations appeared to be more evenly distributed.

Old Dillon Reservoir

The existing reservoir has a surface area of about 10 acres and is impounded by two embankments of about 5 to 7 feet high in a saddle on an east-west trending ridge. The reservoir level is relatively constant annually and regulated by the outlet level. Old Dillon Reservoir currently has a relatively stable water surface elevation with relatively small changes annually. This provides the opportunity for managing the reservoir as a "put-grow-and-take" fishery or a "put and take" fishery. The stable volume allows the CDOW to stock either smaller fish that can grow to catchable size or stock fish of catchable size.

The stability also is beneficial to the invertebrate community, which is the food source of the stocked fish. The Colorado Division of Wildlife netted the reservoir in fall of 2007 to obtain data on species composition. The reservoir fishery is supported by stocking. The size of fish captured ranged from less than 130 mm to over 330 mm total length. The majority of the fish are rainbow trout or rainbow-cutthroat hybrids. One brook trout was captured.

Threatened, Endangered and Sensitive Aquatic Species

A Biological Evaluation (BE) has been prepared for sensitive aquatic species potentially impacted by the project. A Biological Assessment (BA) has been prepared for threatened and endangered aquatic species potentially affect by the project.

Five sensitive fish species were considered in the BE: bluehead sucker, flannelmouth sucker, roundtail chub, mountain sucker and Colorado River Cutthroat trout. The **bluehead sucker, flannelmouth sucker,** and **roundtail chub** are found in the larger rivers of the western slope and would not occur in the project area. On the White River National Forest, the **mountain sucker** is found in small and medium sized stream below 8,600 feet that drain into the White River. Habitat for these four fish species is not found in the project area and impacts to these four species are not considered further in this document. **Colorado River Cutthroat trout** are known to occur on the Dillon Ranger District. A core conservation population present in Meadow Creek, a tributary to the Blue River (now Dillon Reservoir), is located a few miles west of the project area. In 1980, the Colorado Division of Wildlife (CDOW) sampled Salt Lick Gulch approximately 1.25 miles upstream of the confluence with the Blue River and found only brook trout (Miller 2008). To assess the impacts of the proposed Old Dillon Reservoir Enlargement on aquatic species in Salt Lick Gulch, Miller (2008) inventoried populations of fish and aquatic macro-invertebrates downstream of the diversion, and upstream including in the main tributary, Ryan Gulch. Only brook trout and fathead minnow were found.

Old Dillon Reservoir is a recreational fishery that is supported by stocking. The CDOW netted the reservoir in the fall of 2007 and found rainbow trout, rainbow-cutthroat hybrids and one brook trout (Miller 2008).

Five threatened or endangered fish species were considered in the BA: the Colorado pikeminnow, the razorback sucker, the humpback chub, the bonytail chub and the greenback cutthroat trout.

Greenback cutthroat trout is listed as threatened under the Endangered Species Act. They inhabit cold water streams and cold water lakes that have stream spawning habitat present in the springtime. The greenback cutthroat trout are native to the headwaters of the South Platte and Arkansas River drainages within Colorado and a small segment of the South Platte drainage within Wyoming. Recently, geneticists have been able to differentiate, for the first time, two distinct lineages of cutthroat trout within the range of Colorado River cutthroat trout and greenback cutthroat trout. These lineages have been tentatively called lineageCR (for Colorado River) and lineageGB (for greenback). The origin of lineageGB is currently under investigation. It is not clear whether this lineage is from the Front Range (and therefore true greenback cutthroat) or if it is another form of Colorado River cutthroat trout. In the interim period while this issue is resolved, the lineageGB populations are considered greenback cutthroat for the purposes of ESA. There are currently six populations of lineageGB cutthroat identified on the White River National Forest, including two on the Dillon Ranger District (Frey Gulch and Spruce Creek). No evidence is available to suggest that greenback cutthroat trout are found in the Salt Lick Gulch drainage, where this project is proposed. There are no current or historic records of any cutthroat trout in Salt Lick Gulch. For the Old Dillon Reservoir project, extensive sampling was recently conducted in the Salt Lick Gulch watershed (including Ryan Gulch) and no cutthroat trout were found (Miller 2008). The CDOW sampling of Old Dillon Reservoir did not locate any greenback cutthroat trout (Miller 2008).

The **Colorado pikeminnow, razorback sucker, humpback chub, bonytail chub** are not present in or near the project area. These four species, listed as endangered under the Endangered Species Act, occupy habitats in the Colorado River downstream of the White River Forest boundary near Grand Junction, Colorado. Water diversions within the Upper Colorado River Basin may affect these species and those affects were evaluated in the BA.

3.3.5 Environmental Effects by Alternative

3.3.5.1 Alternative 1 – No Action

The No Action alternative would result in no changes to the existing conditions to aquatic resources in Salt Lick Gulch and Old Dillon Reservoir. The existing reservoir operations determine the flow regime in Salt Lick Gulch. Those flows are a factor that determines the current state of the habitat and aquatic species present. The aquatic resources, as described above in Section 3.3.4, are expected to remain in the present state with the No Action alternative.

3.3.5.2 Alternative 2 – Proposed Action

Direct and indirect effects

The Proposed Action would affect Salt Lick Gulch and Old Dillon Reservoir. Salt Lick Gulch would have a change in stream diversion rates from existing conditions. Old Dillon Reservoir would be enlarged and the reservoir level would vary each year due to draw downs for water use by the project proponents. Changes to aquatic habitat in Salt Lick Gulch were evaluated using PHABSIM and hydrology provided from the Hydrology Specialist's Report (Resource Engineering Inc. 2008).

The calibrated PHABSIM hydraulic model was used to simulate discharges from 0.1 cfs to 20 cfs. This range of flows covers most of the flow range typically seen in Salt Lick Gulch except in wet water years. The hydraulic simulations were combined with brook trout habitat suitability criteria to develop the weighted usable area (WUA) versus discharge function. Habitat availability peaked for adult brook trout at approximately 2 cfs and at approximately 1 cfs for spawning brook trout (Figure 3.10). There is a sharp decline in habitat for flows less than the optimum flow.

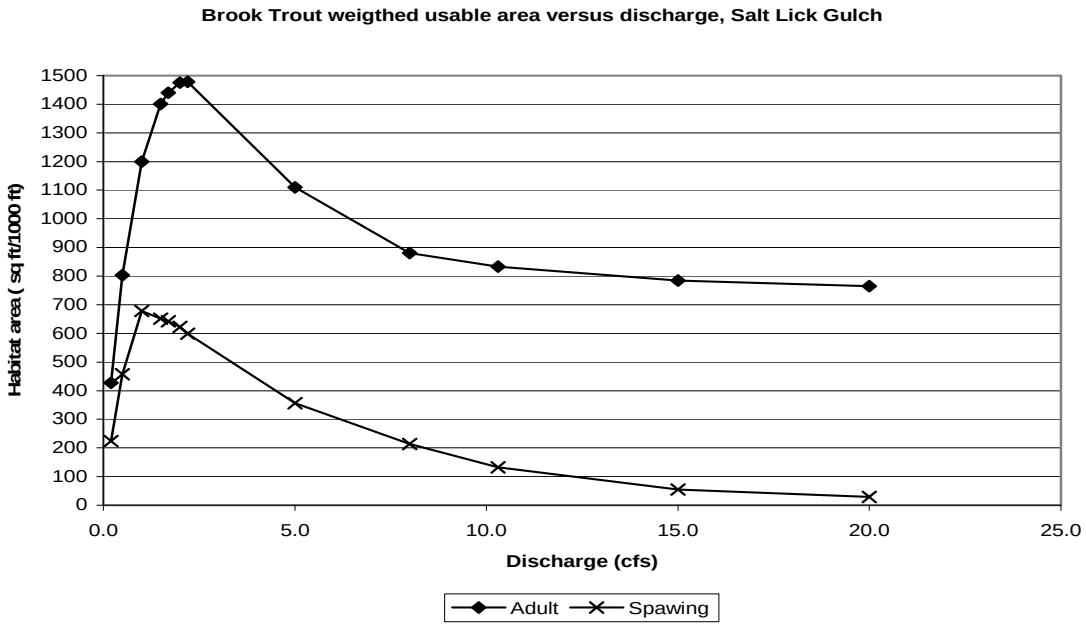


Figure 3.10 Weighted usable area (ft^2 per 1,000 ft) for Brook Trout versus discharge (ft^3/s) for Salt Lick Gulch.

Salt Lick Gulch from Dillon Ditch diversion to Old Dillon Reservoir return

The WUA function was combined with daily hydrology for wet, average, and dry water years (Miller 2008). The daily hydrology was estimated downstream of the Dillon Ditch diversion for existing flows, the Proposed Action normal operations, and the Proposed Action emergency operations with water conservation. The latter flow regime would occur only in emergency situations for short durations when

Straight Creek water is not suitable for diversion and Salt Lick Gulch becomes the primary water supply for the town of Dillon. The percent of flow volume diverted annually ranges from approximately 17% in dry years to approximately 32% in wet years.

The diversion structure for the Dillon Ditch would include a natural type fishway to allow both upstream and downstream fish passage. The diversion pipe also would include a fish screen to protect fish in Salt Lick Gulch from entrainment.

The change from existing conditions for the normal operations range from -10% to 483% for adult brook trout habitat in average years (Table 3.7). The large habitat increase is due maintaining a 0.5 cfs minimum flow. Under existing conditions, there are zero flows downstream of Dillon Ditch during late fall and winter. Brook trout spawning habitat changes range from -6.2 to 31.5% in average years for the normal operations. The normal operation would provide a beneficial effect during most seasons, especially winter since the proposed normal operations would divert less water than current operations.

There is a substantial reduction in adult habitat during the times when emergency operations occur. The adult habitat is reduced by 100 % in the fall and winter months if emergency operations occur. Brook trout spawning habitat decreases during October by nearly 30% if emergency operations occur during the October spawning period. If emergency operations continue through the winter, the depletion of flows to zero would eliminate that year's reproduction.

Table 3.7 Percent change in brook trout habitat from existing conditions downstream of the Dillon Ditch diversion for an average year flow.				
Year Type	**Life Stage**			
Average Year Summary	**Adult**	**Adult**	**Spawning**	**Spawning**
	Normal Operation	**Emergency Operation + Conservation**	**Normal Operation**	**Emergency Operation + Conservation**
Oct 1-15	40.5%	-22.7%	26.4%	-24.6%
Oct 16-31	43.9%	-26.2%	31.5%	-29.0%
Nov 1-15	31.9%	-45.5%		
Nov 16-31	32.1%	-48.9%		
Dec 1-15	64.2%	-100.0%		
Dec 16-31	69.9%	-100.0%		
Jan 1-15	76.2%	-100.0%		
Jan 16-31	80.1%	-100.0%		
Feb 1-15	88.5%	-100.0%		
Feb 16-28	92.2%	-100.0%		
Mar 1-15	483.8%	-100.0%		
Mar 16-31	333.0%	-100.0%		
Apr 1-15	0.0%	0.0%		
Apr 16-30	0.0%	0.0%		
May 1-15				
May 16-31				
Jun 1-15				
Jun 16-30				
Jul 1-15				
Jul 16-31	-10.0%	3.9%		
Aug 1-15	-8.6%	3.7%		
Aug 16-31	-7.4%	-1.7%		
Sep 1-15	10.6%	-16.2%	-6.2%	-5.4%
Sep 16-30	11.5%	-16.2%	-5.7%	-5.5%

Salt Lick Gulch downstream of Old Dillon Reservoir Return

The flow patterns for this section of Salt Lick Gulch are similar to the flows downstream of the Dillon Ditch diversion but with an incremental increase due to discharge gained from additional watershed area and release made from Old Dillon Reservoir. During average water years, more water is diverted during the ascending limb of runoff and during summer and fall than existing diversions.

The change from existing conditions for the normal diversion rates range from -1.4% to 2.1% for adult brook trout habitat in average years (Miller 2008). Brook trout spawning habitat decreases by 1 to 2% in average years for the normal diversion flow regime. There is a substantial reduction in adult habitat if emergency operations occur. The adult habitat is reduced by up to 77% in the winter months. Brook trout spawning habitat decreases during October by nearly 25% if emergency operations occur during the October spawning period.

Old Dillon Reservoir

With the enlargement of the reservoir, the reservoir contents would vary seasonally and annually. This variability would likely require a change in fishery management to provide fishing opportunities. An annual reservoir drawdown would require stocking catchable size trout for fishing opportunities. In addition, the drawdown could reduce the invertebrate productivity from the current level.

The drawdown of the reservoir during the summer to satisfy water demands would affect public fishing opportunities as discussed in the Recreation Section. Extensive drawdown in the future when the reservoir is fully operational would substantially reduce public fishing opportunities from the shoreline, although some may be available from the two dams.

Threatened, Endangered, and Sensitive Aquatic Species

Threatened and Endangered Species

Greenback cutthroat trout populations are not found in or downstream of the project area. Therefore, no effects are expected to occur to greenback cutthroat trout as a result of the project.

The Colorado pikeminnow, razorback sucker, bonytail or humpback chub populations downstream of the project in the Colorado River may be affected by the depletion of 450.2 acre feet of water created by the enlargement of Old Dillon Reservoir. The BA found that this depletion may affect and is likely to adversely affect the four listed fish species. The FS will initiate consultation under Section 7 of the Endangered Species Act with the US Fish and Wildlife Service on the likely to adversely affect determination. The applicant will sign the Recovery Agreement committing to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program) and pay a

one-time fee based on the current per acre foot rate specified by the U.S. Fish and Wildlife Service to the Recovery Program for the depletion from the Upper Colorado River Basin. On December 20, 1999, the Service issued a programmatic biological opinion (1999 Opinion) concluding that implementation of specified elements of the Recovery Action Plan (Recovery Elements), along with existing and a specified amount of new depletions, are not likely to jeopardize the continued existence of the endangered fish or adversely modify their critical habitat in the Colorado River subbasin within Colorado, exclusive of the Gunnison River subbasin.

The applicant's signature of the Recovery Agreement and one-time payment of the fee for depletions will provide the USFWS assurance that implementation of the Recovery Elements specified in the 1999 Opinion will avoid the likelihood of jeopardy and adverse modification under section 7 of the ESA, for depletion impacts caused by Old Dillon Reservoir Enlargement project.

Sensitive Species

Colorado River Cutthroat trout were not found in the Salt Lick Gulch watershed during inventories conducted for the project nor are they know to occur historically in the drainage. They are not known to occur in Old Dillon Reservoir. There would not be any direct or indirect impacts to CRCT from the Old Dillon Reservoir Enlargement including diversions in Salt Lick Gulch as neither the reservoir nor the stream are occupied by this species.

Conclusions

The aquatic resources in Salt Lick Gulch would likely be nearly the same or be improved under the Proposed Action normal operations compared to the existing diversions. The range of flow changes for normal operations produce substantial beneficial impacts to the available physical habitat during winter. This increase in habitat is attributed to the 0.5 cfs target minimum flow that currently does not exist. The current flow regime includes times of near zero flow, which is likely impacting the number of fish and invertebrates in Salt Lick Gulch downstream of the Dillon Ditch diversion. A minimum flow of 0.5 cfs for normal operations would increase the habitat by over 70% from existing conditions. It is likely that the aquatic biota would increase with the increase in minimum flow. An increase in fish abundance in the section of Salt Lick Gulch from the Dillon Ditch downstream to the Old Dillon Reservoir return would provide improved opportunities for public fishing.

The habitat time series used to assess impacts was developed using the hydrology data provided by Resource Engineering. Those hydrology data were developed for what would be the typical operations for the project. As explained in Section 3.1, Water Resources, there may be occasions in the future when the project may not be operated in that manner. The full water right (421.14 AF) may not be diverted during the modeled fill period where diversions end in mid to late June depending on the water year; and, in some years it is possible diversions may continue later into the summer and fall.

All potential flows from summer and fall diversions were not modeled with habitat time series as the amount and duration are not known. However, the design criteria presented in Chapter 2 and Section 3.1 have been developed for normal operations that protect the aquatic biota:

- Under Normal Operations, during the spring reservoir fill period of April, May and June a minimum flow of 0.5 cfs would be maintained in Salt Lick Gulch downstream of the diversion.

- Under Normal Operations, if the full water right of 421.14 AF has not been diverted by late June, and diversions continue into the summer and fall; a minimum flow of 1 cfs would be maintained for July, August, September, October and November.

- Under Normal Operations, no diversions would occur in December, January, February and March.

Avoiding winter diversions would improve the habitat for aquatic biota over existing conditions as discussed above. The 0.5 cfs minimum flow during the reservoir fill period maintains a base flow but in reality the flows during the spring would exceed that minimum as native flows exceed the 10 cfs diversion capacity. If diversions are required after June, the 1 cfs minimum flow from July through November would maintain 81 % of the maximum habitat potential for adult brook trout, and 1 cfs provides peak habitat availability for spawning brook trout.

The flow regimes associated with emergency operations, which utilize the Dillon direct diversion, would result in substantial negative impacts to physical habitat that could reduce fish and invertebrate populations during the time those flows occur. If the emergency operations were to occur in summer, the habitat would be reduced but sufficient habitat and wetted stream channel would remain to maintain aquatic life. A flow of 1 cfs, the target summer flow with conservation measures implemented by the Town of Dillon, would result in 81 % of the maximum habitat potential. A flow of 0.5 cfs would result in 54% of the maximum habitat potential. Salt Lick Gulch flows currently drop to less than 1.0 cfs but usually not until September or October. If the direct flow use of Salt Lick Gulch occurred over several years and flows dropped below 1.0 cfs earlier in the year than now experienced, there could be a negative shift in the aquatic biota. However, a 1.0 cfs target minimum flow during summer could minimize the impact.

If the emergency operation were to occur in winter, the stream would be dewatered downstream of the Dillon Ditch for approximately 0.9 mile until approximately the Old Dillon Reservoir return. This would result in the loss of fish and invertebrate populations in this reach of stream even with short duration (one day) use of the emergency operation. Populations from upstream of the Dillon Ditch diversion could recolonize this reach of stream when flows return to normal operations. Recolonization would be needed after each zero flow occurrence.

Both Salt Lick Gulch and Ryan Gulch upstream of the diversion would be unaffected by the Proposed Action; those aquatic communities would remain as they exist today absent any other changes (land use changes, floods, etc.). These upstream communities could provide the seed populations to re-establish fish and macroinvertebrate populations downstream of the Dillon Ditch diversion upon cessation of emergency operations, when flows return to the normal diversion flow regime. Monitoring this downstream reach approximately one year after flows return to normal diversion would provide the data needed to assess recovery of the aquatic fauna.

The enlarged Old Dillon Reservoir would likely result in the need for a change in fishery management to provide a fishery. The amount of annual and seasonal reservoir fluctuations would be required to specify fishery management. Annual variation of reservoir volume may limit the public fishing opportunities at the reservoir. It may be possible to maintain a public fishery for a portion of the year with annual stocking of catchable size trout. During times of total reservoir drawdown, the fishery would be lost as well as invertebrates. A small minimum conservation pool would help to preserve fish and invertebrates. The opportunity to provide a minimum pool may be limited to water years when demand on the reservoir does not fully evacuate the contents. A rehabilitation plan could be developed to re-establish the aquatic fauna after total drawdown.

Cumulative effects

The cumulative effects of past, present and reasonably foreseeable actions combined with the Proposed Action that would affect aquatic communities in Salt Lick Gulch are disclosed in this section. The Town of Dillon's historic and current operations of Old Dillon Reservoir comprise a past and present action. The projected diversions and water use described under the Proposed Action for the ODR enlargement would replace the historic and current diversions by the Town of Dillon.

Past management actions on NFS System lands and on private land have affected the Salt Lick Gulch watershed. Those include the development of Interstate 70, residential development and hydraulic mining. The upper portions of the watershed are within the Eagles Nest Wilderness Area and were not affected by those past activities. However, Laurie (2007) reports robust stream health for Salt Lick Gulch during studies conducted for the Dillon Reservoir Forest Health and Fuels (DRFHF) project; demonstrating the natural buffering ability of the surrounding forest, and more importantly the large groundwater supported wetland complex adjacent to the creek.

Healy (2007) found that this watershed naturally produces fine sediment that creates less than ideal habitat for trout and sediment intolerant macroinvertebrates; further concluding that this is the stream's natural potential. The sampling of fish populations and macro-invertebrates conducted for this project upstream of the Dillon Ditch diversion documents that natural potential albeit the past affects of mining and development in the watershed. For the reach of Salt Lick Gulch downstream of the diversion affected by this project, the combination of the less than ideal natural habitat conditions and the past and current actions created the aquatic communities sampled and disclosed above and in Miller (2008).

The DRFHF project is a current action in the project watershed. The purpose of the DRFHF project is to manage forest vegetation affected by the mountain pine beetle epidemic while reducing the threat of catastrophic wildfire to community infrastructure. With the implementation of design criteria, there would be no measurably, detrimental direct or indirect effects expected to fish bearing streams as a result of the timber harvest or fuel reduction (Forest Service 2007).

There are no reasonably foreseeable future actions on NFS system lands that would affect aquatic communities. Limited residential development may continue in the subdivisions north of the stream on private lands but the scale of that development would be considerably less than what has already occurred. The buffering capacity of the adjacent forest lands and large wetland complex would likely ameliorate the affects of that limited development. The Colorado Department of Transportation has not developed final plans for improvements to the I-70 corridor in the project area.

Considering the direct and indirect effects of the proposed action under normal operations, and the past and present actions in the watershed, the cumulative effects of aquatic resources in Salt Lick Gulch would be beneficial. The elimination of winter diversions as discussed above would improve habitat conditions for brook trout and macroinvertebrates. In addition, the project would reduce sediment contributions to the affected reach from the Salt Lick Gulch trail which parallels the stream and wetland system in the project area. The trail would be used for temporary construction access and best management practices would be constructed to reduce sediment delivery. Under emergency operations, the cumulative effects would be detrimental, although temporary; and, as discussed above the aquatic communities would recolonize the affected reach.

The impacts of the proposed activities are described above and would contribute to the cumulative effects on aquatic resources in the amount and manner disclosed in the direct effects section. In conjunction with implementation of the Dillon Reservoir Forest Health and Fuels (DRFHF) project, there would not be any additional cumulative effects to aquatic resources since no other projects have been identified on NFS lands or private lands that would affect aquatic resources in Salt Lick Gulch.

3.3.6 Monitoring Recommendations

Monitoring of aquatic resources is not required during normal operations. If emergency operations are required, Salt Lick Gulch downstream of the Dillon Ditch diversion should be monitored. Fish and macroinvertebrates should be sampled in the fall, after the flows return to normal operation and one growing season has passed.

3.3.7 Mitigation Recommendations

Mitigation may be required in Salt Lick Gulch after emergency operations. The mitigation would be based on the monitoring results. Mitigation could include translocation of fish from reaches upstream of the Dillon Ditch diversion to reaches downstream of the diversion.

3.3.8 Irreversible and Irretrievable Commitments of Resources

There would be no irreversible and irretrievable commitment of resources.

3.3.9 Forest Plan Consistency

The Proposed Action would be consistent with Forest Plan standards for aquatic resources. The project under normal operations complies with Standard 1 and Management Measure 3 as less water is diverted under existing operations and in particular water is not diverted during the winter under normal operations. Under emergency operations, the project would impact the aquatic biota in Salt Lick Gulch downstream of the diversion, particularly if those operations occur during the winter; however, the project complies with Standard 1 and Management Measure 3 under emergency operations as those operations are temporary in nature. When emergency operations cease, the populations of aquatic communities upstream of the diversion in Salt Lick Gulch and Ryan Gulch would recolonize the habitats downstream of the diversion.

3.4 WILDLIFE

This section describes the effects of the Old Dillon Reservoir (ODR) Enlargement project on wildlife resources. Species covered are those listed under the Federal Endangered Species Act (ESA) for the Dillon Ranger District, species listed on the Forest Service Region 2 Sensitive Species list, and Management Indicator Species (MIS). Specialist reports for each of these categories are on file in the Dillon Ranger District office including a Biological Assessment (BA) for ESA listed species, a Biological Evaluation (BE) for Forest Service Sensitive Species, and an MIS report.

The Forest Service maintains a list of Sensitive Species and considers effects to those species to ensure that activities on NFS lands do not lead to the listing of those species by the Federal ESA. Management Indicator Species are those whose response to management activities can be used to predict the likely response of a larger group of species with similar habitat requirements. Elk are the only MIS species present in the project area.

3.4.1 Issues and Indicators

Through the public and internal scoping process, the wildlife issues raised were the effects of the project on wildlife habitat and populations. Specific indicators used in this analysis are the effects to habitat or the use of habitats by threatened, endangered, candidate, sensitive and management indicator species.

3.4.2 Forest Plan Direction

General Wildlife

There are nine standards and four guidelines for general wildlife in the WRNF LRMP (Forest Plan, pages 2-17 and 18).

Proposed, Threatened, Endangered, Sensitive Species:

The standards and guidelines for proposed, threatened, endangered and sensitive species are found on pages 2-18 to 2-28 of the Forest Plan and include species-specific standards and guidelines; however, only those applicable to Canada lynx are relevant to this project (pages 2-19-21). The Southern Rockies Lynx Amendment can be found on the Forest Service's web site: (http://www.fs.fed.us/r2/projects/lynx/). The only wildlife-specific guideline under management area 8.21 is relevant to fish and discussed in the fisheries section of this document.

Management Indicator Species:

Forest Plan direction for elk (an MIS) is: Vegetation management practices will be used to maintain or improve elk habitat.

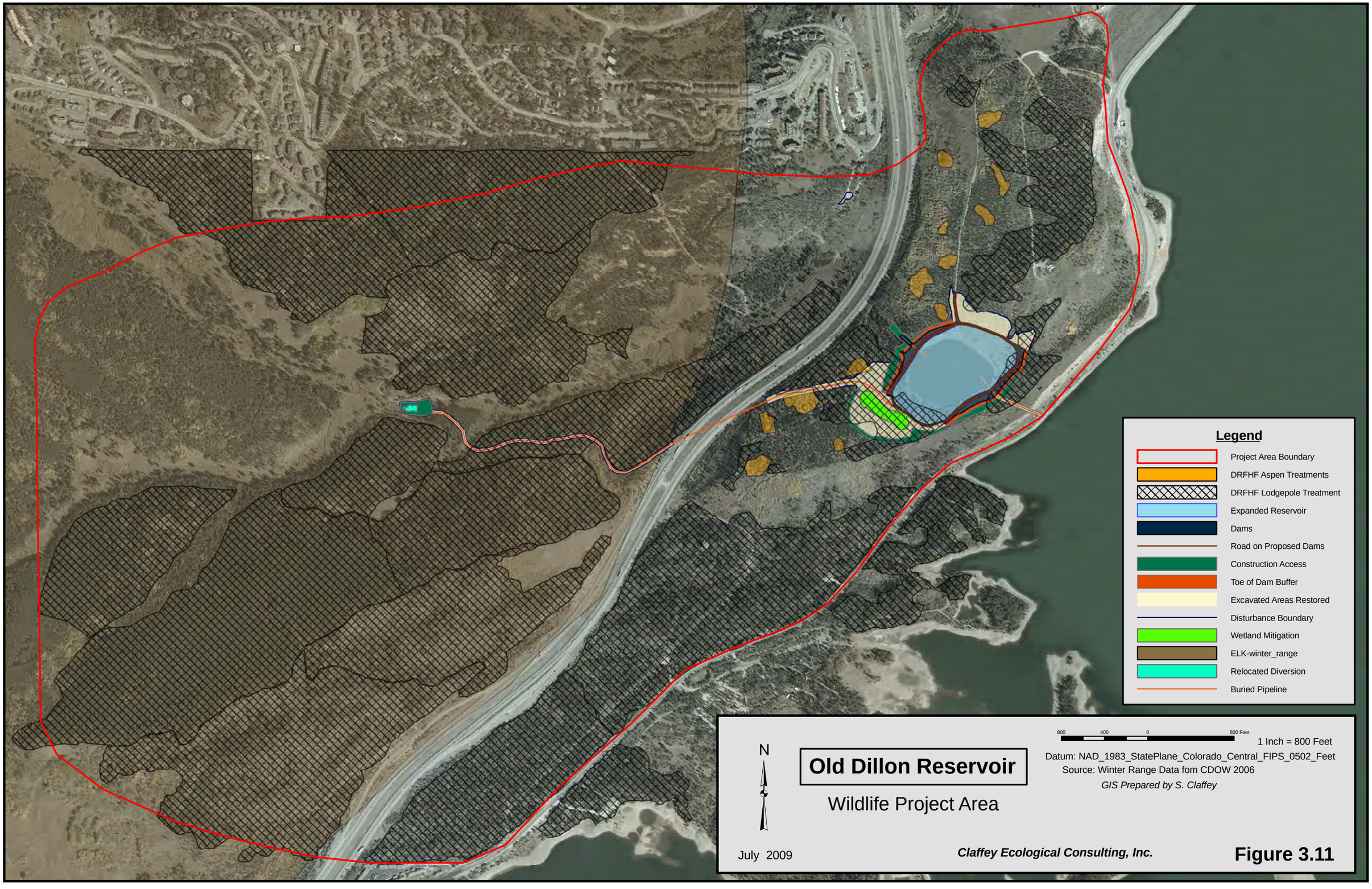
3.4.3 Geographic and Temporal Scope

The geographic scope includes the project area shown on Figure 3-11. This includes habitats around the existing reservoir and habitats in the vicinity of the project that may be affected in the long term or during construction. The temporal scope includes long term effects of the project and temporary effects during construction that would limit species use of habitats near the construction zone.

3.4.4 Affected Environment

The project area is in Summit County, Colorado between the Towns of Silverthorne and Frisco, and it is bisected by Interstate 70 (I-70). Denver's Dillon Reservoir borders the southern boundary of the project area. Elevations range from 9,100 feet to 9,400 feet above mean sea level. The project area for includes the Salt Lick Gulch watershed from the Eagles Nest Wilderness boundary downstream to Dillon Dam, north to near the Wildernest Subdivision and south along the Dillon Dam Road (Summit County Road 7).

Old Dillon Reservoir sits on a saddle on a glacial moraine ridge that trends east-west. The southern slope of this ridge is a steep gradient falling towards Dillon Reservoir, and the northern slope is more gradual towards I-70. The ridge, locally known as Lake Hill, is developed with a network of trails, access roads, power and communication lines, and cellular towers.


Legend
Project Area Boundary
DRFHF Aspen Treatments
DRFHF Lodgepole Treatment
Expanded Reservoir
Dams
Road on Proposed Dams
Construction Access
Toe of Dam Buffer
Excavated Areas Restored
Disturbance Boundary
Wetland Mitigation
ELK-winter_range
Relocated Diversion
Buried Pipeline
N
800 400 0 800 Feet
1 Inch = 800 Feet
Old Dillon Reservoir
Wildlife Project Area
Datum: NAD_1983_StatePlane_Colorado_Central_FIPS_0502_Feet
Source: Winter Range Data fom CDOW 2006
GIS Prepared by S. Claffey
July 2009
Claffey Ecological Consulting, Inc.
Figure 3.11

The dominant vegetative type in the project area is mixed coniferous forest dominated by lodgepole pine (*Pinus contorta*) with a minor component of subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (Picea engelmanni). Much of the area contains pure stands of lodgepole pine, with the spruce and fir occurring in the riparian corridor along Salt Lick Gulch and adjacent to ODR and on more mesic, north-facing slopes adjacent to Salt Lick Gulch. Small stands of aspen (*Populus tremuloides*) are present throughout the project area. Spruce and fir are also present along the south and southwest shoreline of ODR; the eastern shoreline is a mesic meadow dominated by non-native pasture grasses such as timothy (*Phleum pretense*), smooth brome (*Bromus inermis*), and Kentucky blue grass (*Poa pratensis*). Native grasses are present as well as native forbs. The steep slope south of ODR is a mixed lodgepole pine and sagebrush (*Artemesia tridentata*) community with native grasses and forbs. Willow and emergent wetlands are present along the riparian corridor of Salt Lick Gulch, as a narrow band around the perimeter of ODR , and within Dillon Ditch. Beaver ponds are prevalent in Salt Lick Gulch from several hundred feet downstream of the diversion to I-70; and more prevalent downstream of the Interstate.

The lodgepole pine forest in the project area is heavily impacted by the ongoing pine beetle infestation; the Dillon Reservoir Forest Health and Fuels (DRFHF) project was approved in 2007 to manage forest vegetation affected by the mountain pine beetle epidemic while reducing the threat of catastrophic wildfire to community infrastructure. The ODR project area is a subset of the DRFHF project area. Figure 3-11 depicts the timber treatment units in the project area. For areas shown within the management units, lodgepole pine stands with trees over five inch diameter at breast height (dbh) would be clear-cut; however, management prescriptions within the units would leave younger seral stage lodgepole pine in some locations as well as preserve spruce and fir trees in others. Small stands of aspen in the project area would be managed to maximize aspen regeneration. Those management prescriptions are described in the DRFHF EA and in the project file at the Dillon Ranger District. The areas outside of the management units would remain as described above. The DRFHF project implementation would not enter the water influence zone (WIZ), which in the ODR project area would include a 100 foot buffer around shoreline of ODR, areas adjacent to Salt Lick Gulch and the outlet channel from ODR. Since the DRFHF project has been approved and being implemented, the conditions following the timber removal constitute the affected environment for the ODR project.

Threatened and Endangered Species (TES)
According to the White River National Forest Threatened, Endangered, and Candidate Species by District with concurrence by USFWS (7/20/09) by the US Fish and Wildlife Service, there are eight threatened or endangered (T&E) species potentially occurring on the Dillon Ranger District or potentially affected by management activities on the District. One species is a plant, Penland Alpine Fen Mustard that does not occur in the project area; one is a butterfly, Uncompahgre fritillary that does not occur in the project area; and, five are fish species that are discussed in the Aquatic Resource Section 3.3. The Canada lynx is the only Federally-listed species discussed in this analysis because it could occur on the project area due to the presence of suitable habitat.

The project area within the Blue River LAU contains 203 acres of lynx "other" foraging habitat, 45 acres of lynx "winter foraging" habitat, 363 acres of lynx "unsuitable[2]" habitat, and 100 acres of lynx "non-habitat[3]." The project area within the Snake River LAU contains 21 acres of lynx other habitat, 232 acres of lynx unsuitable habitat, and 82 acres of lynx non-habitat. This information is based on the lynx habitat data modified for the DRFHF project analysis through field reconnaissance and the conditions of the project area following implementation of the DRFHF project. The BA prepared for this project displays the modifications to lynx habitat data in the ODR project area. The project area does not contain any landscape linkage corridors within the LAUs or between LAUs. The presence of Dillon Reservoir to the south, and the urbanized areas of Silverthorne to the east and Frisco to the west as well as the high volume of traffic on I-70 all degrade the habitat values in the project area for lynx. The lynx habitats in the project area are mapped as other foraging habitat, winter foraging habitat, non-habitat and unsuitable habitat. The winter foraging habitat is located in the northwest portion of the ODR project area. Other foraging habitat is described as conifer forest cover that does not express characteristics that would meet the criteria for denning habitat or does not have the structure to support snowshoe hare year round in sufficient numbers to provide winter foraging opportunities for lynx. The DRFHF project treatment units are the unsuitable lynx habitats within the ODR project area. Unsuitable habitat is described as habitat that has been altered by human or natural disturbances such that it cannot currently support lynx or lynx prey species but through ecological succession is capable of supporting lynx or lynx prey species in the future.

Old Dillon Reservoir is within a band of forest cover, roughly 1,800 feet wide, between I-70 and Dillon Reservoir, which currently has significantly reduced functionality for lynx habitat due to the fact this band of cover lies in a highly disturbed landscape, and in an area that is mostly inaccessible to lynx. Very little of the project area has suitable habitat for snowshoe hares, the lynx primary prey species. Some young stands of lodgepole pine in the vicinity of ODR support a small population of snowshoe hares as confirmed by winter track observations. The habitat available (approximately 25-30 acres) would support a relatively small population of hares; and, the location of these habitats between I-70 and Dillon Reservoir reduces the functionality of these isolated pockets of habitat for lynx due to the inaccessibility of these areas.

Sensitive Species

Fifteen species from the R2 Sensitive species list were assessed in the BE as these species could be affected by the project as potential habitat for these species exists in the project area. The fish species are discussed in the Aquatic Resources Section 3.3.

Marginal habitat is present for **marten**. Late successional forest stands or stands with complex structure close to the ground, which are preferred habitats of the marten, are limited in the ODR project area.

[2] The definition of Unsuitable Habitat is vegetation communities that could support lynx but are currently in an ecological stage that does not support lynx or lynx prey species but will progress through ecological stages where the vegetation will support lynx or lynx prey species in the future.

[3] The definition of Non-habitat is vegetation communities that do not support lynx or lynx prey species and do not have the potential to develop vegetation that would support lynx or lynx prey species.

The project area is not suitable **wolverine** habitat due to the existing road density, nearby subdivisions, the high levels of human activity in the project area. **Bighorn sheep** occur on the Dillon Ranger District, but the project area does not support suitable habitat for this species. Habitat is considered available for the **pygmy shrew** due to the wide range of potential habitats for this species; however, pygmy shrews have never been found on the Dillon Ranger District. **River otters** occur on the Dillon Ranger District, but otter habitat is not present in the project area.

Marginal habitat for the **northern goshawk** and **boreal owl** is present in the project area although both species prefer mature timber stands. Goshawk surveys completed for the DRFHF project analysis did not locate breeding goshawks. Although the DRFHF project implementation would affect habitat for both the goshawk and the boreal owl in the project area, both species could still use the remaining habitats for foraging. Habitat for the **olive-sided flycatcher** is present in relatively small stands of spruce and fir along Salt Lick Gulch. The **peregrine falcon** and **black swifts** could forage over the project area, but nesting habitat for these species is not present. The project area contains habitat for the **American three-toed woodpecker**, and the mountain pine beetle epidemic has expanded habitat for this species throughout northern and central Colorado. Habitat for **purple martens** would not be expected in the project area as their habitat, mature aspen stands, is not present.

Boreal toad breeding and adult habitat is present in the wetland system on Salt Lick Gulch. Since potential habitat for this species exists in the beaver ponds in Salt Lick Gulch and at ODR, surveys of the beaver ponds and the reservoir shoreline were conducted to determine if toads were present. There was no evidence of boreal toad use of the beaver ponds or the reservoir recorded during these surveys. The **northern leopard frog** could occur on the Dillon Ranger District, but habitat for this species is not found in the project area. The **Great Basin silverspot** is a butterfly that is not known to occur on the Dillon Ranger District; and, the typical habitat for this species is on springs and seeps at lower elevations and more arid environments than are present on the Dillon Ranger District.

Management Indicator Species
The entire project area is suitable elk summer habitat. The majority of the project area north of I-70 adjacent to Salt Lick Gulch is elk winter range as mapped by the Colorado Division of Wildlife (CDOW) (Figure 3.11). The project area south of I-70 around ODR is not mapped as elk winter range. Elk in the project area are part of the herd in the CDOW's Data Analysis Unit 13 (DAU-13).

3.4.5 Environmental Effects by Alternative

3.4.5.1 Alternative 1 – No Action

Direct effects

Under the No Action Alternative the reservoir would remained drained until the north dam could be reconstructed to the requriments of the State Engineer's Office. There may minor and most likely immeasurable impacts to wildlife habitats at the reservoir due to reconstruction of the north dam. Lynx other habitat is mapped in the project area near the north dam, and it could be impacted during recontruction but that loss would likely be less

than one acre in an area where the functionality of the habitat is already reduced due to the inaccesibility of the ODR area (between I-70 and Denver's Dillon Reservoir). Direct effects to the senstive species considered and to elk would be very minor and most likely immeasurable.

Indirect effects

The No Action alternative would likely have indirect effects on T&E, Sensitive, and Management Indicator Species. Those indirect effects would be related to construction acitvities at the reservoir for reconstruction of the north dam. Those activities would create disturbance during daylight hours that habitats surrounding the reservoir would not likely be used by lynx, or the sensitive species considered in this document. Those indirect effects would be temporary and would last less than two months during the summer during dam reconstruction.

Cumulative effects

There would not be any cumulative effects of the No Action alternative.

3.4.5.2 Alternative 2 – Proposed Action

Project development impacts to wildife habititat are described as three different categories based on the permanancy of the impact and the type of disturbance:

Category 1 – Permanent loss of terrestrial habiat due to the two dams, the expansion of the water surface elevation of the reservoir, and access roads;

Category 2 – Impacts due to excavation and/or grading to construct the facilties which include: the borrow area on the east side of the reservoir to obtain material for dam construction, the excavation on the west to create the wetland mitigation and obtain material fro dam constrcution, grading and fill to construct the pipelines, minor excavation to create a buffer at the toe of each dam to remove all woody vegetation, and excavation to install toe drains for the dams;

Category 3 – Construction access only where tree and brush cutting only is required to allow for heavy equipment access to construct the various facilities, basically clear-cuts with regeneration.

Category 2 and 3 sites would be restored to native habitats; however, Catoegory 2 sites undergo substantial earth disturbance, and restoration to native plant communities would be more difficult than Category 3 sites, which should regenerate to native habitats.

Analysis of impacts includes the existing habitats and the habitats that will be present following implementation of the DRFHF project as described above. Table 3.8 displays the habitat impacts of the ODR project by Impact Category, and either existing habitat or DRFHF treatment area.

Table 3.8. Wildlife habitat impacts (acres) from the Old Dillon Reservoir Enlargement Project by impact type and habitat impacted.

	Category 1 permanent change to non-habitat	**Category 2** excavation/grading restored	**Category 3** tree and brush cutting, natural regeneration	**Total** acres disturbed by the ODR project implementation
Existing vegetation/habitats (described above)	9.12	4.90	2.26	16.28
Habitat Post DRFHF treatments	0.98	8.38	1.74	11.10
Total acreage	**10.10**	**13.28**	**4.00**	**27.38**

Direct and indirect effects

Threatened and Endangered Species
Lynx habitats affected by the project area are other foraging habitat, non habitat and unsuitable habitat. There are no mapped denning habitats or winter foraging habitats directly or indirectly affected by the project. As described above, the existing development in the area degrades the habitats value and effectiveness for lynx.

The Proposed Action would permanently convert (Category 1) 7.5 acres of other foraging habitat and 1.78 acres of unsuitable lynx habitat to non-habitat in the Blue River LAU. In the Snake River LAU, the Proposed Action would permanently convert 0.60 acres of unsuitable lynx habitat to non-habitat. In the Blue River LAU, the Category 2 impacts (excavated and restored) would convert 6.08 acres of other foraging habitat to unsuitable habitat, and the Category 3 impacts (clearing for construction access) would convert 2.85 acres of other foraging habitat to unsuitable habitat. In the Blue River LAU, Category 2 impacts occur on 7.92 acres of unsuitable habitat, and Category 3 impacts affect 1.82 acres of unsuitable habitat. In the Snake River LAU, Category 2 impacts occur on 0.44 acre of unsuitable habitat. The distinction between categories is made for the conversion to unsuitable habitats or the occurrence of Category 2 impacts on unsuitable habitats, as the excavated areas would be restored but the restoration of native plant communities would be difficult to soil disturbance, and thus the value of those habitats would likely be lower than the construction access areas (Category 3).

In summary, the ODR project permanently converts 9.88 acres of other foraging and unsuitable lynx habitat to non-habitat. These impacts primarily occur at the reservoir site east of I-70, and are due to the expansion of the reservoir and the reconstruction of the two dams. The ODR project also converts 8.93 acres of other foraging lynx habitat to unsuitable habitat due to excavation and construction access.

The project construction activity would occur during the daylight hours and mostly during snow free periods. There are not any resident lynx using the project area therefore there would be no direct effects to individual lynx from displacement. Due to the traffic on I-70 and the level of development near the project area, lynx movement through the project area is unlikely. The project is not expected to result in the direct mortality of a lynx, or prevent a lynx from moving through the project area north of I-70. The project does not affect any critical landscape linkage corridors allowing lynx to move within and between LAUs.

The indirect effects are related to lynx ability to use adjacent habitats both during and after construction. The habitats around Old Dillon Reservoir would remain basically inaccessible to lynx due to I-70, Dillon Reservoir and the development in the Town of Frisco, but the habitats west of I-70 would remain open to lynx movements and foraging in the Blue River LAU. The proposed project would not have any indirect effects on the ability of lynx to use these habitats. Maintenance activities at the diversion structure would be minimal and sporadic.

An increase in vehicle traffic on roadways can result in direct mortality to lynx when lynx encounter roadways during dispersal or use within their home range. Anticipated traffic increases generated during the peak of construction would be minimal. Rough estimates indicate traffic could increase on I-70 by 0.10% and on local roads by less than 0.20% over current traffic volumes. That increase in traffic would occur during construction, and thus be temporary. The effect on lynx of this minor traffic increase during construction would be insignificant and discountable. There are no expected increases in recreational use in the project area due to the proposed project.

Sensitive Species

American martens inhabit spruce/fir and lodgepole pine forests although generally associated with old growth and late succession stands with complex physical structure near the ground. The direct impacts of the Proposed Action on martens would be minimal and insignificant as the habitat in the project area is marginal and the acreage of permanent impact would be 10.1 acres. The project would not eliminate any home ranges for local marten populations due to the low value habitat in the project area. Although the project could potentially affect individuals, it would not impact the population at the landscape level and would not cause the loss of viability of the species at the landscape level.

Habitat for the **wolverine**, **bighorn sheep**, and **river otter** is not present in the project area; therefore, the ODR project would not impact these species or their habitat. The project area contains potential habitat for **pygmy shrews** due to the species use of a variety of habitats cited in the literature that includes subalpine forests, boggy meadows, clear cuts, willow thickets, aspen-fir forests, and subalpine meadows. Although it is unlikely they would be present in the project area, project implementation could kill individuals during construction, and the permanent loss of 10.1 acres due to the ODR Enlargement would directly impact pygmy shrew habitat. This impact could affect a number of individuals but would not cause the loss of viability of the species at a landscape level.

Goshawks are recognized as an interior forest (mature habitat) species requiring large blocks of forest for foraging and nesting, and are also relatively intolerant of human disturbance especially during nesting. The ODR enlargement would not directly affect goshawks as they were not detected in the previous surveys for the DRFHF project, and the habitat present is marginal due to the current level of human activity and traffic in the project area. The ODR project would not directly affect northern goshawks. The Proposed Action could indirectly impact goshawks due to the loss of 16.28 acres of potential forging habitat during construction, and the permanent loss of 10.1 acres of foraging habitat.

This level of impact may reduce the home range of an individual but would not impact the population at the landscape level and would not cause the loss of viability of the species at the landscape level.

In Colorado, **boreal owls** occur mainly in mature and old-age spruce/fir forests above 9,000 feet, but also frequent higher elevation lodgepole pine and aspen, and require large snags for nesting. Although the habitat is marginal in the project area, boreal owls could forage in the lodgepole pine stands present. The Proposed Action may indirectly impact boreal owls as 16.28 acres of potential foraging habitat would be affected by construction of ODR (11.1 acres of the total ODR footprint changed by the DRFHF project in the near term); and, the ODR project would permanently remove 10.1 acres of foraging habitat. This level of impact may reduce the home range of an individual but would not impact the population at the landscape level and would not cause the loss of viability of the species at the landscape level.

In the Southern Rockies, the **olive-sided flycatcher** is most common in high elevation spruce-fir forest, especially old growth - opening ecotones with a prevalence of standing dead trees and water. The presence of water and a high water table in wetland complexes helps create ideal conditions, including snag availability and an abundant insect food source. Habitat for this species is available along the Salt Lick Gulch wetland complex although the acreage is minimal; however, this habitat is not disturbed by the proposed project and is located several hundred feet downstream of the construction activities at the diversion. Olive-sided flycatchers would not be directly impacted nor would the habitat present be impacted. There would not be any indirect effects to olive-sided flycatchers.

The project would not affect **black swifts** or **peregrine falcons** as there is no nesting habitat in the project area; and, although each species could forage in the project area, the ODR project would not impact their ability to forage.

The **American three-toed woodpecker** commonly occurs in mature coniferous forests especially in areas with large infestations of bark beetles or recently burned areas. They are associated with spruce/fir forests but would use other habitats, and most observations are found above 9,000 feet. The baseline for the three-toed woodpecker following the DRFHF project would be a reduced amount of suitable habitat than is currently present in the project area. The ODR project would impact an additional 16.28 acres of suitable habitat in the short term and 10.1 acres of that total is permanent habitat loss (Category 1). The ODR project impacts would have a relatively minor impact on the species ability to forage in the area; however, the abundant habitat created by the pine beetle epidemic in the region would ameliorate any impact the project may have on species abundance. The project could impact individual's use of the project area but would not impact the project at the landscape level, would not cause the loss of viability of the species at the landscape level.

Boreal toads occupy marshes, wet meadows, and the margins of ponds, streams, and lakes in subalpine areas from 8,500 to 11,500 feet. They are commonly found in shallow water or among sedges and shrubby willows. There would be no direct effects on boreal toads from the reservoir expansion. Indirect effects to boreal toads from the diversions of water from Salt Lick Gulch for the expanded reservoir operations were considered in detail in the Biological Evaluation. Although boreal toads were not detected, habitat for breeding is available. The wetland type in Salt Lick Gulch is primarily a slope wetland which is

supported by groundwater flows from the adjacent slopes. Reduction in stream flow during average and wet year flow events would not likely affect boreal toad breeding due to the groundwater support of the wetland for both normal and emergency operations. During a dry year flow event and emergency operations, water levels in the beaver ponds could be reduced; however, the frequency of occurrence of a dry event is 1 in 80 years, and emergency operations would likely occur infrequently.

For the sensitive species discussed above, the ODR project may adversely impact individuals, but is not likely to result in a loss of viability of the planning area, nor cause a trend to federal listing or a loss of species viability range wide.

Management Indicator Species
Elk use of the habitats around the reservoir was documented by the presence of sign (scat) but the amount of sign observed was low indicated relatively low use of the area by elk. It appeared elk were using these habitats in the summer and fall. Tom Kroening (CDOW – personal communication) stated that elk move into the habitats around the reservoir from the areas west of I-70. Elk habitat in the wildlife project area would be temporarily impacted by the disturbance of 16.28 acres due to the ODR project implementation, and of that total, 10.1 acres of habitat would be lost permanently. The elk winter range west of I-70 would not be affected by the ODR Enlargement. The relocation of the diversion would permanently impact approximately 0.10 acre of the winter range, and that loss of habitat would not measurably affect elk use of the winter range habitats west of I-70. The habitats around the reservoir are not winter range.

Elk use around the reservoir and in the habitats near the Dillon Ditch north of I-70 would be affected by construction. Construction would commence in late April and continue to November during snow-free periods, and it may last for two years. Elk use of the habitats around the construction areas would be reduced during the construction period.

The permanent loss of 10.1 acres of elk summer habitat would have an immeasurable effect on elk at the project area level. The project would not affect elk populations at the DAU level or at the forest- wide level. There would be no indirect effects to elk associated with the project after the project construction is complete. Water diversions would be automated resulting in reduced amounts of human disturbances in the Salt Lick Gulch winter range than exist currently. Recreational activities around the reservoir would be expected to return to pre-project levels. Elk would continue to use habitats adjacent to the disturbed areas after construction.

Cumulative effects

Threatened and Endangered Species
Cumulative effects for TES consider future federal, state, and private actions within the action area (Summit County), and only those future federal, state, and private actions that are reasonably certain to occur. There are no "reasonably certain to occur actions" that would occur within the Towns of Silverthorne or Dillon that would affect lynx. Both towns are in lower elevations that do not support lynx habitat and the habitats present are already fragmented.

Throughout unincorporated Summit County, there are platted undeveloped lots within existing subdivisions within higher elevation spruce-fir forests that are lynx habitat in the upper Blue River watershed. Each of these lots has a water right to drill a well for in house potable water. The enlargement of Old Dillon reservoir may provide water for outside watering; therefore, while the project would not allow this future development to occur, it may change the nature of the development.

Some of the lots are on the periphery of the subdivisions and abut NFS system lands, and those NFS lands in the upper Blue River watershed either are, or could be in the future, part of the home range of a lynx. The habitat on the periphery lots could be used by lynx. The change in the nature of the development of these lots would affect snowshoe hare and red squirrel habitat and reduce the functionality of the habitats on private lands for lynx. The development of these lots would have an immeasurable and discountable impact on lynx use of the adjacent habitats on NFS lands. The impact is discountable as it would not affect the ability of lynx to utilize the habitats on NFS lands or measurably affect the home range of an individual lynx. The loss of habitat on the developed lots would not appreciably affect hare or red squirrel numbers on adjacent NFS lands.

Sensitive Species
Cumulative impacts are the additive effects of the Proposed Action on the sensitive species considered related to past, present, and reasonably foreseeable future actions in the Salt Lick Gulch watershed and the Blue River watershed.

The residential developments in the unincorporated sections of Summit County are within habitat for the American marten, pygmy shrew, boreal owl, olive-sided flycatcher, three-toed woodpecker, and boreal toad. The change in the nature of the development of the undeveloped lots due to the availability of water from the ODR project could result in additional landscaping and removal of more trees than would otherwise occur without the ODR project. This change could reduce the home range of a few individuals of the sensitive species listed above, or change how they use the adjacent NFS lands. However, that impact would not affect those species at the landscape level nor result in a loss of species viability. The cumulative impacts of the Proposed Action to these species related to past, present, and reasonably foreseeable actions would be immeasurable. Those cumulative impacts would not likely result in a loss of viability of the planning area, nor cause a trend to federal listing or a loss of species viability range wide.

Management Indicator Species
Cumulative effects consider past, present and reasonably foreseeable future actions combined with the Proposed Action that would affect elk populations. There are no cumulative effects related to the ODR project as the direct loss of winter range is immeasurable (<0.10 acre). Elk use around the reservoir was relatively low and the habitat loss (10.1 acres) at the reservoir is minor. Human population growth and land development would continue to be two of the largest influences on elk management. The change in the nature of development in the unincorporated sections of Summit County due to water made available by the ODR project would affect the higher elevation elk summer habitats within the aforementioned residential subdivisions. Those impacts on private lands would be minor to elk herd using those areas due to the abundance of summer habitat available on both private lands and adjacent NFS lands. The CDOW would continue managing the

population, including their intent to reduce the population within DAU E-13 to the established herd objectives.

3.4.6 Monitoring Recommendations

There are no monitoring recommendations for wildlife resources for this project.

Revegetation efforts would be monitored as required by vegetation and wetlands sections.

3.4.7 Mitigation Recommendations

There are no mitigation recommendations.

3.4.8 Irreversible and Irretrievable Commitments of Resources

There would be no irreversible or irretrievable commitment of wildlife resources.

3.4.9 Forest Plan Consistency

The action alternative would be consistent with Forest Plan standards for wildlife species.

3.5 VEGETATION

The plant surveys were completed by Nancy Redner. The specialists report for vegetation completed by Ms. Redner is in the project file.

3.5.1 Issues and Indicators

Issues pertaining to vegetation were raised by the Forest Service with respect to scenery management and noxious weed control. Indicators include achieving Scenic Integrity Objectives (SIOs) for the project area via a revegetation plan and monitoring, which would also address noxious weeds.

3.5.2 Forest Plan Direction

The applicable Forest wide standard includes: Use genetically local (at the ecological subsection level) native plant species for revegetation efforts when technically and economically feasible. Use seed mixtures and mulch that are noxious weed-free.

Applicable 8.21 Management Area direction includes: Vegetation management practices would be used to meet specific resource objectives other than wood production. Vegetation management operations should be designed to maintain the desired recreation setting. Vegetation communities are maintained or improved to provide an eye-pleasing appearance for visitors, complement the recreation values, and provide varied structural stages and plant communities. The health, sustainability, and appearance of communities are emphasized because of their desirability for recreational use. This includes manipulating vegetation to accommodate both existing and new facilities.

3.5.3 Geographic and Temporal Scope

The proposed ODR expansion project is located on the Dillon Ranger District of the White River National Forest in Summit County. The project area covers approximately 40 acres bordered by Interstate Highway, I-70, and by the Dillon Reservoir. Additional surveys were conducted across Interstate Highway I-70 on the north side near the Town of Silverthorne and below a subdivision known as Wildernest.

Based on the results of the pre-field review, field reconnaissance was conducted to assess the project area for suitable habitat for the Proposed, Threatened, Endangered, and Sensitive (PETS) plant species in question. Where suitable habitat was present, species surveys were conducted to refine knowledge of presence or absence of PETS plant species.

3.5.4 Affected Environment

The proposed project is located in the Southern Rocky Mountain Eco-zone at approximately 9,200 feet in elevation. The elevation determines this area to be in the upper periphery of the montane and lower periphery of the subalpine forest ecosystems for plants and plant communities. This area is a popular easy hiking destination for visitors to Summit County. There is a road to the Old Dillon Reservoir that is gated and controlled by the USFS. The area has had extensive weed control preformed for the past six years. The weeds are still present, but not as extensive due to weed control efforts. Mountain pine beetle are epidemic in pine stands found throughout the area. Vegetation communities found in the project area are described in this section.

The DRFHF project implementation would alter the plant communities in the project area. Lodgepole pine over five inches diameter at breast height (dbh) would be removed; this would set back the seral stage of the forest in the project area. Shade intolerant plant species would dominate the plant communities until natural forest regeneration begins to shade out these species.

Montane & Subalpine Trees

Historically the ODR area was a mixed forest of subalpine fir (*Abies bifolia*), Englemann spruce (*Picea englemannii*), and lodgepole pine (*Pinus contorta*) (Benedict pg. 460). All three of these conifer trees are still growing in this area. Lodge-pole pine is the dominant species. Evidence of clear cutting and selective cutting are evident in this area. The area has been used for Christmas tree harvesting by individuals. Aspens (*Populus tremuloides*) are a widely distributed deciduous native tree species and are dispersed throughout a montane and subalpine forest. Aspens were found scattered throughout this area.

Trees were inventoried with parasites around the ODR. Mountain pine beetle are at an extreme epidemic stage in lodgepole stands found throughout the Dillon Ranger District. Additionally the lodgepole stands throughout the Dillon Ranger District are infected with American mistletoe (*Arceuthobium americanum*).

Herbaceous Plants

Most plants found around the project area were typical and common to the upper montane and lower subalpine forest ecosystems. The dominant forest type is monotypic stands of lodgepole pine. Small isolated stands of Englemann spruce and subalpine fir are present along Salt Lick Gulch and ODR, and aspen were a minor component of the stands throughout the project area.

The lodgepole pine drops its needles, causing a dense acidic duff underneath the tree. This limits other plant species ability to grow in these acidic conditions. These species included; yarrow (*Achillea lanulosa*), golden rod (*Solidago spathulata var. nana*), lessor wintergreen (*Pyrola minor*), one-sided wintergreen (*Orthilia secunda*), common juniper (*Juniperus communis ssp. alpina*), russet buffaloberry (*Shepherida canadensis*), grouse whortleberry (*Vaccinium myrtillus var. oreophilum*), wood's rose (*Rosa woodsii*), and elk sedge (*Carex geyeri*).

Threatened Plant Species

Only one of the 13 threatened and endangered plants federally listed for Colorado (USFWS 1993) has been documented in Summit County and located on the Dillon Ranger District. The threatened plant penland alpine fen mustard (*Eutrema penlandii)* has been found in Summit County on Hoosier Ridge. There are no records of this plant outside the Hoosier Ridge area that extends south to Mount Sherman in the Mosquito Range.

Sensitive Plant Species

The following are the plant species listed on the Region 2 Sensitive Species list for the WRNF that could be found in the project area. These sensitive plant species are discussed due to possible habitat interrelated by elevation or specific habitat requirements found in this area.

Astragalus leptaleus - Park Milkvetch
This milkvetch grows from 6,500 to 9,500 feet in elevation. This plant grows in Park County in moist, sedge-grass meadows, swales, turfy hummocks on the edge of meandering brooks. Habitat for this species is not found in the project area nor was it located during surveys.

Carex diandra – Lesser Panicled Sedge
This sedge grows from 6,100 feet to 8,600 feet in elevation. Lesser Panicled sedge can be found in floating and non-floating peatland, pond edges, hummocks in open shrub and sedge meadows, swamps, and in sphagnum bogs. Habitat for this species is not found in the project area nor was it located during surveys.

Erophorum altaicum var. neogaeum – Altai Cottongrass
This sedge is found in bogs, swamps, and marshes in montane and subalpine zones. It grows from 9,500 to 12,000 feet in elevation. This plant has been found on the White River National Forest but not in the Dillon Ranger District. Fens, the typical habitat for this species, were not found in the project area.

Eriophorum chammissonis - Russet Cottongrass
This plant is usually found in fens in montane and subalpine zones. It grows from 7,350 to 8,320 feet in elevation. This plant has been found on the White River National Forest but not in the Dillon Ranger District. Habitat for this species is not found in the project area, nor was it found during surveys.

Eriophorum gracile - Slender Cottongrass
This sedge is found in wet meadows, fens, and pond edges. This plant is known to grow in Colorado at 6,900 to 12,000 feet in elevation. In Summit County any species of Cottongrass is very uncommon. During the survey potential habitat for this species were not found in any areas that would be disturbed.

Machaeranthera coloradoensis var. coloradoensis – Colorado Tansy-Aster
This tansy-aster is more closely associated with ponderosa pine and bristlecone pine trees able to grow from 7,675 feet to 12,940 feet in elevation. It requires a dry habitat with various soils. This plant was not found during the surveys, nor is habitat for this species found in the project area.

Penstemon harringtonii - Harrington Beardtongue
This penstemon grows in sagebrush stands. Sagebrush is found near the ODR but this penstemon was not found in the sagebrush at the ODR site. The area does not have the dry rocky clay loam soil from calcareous parent materials that is this plant's habitat. This powder blue flowering plant has not been found above 8,000 feet in Summit County or the Dillon Ranger District. The dry rocky clay loam soil and limestone shale is not present at the ODR.

Ptilagrostis porteri – Porter Feathergrass
The ideal habitat for porter feather grass is in willow carrs or hummocks in fens where tufted hair grass is co-dominant. This plant has been found in elevations from 9,200 feet to 12,000 feet in elevation. This plant is endemic to El Paso, Lake, Park and Summit County. Habitat for Porter feathergrass is not present in the project area nor was this species found in the project area during surveys.

Weeds

The recreational use and road access to this area has caused a noxious weed corridor of Canada thistle (*Cirsium arvense*), mayweed chamomile (*Anthemis cotula*), and musk thistle (*Carduus nutans*). The Forest Service has implemented very effective noxious weed control measures over the past few years. Thistle and chamomile populations have been reduced around the reservoir. The Forest Service, Colorado Department of Transportation (CDOT), and the Town of Dillon have used non-native seed mixes in the past for revegetation. These cultivated grass seed mixes with non-native species have aided in the displacement of native species. These species include smooth brome (*Bromus inermis*), Kentucky bluegrass (*Poa pratensis*), and orchard grass (*Dactylis glomerata*). Reed canary grass (*Phalaris arundinacae*) is present in the Salt Lick Gulch wetland downstream of the diversion.

3.5.5 Environmental Effects by Alternative

3.5.5.1 Alternative 1 – No Action

Under the No Action alternative, no reservoir expansion would take place. The Dillon Ditch would not be rehabilitated. Other than removal of a few trees for rehabilitation of the north dam, there would be no removal of forested vegetation from reservoir enlargement. Although the DRFHF project would remove lodgepole pine over 5 inch dbh those trees would return as the forest regenerates. There would also be minimal ground disturbance associated with reconstruction of the north dam as mandated by the state engineer. No PETS plant species would be affected by selection and implementation of the No Action alternative.

3.5.5.2 Alternative 2 – Proposed Action

Habitat for threatened and endangered plant species listed under the Endangered Species Act is not present in the project area, and surveys did not locate any of the species in the project area. Although the range of elevations where R2 Sensitive species are found do exist in the project area, the specific habitat requirements are not present in the project area. Species specific surveys for sensitive species did not locate any of the species in the project area.

Direct effects

The Proposed Action would result in the removal of 10.1 acres of vegetation around the expanded reservoir and the removal of trees along the Dillon Ditch. Removal of this forest by enlarging the Old Dillon Reservoir would be a permanent impact because the forest would not regenerate in this area; however, this would not result in a loss of any important habitat. The Proposed Action would not adversely affect any Federally-listed threatened, endangered, or proposed species; would not cause any R2 Sensitive species to move toward Federal listing; and would not contribute to a loss of viability of native species in this area, nor cause a loss of sensitive species' viability range-wide.

Indirect effects

The indirect effects to vegetation are related to the conversion of the Dillon Ditch to a pipeline. Although the alignment would be reseeded with a native seed mix, natural regeneration of the lodgepole pine or aspen would not occur on ~3.5 acres because the pipeline corridor would be kept clear of woody vegetation.

Cumulative effects

The cumulative effects of the Proposed Action when considered in conjunction with the DRFHF project would add 10.1 acres of tree removal to the acreage affected by the DRFHF project. The trees removed by the DRFHF project would regenerate, but the 10.1 acres would not as that area would be covered by reservoir and the two dams. There would be no cumulative impact to any PETS plant species.

3.5.6 Monitoring Recommendations

The project proponents would monitor revegetation efforts for three years following project completion. Monitoring work would begin one full growing season after disturbed areas are reseeded. Monitoring would consist of site photographs from fixed photographic points as well as close up ground photographs to document vegetative cover. A list of species would be included in the monitoring report (including weeds) along with recommendations for remedial measures if the revegetation efforts are not successful.

3.5.7 Mitigation Recommendations

Revegetation efforts are included as part of the Proposed Action. No further mitigation recommended.

3.5.8 Irreversible and Irretrievable Commitments of Resources

There would be no irreversible or irretrievable commitments of vegetation resources with selection and implementation of the Proposed Action.

3.5.9 Forest Plan Consistency

Both the proposal and the No Action alternative are consistent with Forest Plan standards and guidelines.

3.6 RECREATION

3.6.1 Issues and Indicators

Recreation resources analyzed in this section include developed recreation sites (e.g., trailheads), trail uses (hiking, mountain biking, etc), non-motorized winter uses, and other dispersed recreation activities (fishing, sightseeing, etc). Potential impacts to these facilities and activities are those which either limit access or change the setting. Effects to the recreation resources can be measured in number of days that sites or areas are closed to public use and miles of road/trail closed to recreational uses.

3.6.2 Forest Plan Direction

Applicable Forest wide standards include: At special recreation features, maintain enough water in streams to sustain the water-dependent recreation values and protect stream flows (Forest Plan page 2-31). Also, all new or reconstructed recreation facilities would provide a range of universally accessible opportunities within the limits of the site characteristics and Recreation Opportunity Spectrum (ROS) classification. Applicable Forest-wide guidelines include: Management activities should be consistent with guidance in the ROS User's Guide for the adopted summer and winter ROS classes on the ROS maps (Forest Plan page 2-31).

Applicable 8.21 Management Area direction states that these areas contain developed recreation sites that provide an array of recreational opportunities and experiences in a

forested environment. These types of areas also include the surrounding terrain, resulting in an attractive setting for the developments (Forest Plan page 3-78).

3.6.3 Geographic and Temporal Scope

The area which may be affected by the proposed activities includes the Salt Lick Gulch trail system and the ODR trail system. Facilities include trailheads, trails, and roads as well as Salt Lick Gulch and Old Dillon Reservoir.

Recreation use occurs throughout the year; however, it varies by type and intensity. Winter uses are primarily non-motorized over-the-snow activities (e.g., cross county skiing and snow shoeing), which occur November through April; however, the bulk of use occurs December through March (when there is sufficient snow on the ground). The summer season is the remainder of the year (May through October).

3.6.4 Affected Environment

The project area includes two areas with trails: Ryan Gulch trails, including Salt Lick Gulch, and FDT#87.1 Old Dillon Reservoir Trail.

The Ryan's Gulch trail system consists of several miles of non-system, non-motorized routes. Recreation use on these trails is high throughout the year, with hiking, mountain biking, and fishing in the summer and snowshoeing and Nordic skiing in the winter. Salt Lick Gulch access road is part of an extensive unauthorized, non-motorized trail system and is proposed for closure to all motorized vehicle travel (except for infrequent maintenance of the diversion structure and ditch by the Town of Dillon). This access road would likely be converted to a single-track trail.

The ODR Trail offers a trailhead parking area and a non-motorized trail to the Old Dillon Reservoir. This area is used primarily in the summer for hiking, fishing, sightseeing, and picnicking. This trail offers views of Dillon Reservoir and the Ten Mile Range.

3.6.5 Environmental Effects by Alternative

3.6.5.1 Alternative 1 – No Action

Direct and indirect effects

Under the No Action alternative, the reservoir would still be drained and the north dam embankment improved to address dam safety standards as required by the State Engineer. This would have a short-term direct effect on opportunities for fishing and other dispersed recreation activities at ODR. The trail to ODR would remain open to a certain vantage point that would offer views of Dillon Reservoir and the Ten Mile Range.

Cumulative effects

There would be no cumulative effects to recreation resources under the No Action alternative.

3.6.5.2 Alternative 2 – Proposed Action

Direct and indirect effects

The reservoir enlargement project would likely necessitate closure of the ODR area for public safety. This may be from April 2009 through November 2010, with limited access in 2011 to allow for successful revegetation efforts. This would have a short-term direct effect on opportunities for fishing and other dispersed recreation activities at ODR. The trail to ODR would remain open to a certain vantage point that would offer views of new Dillon Reservoir and the Ten Mile Range as well as an opportunity to view the enlargement project.

Post-construction, the ODR trail would be open to and around the enlarged reservoir. Hiking, biking, and other dispersed recreation opportunities would persist. The CDOW would likely continue stocking the reservoir and several areas around the reservoir would be designed to facilitate fishing access. Reservoir operations would include filling ODR during the spring runoff, storing water in ODR through the spring and early summer, and then releases to enable the proponents to utilize this water. Demand for this water would be greatest during the warmer months (June, July, and August). During emergency operations and as reservoir service demands reach maximum annual levels, the reservoir would be fully utilized and drained each year, which would result in lost fishing opportunities and a changed recreation experience.

Reservoir operations may affect recreation opportunities and experience for fishing at ODR. Currently the reservoir is maintained at a stable level through the summer. Although fishing opportunities would remain, the fishery would be less productive due to the draw downs of the expanded reservoir.

The small parking area east of the main Salt Lick Gulch trailhead would remain open. The larger Salt Lick Gulch trailhead parking area would be used as a construction staging area for project components north of I-70 and would likely be closed to vehicular traffic for public safety purposes. A narrow path would remain open to facilitate pedestrian access to the trail network. Temporary closure (two weeks) of Salt Lick Gulch access road from the trailhead to the proposed diversion structure would be necessary during implementation of proposed road improvements. Additional temporary closures (less than one week at a time) on this section of the trail system may be necessary throughout the summer when materials are delivered to the diversion structure site or the ditch. The trail along the Dillon Ditch would be closed for public safety reasons during the 2009 construction season as the pipeline is installed and buried. Because of the relative large availability of other trail opportunities, the use of these trails can easily be dispersed without negatively and indirectly affecting other trails.

Post-construction, the Salt Lick Gulch access road would be scarified and seeded to achieve the desired future condition as indicated in the WRNF Travel Management Plan. Converting roads to single-track trails significantly reduces maintenance costs while maintaining hiking and mountain bike opportunities. This is consistent with direction from the White River National Forest Recreation Strategy. The improvements necessary for

construction staging would be maintained and the trailhead parking area for this trail system would benefit from the improved condition.

Cumulative effects

Through an examination of past, present, and foreseeable actions, it has been determined that there have been and would be trail closures on NFS lands. Most have been short-term and at times of lower use. Displacement created an inconvenience to the public; however, efforts were made to educate them about the public safety need for closures.

There are no other cumulative effects to recreation resources under the Proposed Action alternative.

3.6.6 Monitoring Recommendations

None

3.6.7 Mitigation Recommendations

None

3.6.8 Irreversible and Irretrievable Commitments of Resources

None

3.6.9 Forest Plan Consistency

Both the proposal and the No Action alternative are consistent with Forest Plan standards and guidelines.

3.7 SCENERY RESOURCES

3.7.1 Issues and Indicators

The ODR project area is used throughout the year by the recreating public. Foreground and middleground views along travel routes and adjacent to the recreation site are important for users of travel corridors in the area (I-70 and Dillon Dam Road). The project is in an area of high visibility used primarily by recreationists.

The issue of the visibility of the enlarged embankments was raised during scoping, in conjunction with the March 2007 decision to approve the Dillon Reservoir Forest Health and Fuels (DRFHF) Environmental Assessment (EA). Because this decision precedes the decision on the ODR Enlargement, the environmental baseline for this scenery analysis is post-implementation of the work considered in that EA. The indicators for this issue are the Scenic Integrity Objectives (SIO) and whether project implementation would maintain those objectives.

3.7.2 Forest Plan Direction

The Revised Land and Resource Management Plan for the White River National Forest (WRNF, 2002 Forest Plan Revision - Record of Decision 4/2/02) establishes acceptable limits of change for Scenic Resources. The acceptable limits are the Scenic Integrity Objectives (SIOs).

3.7.3 Geographic and Temporal Scope

The viewshed analysis includes six points identified by the Forest Service representing the foreground (IF-03), middleground (M-01, 03, 08, and15), and background (B-01). The analysis considers the current condition, the baseline condition (post-tree removal with implementation of the DRFHF project), and the proposed condition with implementation of the ODR Enlargement project.

3.7.4 Affected Environment

There is a high level of recreation use throughout the year. Recreational activities include a variety of developed and dispersed activities. The SIO for the ODR project area ranges from Moderate, which refers to landscapes where the character appears slightly altered, to Low, which refers to landscapes where the character appears moderately altered. The road corridors and the trails are Concern Level 1 travel corridors due to high levels of use. The Scenic Class for this area is High because it receives high use, is visible, is scenic, and is valued by the public.

The Concern Level 1 travel routes include I-70, Dillon Dam Road, and the Dillon Reservoir Bike Trail System. This project is located between I-70 and the Dillon Dam Road, on a hill north of Dillon Reservoir. The project is in an urban area with private residences, commercial facilities, and recreation facilities in close proximity. Foreground and middleground views along these travel routes and adjacent to recreation sites are important for users of these travel corridors and recreation facilities. Due to the high visibility of this project, most of this area is in a critical viewshed and used primarily by recreationists. This area is currently providing scenic benefits to the adjacent highway users and provides a scenic setting for the Towns of Dillon, Frisco, Silverthorne and its residents. The trend appears to be increased recreational use. This project would provide recreational opportunities for the public benefit.

The existing condition of the project area and the entire viewshed is that a large percentage of the lodgepole pine is infested with mountain pine beetle (MPB). The landscape character of the area has been changed due to the MPB epidemic. This area would be changed even more after the tree removal associated with the Dillon Reservoir Forest Health and Fuels Project. Initially, there would be minimal existing vegetation for screening.

A viewshed analysis was conducted from six viewpoints representing the foreground (IF-03), middleground (M-01, 03, 08, and15), and background (B-01) to demonstrate the current condition, the baseline condition (post-tree removal), and the proposed condition with implementation of the ODR Enlargement project. Figures 3.12 through 3.17 depict these images.

The first photo in each of the viewshed analyses was take from the identified viewpoint and shows the current condition. The second has been modified using 3D Modeling software called Visual Nature Studio to demonstrate the baseline conditions post-tree removal.

Foreground (IF-03)

In this photo, the observer is looking southwest at ODR toward Frisco. Peak One, Mount Royal, and Buffalo Mountain are all visible from this viewpoint. The MPB infestation is evident on the western shore of ODR. A recreation path around the reservoir is visible as well as power lines serving the Lake Hill communications site.

In the second figure on IF-03, the photo simulation shows removal of MPB infested trees in all distance zones. More of new Dillon Reservoir is visible with this tree removal. As a result of implementation of the DRFHF project, the landscape character would change with respect to line, form, texture, and color. Specifically, the canopy density would be reduced and fragmented, making it appear patchy rather than continuous forest cover. Additionally, there would be a disparity in the height and color of remaining vegetation due to the removal of the overstory.

Middleground (M-01, 03, 08, and 15)

In **M-01**, the observer is on a boat ramp at the Pine Cove campground looking north across new Dillon Reservoir toward the project area. The MPB infestation is evident along the shores of Dillon Reservoir. The Lake Hill communications site is visible from this viewpoint. Recreation activities are evident on Dillon Reservoir.

In the second figure on M-01, the photo simulation shows removal of lodgepole pine which reduces vegetative cover in the area leaving more bare ground. As a result of implementation of the DRFHF project, the landscape character would change over the short- and long-term with respect to line, form, texture, and color as described under IF-03.

In **M-03**, the observer is at a picnic area along the Sapphire Point trail looking northwest across Dillon Reservoir toward the project area. Extensive amounts of infested trees are visible as well as portions of Dillon Dam Road, the Lake Hill communications site, and residential development.

In the second figure on M-03, the photo simulation shows removal of MPB infested trees in all distance zones, which reduces vegetative cover in the area leaving more bare ground. More residential development is visible as is the existing ODR. As a result of implementation of the DRFHF project, the landscape character would change over the short- and long-term with respect to line, form, texture, and color as described under IF-03.

In **M-08**, the observer is on the Ryan Gulch trail system to Buffalo Mountain looking southeast toward the project area. Extensive amounts of infested trees are visible as well as residential development, new Dillon Reservoir, ODR, and portions of I-70, Highway 6, and Keystone Resort.

In the second figure on M-08, the photo simulation shows extensive MPB treatments in all distance zones, which reduces vegetative cover in the area leaving more bare ground. As a result of implementation of the DRFHF project, the landscape character would change over the short- and long-term with respect to line, form, texture, and color as described under IF-03.

In **M-15**, the observer is on a boat on the surface of new Dillon Reservoir looking west toward the project area. Extensive amounts of infested trees are visible as well as Dillon Reservoir and Dillon Dam Road.

In the second figure on M-15, the photo simulation shows the effects of the MPB treatments, which makes more of Dillon Dam Road visible from this viewpoint and shows more bare ground in the fore- and middleground views. As a result of implementation of the DRFHF project, the landscape character would change over the short- and long-term with respect to line, form, texture, and color as described under IF-03.

Background (B-01)

In **B-01**, the observer is at the summit of Dercum Mountain at Keystone Resort looking northwest across Dillon Reservoir toward the project area. Roads, residential development, and a portion of ODR are visible as well as the extensive recreation use of Dillon Reservoir.

In the second figure on M-15, the photo simulation shows removal of MPB infested trees, primarily visible in the background, leaving more bare ground and less of a vegetative mosaic. More of ODR is visible with removal of vegetative screening. As a result of implementation of the DRFHF project, the landscape character would change over the short- and long-term with respect to line, form, texture, and color as described under IF-03.

BASELINE CONDITIONS

PROPOSED CONDITIONS AT FULL CAPACITY

PROPOSED CONDITIONS AT DRAW-DOWN

Observer IF-03 looking southwest at Old Dillon Reservoir site towards Peak One and Mount Royal in the background.

LATITUDE: *39.5612305*
LONGITUDE: *-106.069862*
ELEVATION: *9,213'*

FIGURE 3.12

FIGURE 3.12

EXISTING CONDITIONS

BASELINE CONDITIONS

PROPOSED CONDITIONS

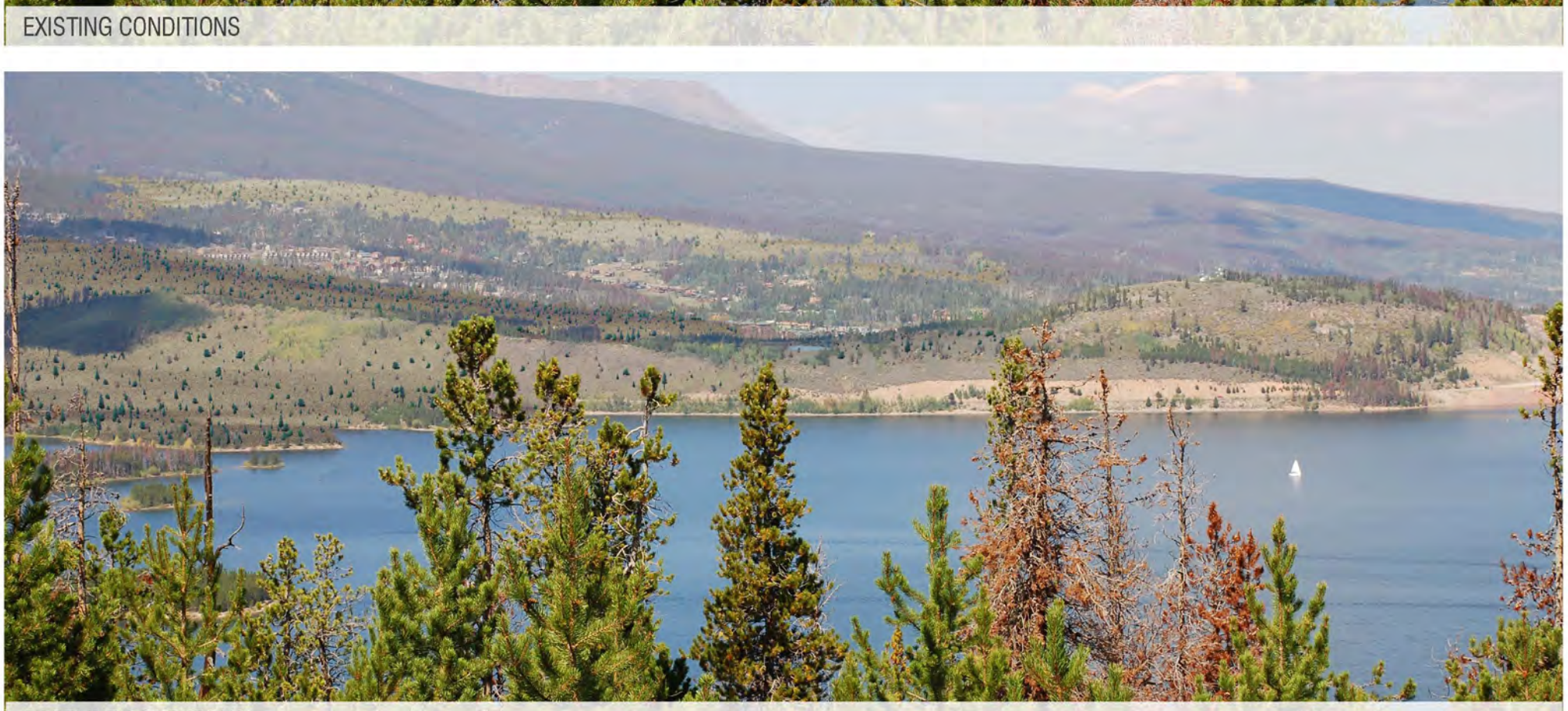
Observer M-01 looking north across Dillon Reservoir towards proposed Old Dillon Reservoir expansion. Observer is on boat ramp at Pine Cove campground.

LATITUDE: *39.588428*
LONGITUDE: *-106.06991*
ELEVATION: *9,027'*

FIGURE 3.13

FIGURE 3.13

EXISTING CONDITIONS



BASELINE CONDITIONS

PROPOSED CONDITIONS

Observer M-03 looking northwest across Dillon Reservoir towards proposed Old Dillon Reservoir expansion. Observer is at picnic area along Saphire Point trail.

LATITUDE: *39.591395*
LONGITUDE: *-106.04591*
ELEVATION: *9,516'*

FIGURE 3.14

FIGURE 3.14

EXISTING CONDITIONS

BASELINE CONDITIONS

PROPOSED CONDITIONS

Observer M-08 looking southeast towards proposed Old Dillon Reservoir expansion. Observer is on USFS hiking trail to summit of Buffalo Mountain.

LATITUDE: *39.620405*
LONGITUDE: *-106.12482*
ELEVATION: *10,477'*

FIGURE 3.15

FIGURE 3.15

EXISTING CONDITIONS

BASELINE CONDITIONS

PROPOSED CONDITIONS

Observer M-15 looking WEST across Dillon Reservoir towards proposed Old Dillon Reservoir expansion. Observer is on boat on the surface of Dillon Reservoir.

LATITUDE: *39.612922*
LONGITUDE: *-106.05625*
ELEVATION: *9,030'*

FIGURE 3.16

FIGURE 3.16

EXISTING CONDITIONS

BASELINE CONDITIONS

PROPOSED CONDITIONS

Observer B-01 looking northwest across Dillon Reservoir towards proposed Old Dillon Reservoir expansion. Observer is at summit of Dercum Mountain at Keystone Resort.

LATITUDE: *39.579439*
LONGITUDE: *-105.942107*
ELEVATION: *11,634'*

FIGURE 3.17

FIGURE 3.17

3.7.5 Environmental Effects by Alternative

3.7.5.1 Alternative 1 – No Action

Direct and indirect effects

Under the No Action alternative, the reservoir would still be drained, and the north dam embankment improved to address dam safety standards as required by the State Engineer. This would have a short-term direct effect on observers from all observer locations. Rather than seeing the water surface, observers would see the topography of the land beneath the surface of the water. Upon completion of addressing dam safety issues, the area would return to the existing condition.

3.7.5.2 Alternative 2 – Proposed Action

Direct and indirect effects

Scenery effects generated by tree removal and enlargement of the reservoir vary in intensity depending on the observer location. Tree removal associated with the project would be minimal compared to the baseline conditions, which include implementation of the DRFHF EA. Ground disturbance would be temporary and visible only in the immediate foreground (i.e. within the project area). The expansion of the reservoir may impact scenic resources by altering existing line, form, color, and texture in the affected viewsheds. The proposed dam design blends with the surrounding topography and terrain characteristics. The undulations and irregularity of the dam faces mimic surrounding topography, while the use of native vegetation and boulders along the toe and perimeter of the dam would aid in preventing the appearance of linear, man-made features typical with dams of this size. Alterations to the landscape resulting from the dams would impact the scenery resource in areas of high visibility for Middleground and Background views. The "desired character" of a landscape is its appearance, which would either be retained or created over time. Revegetation and other design elements have been incorporated into the project to further avoid and minimize impacts to scenic resources. The attached figures demonstrate the potential visual impact from the ODR Enlargement project as observed from six identified viewpoints (Figures 3.12 through 3.17).

Foreground (IF-03)

From observer location IF-03, the observer would see a larger surface area of water and tree removal around the shores of the reservoir for the enlargement. Less of new Dillon Reservoir would be visible under the proposed conditions due to higher embankments along the south west side of the reservoir. The second figure from observer location IF-03 compares the proposed conditions with the reservoir full and empty (at full draw down), which is anticipated in some years of operation. There would be minor alterations in the landscape character associated with form and color in the immediate foreground.

Middleground (M-01, 03, 08, and 15)

From M-01 the observer may notice a slightly higher embankment on the south side of the expanded reservoir. Dam design includes undulations, but a more linear structure may be visible below the Lake Hill communications site. There would be very minor alterations to the landscape character in this view.

From M-03, the additional tree removal associated with the enlargement would be visible as well as the linear embankment along the south side of the reservoir which would remove some of the natural undulations in the landscape. Additionally, more of the water surface would be visible. These impacts contribute to minor alterations in the line, texture, and color of the landscape character.

From M-08 the observer would see increased water surface area, associated tree removal, and the increased height of the embankments on the north side of the reservoir. The expanded reservoir is consistent with the landscape character as new Dillon Reservoir is already very visible from this viewpoint despite the slight modification of line, form, and color.

From M-15 the observer would notice a higher and more linear ridge line due to the dam; however, revegetation efforts and boulders would lessen the impact.

Background (B-01)

From B-01 the observer would see a slight modification in the texture and color of landscape character because of the increased surface area of the reservoir.

To offset the change in the landscape character of the area, an aggressive revegetation strategy would be developed to accelerate the desired future condition of these sites. A combination of native grass and forb seeding in all disturbed areas, as well as seeding and planting on the dam faces would be conducted with a variety of herbaceous species. This would allow the revegetation of these sites at a much faster rate and improve the scenic condition for the long-term.

Evidence of the construction activities would be apparent to users of the trails in the immediate foreground views along the trails in the Salt Lick Gulch area. The project area is generally visible from the ODR trail and the Ryan's Gulch trails in the immediate foreground and foreground distance zones.

The overall scenic effect would not raise the scenery impact to a significant level long-term. Integration of the recommended design criteria and conservation practices (that do not contradict dam safety regulations) would further minimize the scenery impact. The project area would continue to achieve the SIO for MA 8.21 and would be consistent with Forest Plan direction.

Cumulative effects

Past Actions

The area surrounding the ODR project, which is outside the project area but within the viewing area, has been managed for timber harvesting, fuel wood gathering and a variety of recreational activities. This area has become a regional recreation resource for many recreational activities occurring year around and a destination for tourists. The number of man-made disturbances in this area has a visual impact on the users who visit this area. Other management activities which have occurred within the viewing area include the construction of Dillon Reservoir and Dillon Dam, road construction, powerline and utility corridors (water and gas lines), communication sites, marinas, campgrounds, day use facilities, trailheads, bike paths, hiking trails, ski areas, timber treatment, fuel wood gathering, Christmas tree harvest, private residences and commercial developments. These are outside the scope of the project area, but within viewing distance.

Present Actions

The ODR project area is within treatment unit 601 as designated in the DRFHF EA. In summary, the number of acres visually affected by that project would be approximately 3,300 from vegetation management activity. Most of the scenic impact to the users of this area would be within 100 to 200 feet of the trails and the roads in which most would remain open to all uses post-sale. In the short-term, all the units may not meet the SIOs due to amount of vegetation which would be removed. The DRFHF project would have a positive overall scenic effect long-term due to the improvement in the vegetation health and the long-term scenery improvement of the vegetation. In the long-term all the units would meet the SIOs (DRFHF EA page 39).

Management activities, which are taking place at the present time, are a continuation of existing use including a variety of year around recreational activities, fuel wood gathering, and implementation of the DRFHF project. There is residential and commercial construction occurring throughout the viewing area on adjacent non-forest land as well as operation and maintenance of the Dillon Reservoir dam and I-70.

Based on the past and present actions discussed above, the cumulative effects of the Proposed Action would not raise the scenic impact to a significant level long-term, if the recommended design criteria and conservation practices are implemented. No reasonably foreseeable future actions have been identified for this resource.

3.7.6 Monitoring Recommendations

Monitoring would occur during construction to ensure that design criteria and the desired condition are being met. Post-construction monitoring should occur at least once within three years following project completion.

3.7.7 Mitigation Recommendations

None

3.7.8 Irreversible and Irretrievable Commitments of Resources

None

3.7.9 Forest Plan Consistency

Both the proposal and the No Action alternative are consistent with Forest Plan standards and guidelines.

3.8 CULTURAL RESOURCES

3.8.1 Issues and Indicators

Cultural resources are a non-renewable resource and are threatened by development, public access, illegal collection, vandalism, natural weathering, erosion and fire to list a few examples. Forest management activities, also, have potential to adversely impact the cultural landscape.

3.8.2 Forest Plan Direction

Forest Plan direction for cultural resources includes:

Conduct all land management activities in such a manner as to comply with all applicable federal, state, and local regulations. Many heritage resources values can be protected effectively through the application of the provision of the regulations listed in part 2.

Other applicable Forest Plan Standards and Guidelines include:

Standards:

> The *National Historic Preservation Act of 1966* (P.L. 89-665 as amended), the *Native American Grave Protection and Repatriation Act* (NAGPRA), (P.L. 101-601), the *American Indian Religious Freedom Act of 1978* (P.L. 96-341), and the *Religious Freedom Restoration Act of 1993* (P.L. 1-3-141).

Guidelines: Proactive consultation with American Indian people occurs to help ensure the protection, preservation, and use of areas that are culturally important to them.

Heritage resources are protected from damage by project activities or vandalism through project design, specified protection measures, monitoring and coordination.

3.8.3 Geographic and Temporal Scope

The geographic scope for this resource is the project area. The temporal scope is the time it would take to construct the proposed project elements. After that, it is unlikely that operation and maintenance of the project would result in additional impacts to cultural resources.

3.8.4 Affected Environment

Cultural resources, also known as heritage resources, are the remains of districts, sites, buildings, structures, and objects used by past residents or travelers. Cultural resources are non-renewable resources that preserve artifacts and/or features and structures left by prehistoric and historic peoples who once inhabited or used the area. If these resources are damaged or improperly removed, they are irreversibly lost. There have been numerous cultural resource inventories within the project area and surrounding areas for the DRFHF EA in previous years. Nearly 2,365 acres of the project treatment units had been inventoried. These inventories were conducted for timber sales, land exchanges, access roads, and trail improvement projects.

Metcalf Archaeological Consultants, Inc. (MAC) completed cultural resource investigations for the Old Dillon Reservoir Enlargement project in two phases of fieldwork conducted in October of 2007 and August of 2008. MAC undertook field investigations to record a segment of North Tenmile Ditch (5ST936.2) and what appears to be a historic diversion structure for the Old Dillon Ditch (5ST648), neither of which had been previously recorded. The technical report was sent to the SHPO for review in February 2009. The SHPO responded to the review of the report and concurred that a final determination of "no historic properties affected" is appropriate for the proposed project.

In summary, four sites (5ST648, 5ST892.1, 5ST745.1, and 5ST936.2) are located within the project area. Site **5ST648** is the Old Dillon Reservoir and Dillon Ditch, recorded together as one site. The site was recorded in 1997 by the Forest Service (Gustafson and Worthington 1997). The site was updated in 2001 by Science Applications International (Ziemke 2001). The ditch north of I-70 is a simple earthen construction. The diversion from Salt Lick Gulch and all other structures along the ditch were replaced in 1993. A previously undocumented feature was discovered at the head (west end) of Dillon Ditch. This feature was a water diversion structure in Salt Lick Gulch, which consists of approximately nine large logs and the remains of a gate that would have helped control water intake to the ditch. The ends of the logs are embedded in six foot high earthen berms on the north and south sides of the gulch. Approximately five other logs are scattered on top and mixed with milled lumber pieces. One milled lumber board exhibits large drilled holes. This is likely part of the frame of a wood gate that would have been raised or lowered and held in place with large wood pins in the holes to control and adjust the flow of water being diverted. Unmodified cobbles are stacked along the gulch's north/northwest edge and serve as a stone reinforcement wall.

Dillon Ditch retains integrity of location in the project area, and the ditch itself likely retains some integrity of materials, design and workmanship, but has been maintained and upgraded over time and thus may not preserve its original historic configuration. 5ST648 has been recommended to be not eligible for the National Register, and SHPO has concurred with this assessment. The discovery of the historic water diversion feature does not change the current evaluation of the site as not eligible.

5ST936.2 is a newly recorded segment of previously recorded 5ST936, the North Tenmile Ditch. Segment 1 (5ST936.1) was recorded in 2006 by the Forest Service (Brogan and Denardo 2006). Segment 1, the upstream end of the ditch, is located southwest of the

current project area and includes the "Buffalo Placer Flume" mentioned above. Segment 2 (5ST936.2), as recorded here, is a section about 870 meters long, extending from the I-70 road cut (which truncates the ditch) northwest to the point where the ditch crossed Salt Lick Gulch. This segment also is the northern (downstream) end of the Meadow-Dillon Ditch. The portion of North Tenmile Ditch also known as the Giberson Highline Ditch does not extend to this segment.

Segment 2 consists solely of an earthen ditch. The ditch including berm is up to five meters wide and one to two meters deep. It is still in relatively good condition and hasn't silted in to any great extent. The upstream end of the segment ends where truncated by the road cut on the north side of I-70. The downstream end of the segment is located at Salt Lick Gulch. Here, the ditch has been blocked by a berm of materials from the valley floor and clearing of the channel of Salt Lick Gulch. The crossing of Salt Lick Gulch is no longer intact; there are no remnants of a flume to cross Salt Lick Gulch (as would likely have been present originally). The ditch was observed to continue north of Salt Lick Gulch but this portion was not carefully examined nor is it included in this recorded segment because it is outside the current project area. Three ax- and saw-cut logs lie near the crossing at the west end of the segment but they are of unknown purpose, age, or association with the ditch. There are no structures or engineering features (aside from the ditch itself, which is unremarkable) along the ditch and no artifacts other than the logs were seen in or along the ditch.

5ST745.1 is the historic Blue River to Summit Transmission Line, built in 1939. The site was recorded in 1998 by Associated Cultural Resource Experts (ACRE) for a Western Area Power Administration (WAPA) project. This line crosses the project area on the west edge of I-70. The route of the proposed water pipeline intersects the transmission line corridor just upstream of (northwest of) the I-70 siphon. The Forest Service reports that this line was an overhead line, abandoned by the Western Area Power Administration in the 1990s. All infrastructure (poles, wire, etc.) was removed at that time. WAPA still holds an easement for the route, but there is no line, historic or modern, remaining there at and in the vicinity of the project area (personal communication December 10, 2008, Paul Semmer, White River National Forest, Dillon Ranger District). The segment of this site in and around the project area clearly does not retain sufficient integrity to support the eligibility of the whole site. For this reason, and in consultation with the OAHP, MAC has recorded segment 1 of the site which includes that portion in the project area and recommends that segment 1 does not preserve or convey the qualities that cause the site to be eligible. The March 2009 SHPO finding agreed that 5ST745.1 does not support the eligibility of the larger linear resource, of which it is a segment, and concurred that it is not eligible.

5ST892.1, a segment of Interstate 70, including that part that crosses the project area, has been recorded as part of the preparation of Colorado's Highway System context (ACRE 2002). A National Register assessment of the entirety of I-70 is unknown, though it could likely be considered eligible under criterion A as part of the national interstate system, criterion C for engineering, and under criterion exception G, as a property that has achieved significance in the last 50 years. However, this segment is listed in state records as "not eligible," more properly interpreted to mean that the segment does not preserve or convey the qualities that cause the larger site to be eligible.

3.8.5 Environmental Effects by Alternative

3.8.5.1 Alternative 1 – No Action

Direct and indirect effects

There would be no direct or indirect effects to cultural resources from the No Action alternative.

Cumulative effects

There would be no cumulative effects related to the No Action alternative.

3.8.5.2 Alternative 2 – Proposed Action

Direct and indirect effects

The proposed developments would impact most of the site of **5ST648**. The reservoir would be expanded by raising the height of the two dams increasing the depth and the area of the reservoir. Dillon Ditch would be functionally replaced by pipe to convey water from Ryan Gulch to the reservoir. The ditch would be impacted to varying degrees over much of its length by the burial of water pipe; pipe would be installed in most areas along the current ditch alignment. The siphon under I-70 would be lined and small work areas during construction would impact the ditch on either side of I-70, and concrete access structures would be constructed for maintenance of the siphon. Work on the two outlets of the reservoir would alter the reservoir itself to a limited degree (though this would be primarily on the floor of the reservoir), and would cause temporary alteration to the immediate surroundings from excavation. Burial of the power and TV cable lines would also temporarily alter the immediate vicinity around the reservoir. The current concrete headgate would be abandoned and a new diversion constructed slightly upstream, which may remove the remains of the historic headgate. Other direct physical impacts to this site are not anticipated for the current project.

Earlier designs of the project did propose work that would have impacted a portion of segment 2 (**5ST936.2**) (hence its recording for the project), but the currently proposed design would not directly impact this ditch. The new headgate for Dillon Ditch, and the installation of the water pipeline, would now be located a short distance downslope and downstream of segment 2, and segment 2 would not be impacted. All developments around Old Dillon Reservoir are about half a mile away from this segment of the ditch and would not impact it.

The route of the proposed water pipeline intersects the transmission line corridor just upstream of (northwest of) the I-70 siphon. The proposed developments would not impact any known features, structures or materials of this site, except to cross its route. In this area, only the cleared route of the transmission line remains, and it is becoming overgrown since it is no longer maintained. The transmission line itself has been removed. For this reason, this part of 5ST745 (**5ST745.1**) is recommended to not preserve or convey the qualities that

cause the site to be eligible due to a lack of integrity of design, materials and workmanship. As noted, the water pipeline would cross the transmission line route.

Interstate 70 (**5ST892.1**) would not be impacted by the proposed developments. Work would occur on either side of the highway, and the siphon that runs under I-70 would be lined, but the interstate itself would be unaffected.

The SHPO concurred with the MAC report which recommends a finding of "no historic properties affected" for the project. The degree of impact to site 5ST745, the only eligible site within the project's area of potential effect, would be negligible and would occur to a segment MAC has recommended does not preserve or convey the qualities that cause the site to be eligible. The segment of the site retains no historic fabric except for the cleared right-of-way through the forest, which is itself becoming overgrown. It would be crossed at a near right angle by construction of the water line in an area immediately adjacent to I-70. 5ST936.2 is avoided by the current project design. The other two sites within the project area, 5ST648 and 5ST892.1, are determined to be not eligible. No further cultural resource work is recommended for the project as described herein.

There is always the potential to damage undocumented or undiscovered sites. Surveys have been completed in the areas of potential effects, including access routes. The potential for undiscovered cultural resources is low. However, if a site is discovered during the project, the Forest Service would stop work in the area of the discovery until a Forest Service archaeologist can evaluate the site, and, if necessary, implement protective measures.

Cumulative effects

The project poses no threat to eligible sites from the Proposed Action; therefore, there is no cumulative effect to cultural resources.

3.8.6 Monitoring Recommendations

None

3.8.7 Mitigation Recommendations

None

3.8.8 Irreversible and Irretrievable Commitments of Resources

There would be no irreversible or irretrievable commitments of cultural resources as a result of selection and implementation of the Proposed Action.

3.8.9 Forest Plan Consistency

Selection and implementation of the proposed Action would be consistent with Forest Plan direction for cultural resources.

3.9 PUBLIC LANDS

This section discusses the existing condition of the physical resource and the potential changes or affects that may occur as a result of implementing the Old Dillon Reservoir Enlargement Project. Physical resources as used in this report include non-recreation special use permits, land ownership status, rights-of-way, and land line survey information.

3.9.1 Issues and Indicators

Two issues related to Lands surfaced during scoping. The issue of "access to ODR from Lake Hill Road off of the Dam Road" was considered as a non-significant issue with the reasoning that the proponents would coordinate access to the site with other Special Use Permit holders. The issue of the ODR area being a potentially "viable site for wind, hydro, and photovoltaic generation of electricity" was considered but eliminated from further study because it was beyond the scope of the current proposal. The ODR Enlargement project would not preclude this type of renewable energy, but it does not consider this development as part of the project proposal.

3.9.2 Forest Plan Direction

The Forest Plan gives general direction for lands related activities in the project area as follows:

Goal 4 - Effective Public Service
Objective 4b - Provide appropriate access to National Forest System lands and USDA Forest Service programs.

Goal 5 - Public Collaboration
Objective 5a - Improve the safety and economy of Forest Service roads, trails, facilities, and operations and provide greater security for the public and employees.

Strategy 5a.1 - Provide opportunities for local governmental jurisdictions and other interested parties to participate in planning and management of National Forest System lands, especially where local governmental jurisdictions or other landowners are contiguous to or may be affected by the management of these lands.

Forest Plan Standards and Guidelines applicable to physical resources in specific management prescription areas in the project include the following:

Special Uses – Standard – 1. Do not approve new uses and phase out current uses when existing permits expire where the primary use is storage or disposal of hazardous materials, including landfills.

Management Prescription Area 8.21

Minerals – Standard 1. These areas are withdrawn from mineral entry when such action is deemed necessary to meet the objective of the management area.

Special Uses – Guideline 1. Do not issue special use permits that would preclude future recreational developments.

The desired future condition for physical resources in all alternatives would be consistent with the Forest Plan direction. As stated previously collaboration between SUP holders for access to the Lake Hill area is ongoing.

3.9.3 Geographic and Temporal Scope

The geographic scope of the analysis for public lands is the project area. The temporal scope is the proposed duration of the Special Use Permit authorization, which is 20 years.

3.9.4 Affected Environment

The "resource condition" related to Lands is that there are certain special use authorizations in the project area to recognize before any additional uses are permitted. In particular, the Forest Service must assure the protection of property rights, including those rights of adjacent private landowners and holders of special use authorizations on the National Forest.

1. Non-Recreation Special Uses

There are a limited number of non-recreation special use permits in the project area: including water tanks, gas and electric utility lines, and communications sites.

Existing special use permits in the area include:

- Lake Hill Communications Site – Lease Holders:
  - Xcel Energy - Sally Edwards
  - Comcast/TCI Cablevision
  - Sprint Nextel Property Services
  - New Cingular Wireless (AT&T)
- Town of Dillon – reservoir and ditch
- Town of Frisco – water tank

2. Land Status

Old Dillon Reservoir is a 62 acre-foot raw water storage reservoir fed by the Dillon Ditch, which diverts from Salt Lick Gulch. The Dillon Ditch and ODR were constructed by the Town of Dillon in 1939 on approximately 14.5 acres of lands located within the public domain. Those lands in the SW ¼ of the SE ¼ of Section 13, Township 5 South, Range 78 West, were not withdrawn by forest reservation until 1966. The Forest Service, after reviewing evidence provided by the Town, has found that the Town's claim to a right of way for ODR and a portion of the Dillon Ditch has likely been established pursuant to R.S. 2339 of the Act of July 26, 1866, 43 U.S.C. Chapter 15, § 661 (Repealed). The

Dillon Ditch is operated and maintained by the Town of Dillon under special use authorization DIL 199 issued on January 13, 2003.

3.9.5 Environmental Effects by Alternative

3.9.5.1 Alternative 1 – No Action

Under the No Action alternative there would be no change to the existing condition. There would be no change in existing special use.

Direct and indirect effects

There would be no direct or indirect effects to public lands under the No Action alternative. The Town of Dillon would continue to pursue the potentially valid outstanding right for the current Old Dillon Reservoir footprint.

Cumulative effects

There would be no cumulative effects to public lands under the No Action alternative.

3.9.5.2 Alternative 2 – Proposed Action

Direct and indirect effects

Public lands are a non-key issue and is not a factor in developing alternatives. Under Alternative 2 the proponents would need to coordinate access off of the Dam Road to ODR with other SUP holders. There is an opportunity to work in partnership with tenants at Lake Hill communication site to improve the access road from the Dam Road to the project area. The design of the dam for the reservoir enlargement would require relocation of a portion of the Comcast overhead electric line. The proponents would work in partnership with Comcast to bury that portion of the line to bring it in compliance with the Forest Plan.

Cumulative effects

There would be no long-term cumulative effects. The current condition is in compliance with the 2002 White River National Forest Land and Resources Management Plan, standards and guidelines and consistent with regulatory frameworks, (Clean Water Act, ESA, Clean Air Act, NFMA, NEPA, FS manual, State Laws, County Planning area objectives, etc.).

3.9.6 Monitoring Recommendations

None

3.9.7 Mitigation Recommendations

None

3.9.8 Irreversible and Irretrievable Commitments of Resources

None

3.9.9 Forest Plan Consistency

The desired future condition for physical resources in all alternatives would be consistent with the Forest Plan direction.

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