

Price-Stubb Fish Passage

SUPPLEMENTAL DRAFT ENVIRONMENTAL ASSESSMENT

*Providing Endangered Fish Passage
at the
Price-Stubb Diversion Dam
on the Colorado River*

**United States Department of the Interior
Bureau of Reclamation**

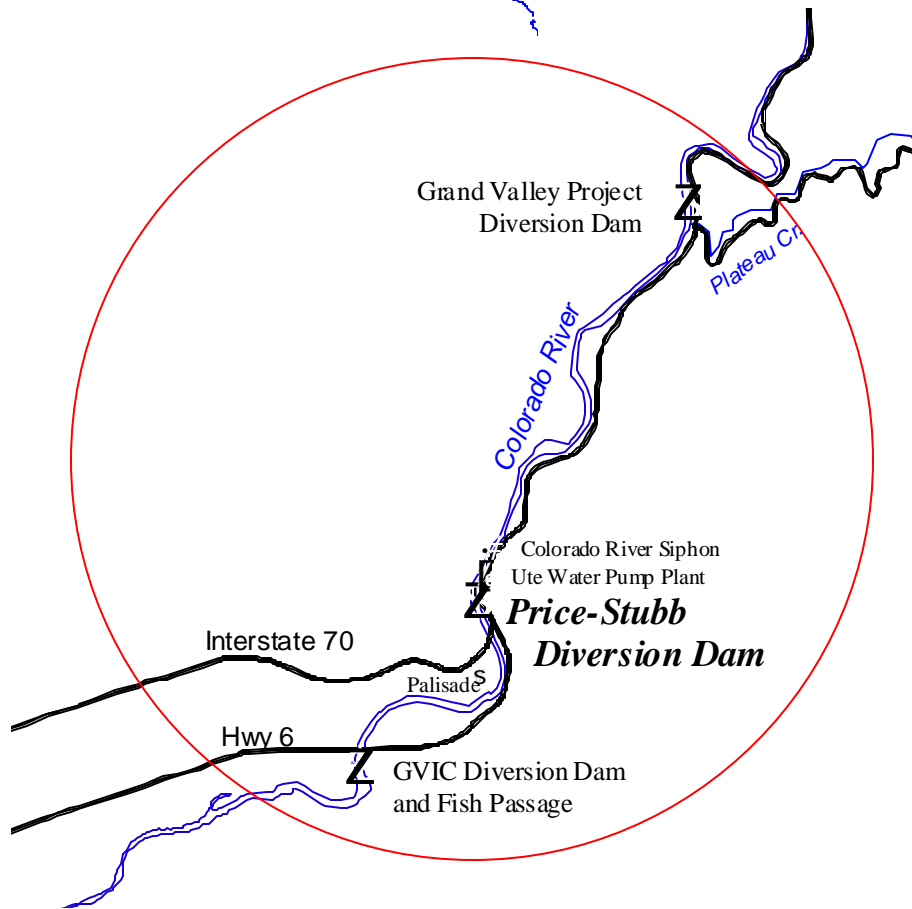
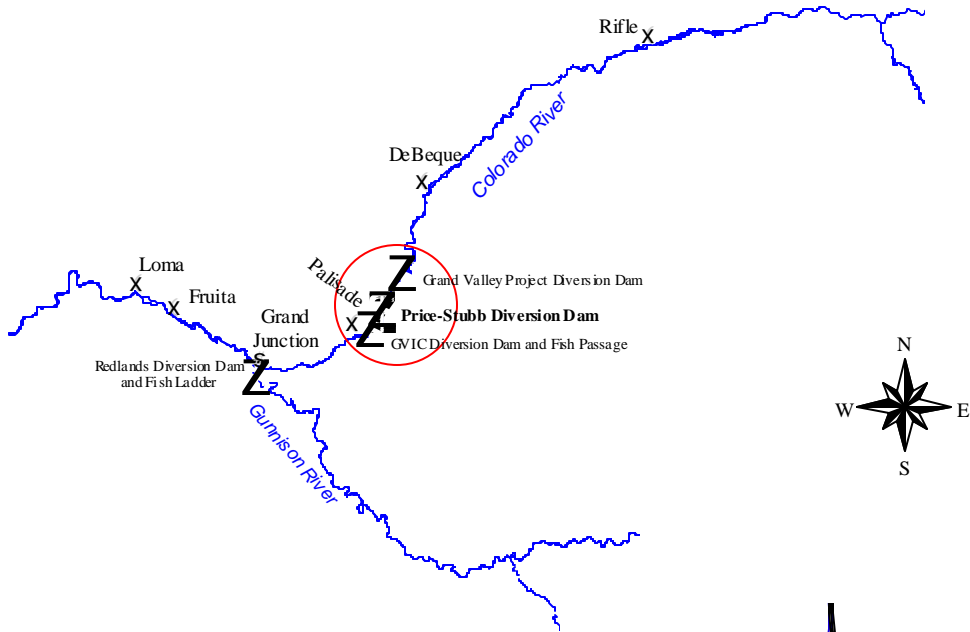


Upper Colorado Region
Western Colorado Area Office
Grand Junction, Colorado

July 26, 2002

Price-Stubb Diversion Dam

Vicinity Map



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CHAPTER 1 - INTRODUCTION

Need for and Purpose of Action

This Supplemental Draft Environmental Assessment (EA) discusses alternatives for providing endangered fish passage at the Price-Stubb Diversion Dam on the Colorado River in Mesa County, Colorado. It was prepared by the U.S. Bureau of Reclamation (Reclamation) in cooperation with the U.S. Fish and Wildlife Service (Service) to comply with the National Environmental Policy Act (NEPA), Endangered Species Act, and related U.S. Department of the Interior policies and regulations. If, based on this analysis, Reclamation concludes the selected action would have no significant impact on the human environment, preparation of an Environmental Impact Statement would not be required before the action could be implemented.

A Draft EA for the Price-Stubb Diversion Dam fish passage was distributed for public comment in April 1999 (Reclamation, 1999). This current Draft EA supplements the 1999 Draft EA.

The 8-foot-high Price-Stubb Diversion Dam (see Figure 1) is owned by the Palisade Irrigation District and Mesa County Irrigation District. They completed construction of the dam in 1911 to divert their irrigation water. In 1919, the dam was no longer used following completion of Reclamation's Grand



Figure 1 - Price-Stubb Diversion Dam on the Colorado River near Palisade, Colorado

Valley Project Diversion Dam and the Government Highline Canal. *Providing fish passage would require approval of the dam owners and affected land owners.*

Since 1987, Federal and State agencies, water users and environmental interests have been cooperating in the Upper Colorado River Endangered Fish Recovery Program (Recovery Program). The goal of the Recovery Program is to establish self-sustaining populations of four endangered fish species in the Upper Colorado River basin while allowing for continued use and future development of Colorado River water supplies. The Recovery Program has developed a basin-wide action plan that includes restoring fish passage.

Access to upstream habitat of these migratory fish species has been blocked by three irrigation diversion dams on the Colorado River:

- 1) the Grand Valley Irrigation Company (GVIC) Diversion Dam, about 3 miles downstream of the Price-Stubb Dam
- 2) the Price-Stubb Diversion Dam (discussed in this Draft EA)
- 3) the Grand Valley Project Diversion Dam, about 5.3 miles upstream of the Price-Stubb Dam

In March 1998, a notch was completed in the GVIC Diversion Dam and a fish passageway was constructed below it. The passageway consists of rocks placed in the Colorado River channel to form a series of riffles and pools. This Draft EA references information from the Final EA for passage at the GVIC Dam (U.S. Bureau of Reclamation, 1997). The GVIC EA discussed the need for fish passages to help restore populations of the razorback sucker (*Xyrauchen texanus*) and the Colorado pikeminnow (*Ptychocheilus lucius*, formerly called the Colorado squawfish).

The Recovery Program's target date to start construction of a fish passage at the Price-Stubb Diversion Dam is September 2004. Construction for fish passage at the Grand Valley Project Diversion Dam is also planned for 2004. Providing passage at these dams would give the fish access to approximately 50 miles of critical habitat upstream.

Need: *Action is needed to restore fish passage at the Price-Stubb Diversion Dam to meet the agreed upon schedule of the basin-wide Recovery Program and make sufficient progress toward recovering the endangered fish.*

Purpose: Purposes of the Price-Stubb Fish Passage Project are to further the goals and progress of the Recovery Program:

- Actions taken should be cost effective, timely, and complement related actions to help restore native fish populations and protect existing and planned rights and uses affected by the project.

Related Recovery Program actions include stocking endangered fish, controlling nonnative fish species, acquiring and restoring floodplain habitat, and protecting instream flows.

- Potentially affected uses of Colorado River water include: providing municipal, domestic, and irrigation water to residents of the Grand Valley; hydroelectric power development at the dam site; and recreational use of the river. Actions taken should also protect use of the river canyon as a transportation corridor.
- The choice among alternatives should ensure costs to the Recovery Program are as low as possible while considering benefits to the endangered fishes.

Background Information

Endangered Fishes – Appendix A to the GVIC EA summarized information from many studies completed on the endangered fish, their habitat, their behavior, and factors that led to the decline and listing of the species under the Endangered Species Act. These studies have increased our understanding of actions needed to recover the fish (establish self-sustaining populations) throughout the Upper Colorado River basin. Critical habitat (critical to survival of a listed species) has been designated for the Colorado pikeminnow and razorback sucker and includes the 100-year floodplain of the Colorado River from Lake Powell in Utah to Rifle, Colorado. The Colorado pikeminnow is now absent from its historic range in the river from the Price-Stubb Diversion Dam upstream to Rifle, and razorback suckers are now extremely rare throughout the Upper Colorado River basin. *Providing upstream access past all three man-made diversion dams is needed to restore use of historical habitat to endangered fish species.*

Habitat Availability Upstream – One factor that has led to the decline of native fish is loss of historic habitat. In 1997, the Colorado Division of Wildlife assessed the aquatic habitat available to endangered fish species in about 50 miles of river upstream from the three diversion dams (Palisade to Rifle). Runs (deep, moving water) and pools are excellent feeding and wintering areas for both Colorado pikeminnow and razorback suckers, and comprise 49 to 70 percent of the available habitat in various sections of the river. Seventy-six pools larger than 80 square feet were documented in Anderson’s fall survey (Anderson, 1997). *Providing passage at the Price-Stubb Dam, and the Grand Valley Project Diversion Dam, would open approximately 50 miles of suitable habitat upstream to help recover these endangered fish species.*

FERC Hydropower License – In 1990, the Federal Energy Regulatory Commission (FERC) granted a license to develop a hydroelectric power generation project at the dam site (the Jacobson Hydro No. 1 Project). The project was put on hold in 1994, and has not been constructed. FERC amended the Jacobson Hydro No. 1 license in September 2001 (FERC 2001). The amendment included the means to reimburse the licensee for the cost of the fish passage. The

maximum amount of the reimbursement was the anticipated cost of the least cost passage alternative. The license was terminated by FERC on July 15, 2002 (FERC 2002C). *Reclamation's implementation of fish passage at the Price-Stubb Dam was dependent on FERC's decision on the amendment and/or the licensee's decision to proceed with hydropower development.*

Scope

Reclamation developed fish passage alternatives and identified issues or concerns with participation from many individuals, agencies, and organizations who may be affected by the project. Alternatives discussed in Chapter 2 are: **No Action, Conventional Fish Ladder, Downstream Rock Fish Passage, and Dam Removal.**

Each issue and concern described below is examined in Chapter 3. More information on scoping activities is also included in Chapter 4.

Water Resources

Ute Water Conversation District (Ute Water) Pump Plant Intake - Ute Water provides domestic water to over 60,000 Grand Valley residents via a pipeline from storage reservoirs. Their emergency backup water supply is pumped from the Colorado River out of the pool formed by the Price-Stubb Dam. Construction dewatering or dam removal could adversely affect their ability to pump water from the river during low river flows.

Water Rights - Owners of existing water rights with points of diversion at the Price-Stubb Diversion Dam have raised issues regarding potential impacts and the future utilization of their water rights under the Dam Removal alternative.

Clifton Water District - Downstream Water Quality - Changes in water quality downstream from the dam may affect the ability of Clifton Water to meet drinking water standards and provide domestic water to approximately 30,000 people.

Ute Water Pump Plant - Spring Flooding - The fish passage alternatives may affect spring flooding of the Ute Water pump plant.

Recreation Resources

River Boating - Historically, the dam has been a barrier to recreational boating. The fish passage project would affect future recreational boating along the Colorado River in the vicinity of the Price-Stubb Diversion Dam.

Public Safety - The dam poses a significant safety threat to all forms of water recreation in the vicinity of the dam.

Land and Facility Resources

Protect Existing Structures - The nearby highway, railroad, and siphon were designed and constructed with the dam in place. Evaluating the effect of the alternatives on integrity and use of these structures is necessary.

Railroad and Landslide Stability - Fish passage alternatives could affect the stability of an existing landslide and railroad. Union Pacific Railroad tracks run along the Colorado River past the Price-Stubb Dam. The landslide has previously caused damage to the tracks.

Ownership of Dam and Lands - Before any modifications to the dam and site could be made, permission would be needed from the dam owners and adjacent land owners to access the site and/or use their land and facilities.

Unique Geographical Features

Floodplain and Wetlands Protection - The Colorado River provides highly valued riparian habitat and floodplain functions that need to be considered as fish passage is restored.

Fish and Wildlife Resources

Effects on Endangered Colorado River Fishes - Providing passage at the dam is needed to allow endangered fish access to upstream habitat (see background information on page 3). Passage actions should complement other Recovery Program efforts such as stocking endangered fish, controlling competition or predation by nonnative fish, and restoring habitat.

Cultural Resources

Protect Historic Dam - The Price-Stubb Diversion Dam is eligible for listing on the National Register of Historic Places, and Federal agencies are responsible for ensuring that their actions do not adversely affect the historic qualities of the dam.

Social and Economic Resources

Hydropower - The Price-Stubb Dam could be used to generate hydroelectric power. Fish passage alternatives may reduce potential power generation, and dam removal would preclude hydropower development.

Costs and Benefits - Some people question using taxpayers' money to provide passage for endangered fish.

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CHAPTER 2 - ALTERNATIVES

This chapter describes the **No Action** alternative, and alternatives for providing fish passage through or around the existing Price-Stubb Diversion Dam. Three alternatives for the Price-Stubb Fish Passage are given detailed consideration: constructing a **Conventional Fish Ladder**, constructing a **Downstream Rock Fish Passage**, and **Dam Removal**. Alternatives eliminated from detailed analysis were discussed in the 1999 Draft EA.

Preferred Alternative

Reclamation's preferred alternative is to construct a **Downstream Rock Fish Passage** below the Price-Stubb Diversion Dam. Reclamation and the Recovery Program believe the **Downstream Rock Fish Passage Alternative** would best meet project purposes while protecting existing upstream uses. It also minimizes the need of operation and maintenance.

No Action

Under this alternative, Reclamation would not take any action to provide for endangered fish passage at or around the Price-Stubb Diversion Dam. The dam would remain in place and continue to be a barrier to upstream passage by endangered fish species.

The No Action alternative assumes development and operation of the Jacobson Hydro No. 1 Project, as licensed September 13, 2001, would not occur (FERC, 2001). This 40-year license was originally issued to E.R. Jacobson (licensee) for the construction, operation and maintenance of the project by the Federal Energy Regulatory Commission on June 19, 1990 (FERC, 1990).

In 1994, FERC granted a 'stay' on development of the hydropower project for several reasons. These included the need to reinitiate consultation with the Service on the effects of the project on the newly listed razorback sucker and recently designated critical habitat upstream from the project. On June 27, 1996, the licensee filed an application for amendment of the license. Major provisions of the amendment included moving the hydroplant upstream to the toe of the dam and decreasing hydroplant flow from 2,000 cubic feet per second (cfs) to 1,000 cfs.

FERC (2002A) issued a letter dated January 14, 2002 to Mr. Jacobson that stated since deadlines had passed to commence project construction, Mr. Jacobson should refrain from any land-disturbing or land clearing activities at the project site. On June 3, 2002, FERC (2002B) issued Mr. Jacobson a notice, pursuant to Section 375.308(f) of the Commission's regulations, of probable termination of the license for Project No. 4515 after 30 days from the date of the letter. An order terminating the license for the Project No. 4515 was issued by FERC on July 15, 2002 (FERC, 2002C). Additional details about the Jacobson Hydro No. 1 Project is included in the 1999 Draft EA.

Conventional Fish Ladder

Under this alternative for the Price-Stubb passage, Reclamation would construct a ladder around the dam, similar to the U-shaped ladder constructed in 1996 at the Redlands Diversion Dam on the Gunnison River (U.S. Bureau of Reclamation, 1995). This alternative would be compatible with private development of the Jacobson Hydro No. 1 Project, as permitted in the 2001 FERC License Amendment (FERC 2001) if independently constructed. However, this license was terminated by FERC in July 2002.

Design

The fish ladder would be built on the right bank of the river¹. Conceptual designs for development of the site show the channel of the ladder surrounding the outside wall of the power plant intake (see Figure 2). The ladder would consist of a 200- to 250-foot-long concrete channel, 6-feet wide and 8- to 10- feet deep. About 25 cfs of streamflow would be diverted into the channel for the ladder. The upstream entrance to the channel would have a trash rack to prevent debris from entering. Baffles (vertically placed plates) would divide the channel into a series of small pools; fish would swim from pool to pool through openings in each baffle. The baffles would be placed at appropriate intervals to keep flows at velocities that native fish can swim against. The fish passage site would be fenced with a 6-foot-high fence for facility and public safety.

A fish trap to control upstream movement of nonnative fish also was considered in the preliminary designs for the fish ladder. However, factors such as cost, space limitations, and land ownership at the dam site may make it infeasible to include a fish trap at this location. The preferred location for a fish trap would be at the fish passage proposed for the Grand Valley Project Diversion Dam about 5 miles upstream (Reclamation, 2002).

Construction

The fish ladder around the Price-Stubb Diversion Dam would be completed under a construction contract. Before the fish ladder could be constructed, Reclamation would coordinate the design, easements and access with the dam owners. Temporary construction easements or permits would also be acquired from all affected land owners before construction. Reclamation would negotiate protective measures to reduce impacts to private property, right-of-ways and facilities. Following construction, any damaged area would be restored, as near as practicable, to its original condition. Access to the dam would be from Highway 6 along a trail that lies within the railroad right-of-way and would require permits from the railroad. Construction staging and material storage would be on adjacent vacant land. Construction access is limited near the dam because of its proximity to the railroad tracks.

¹ Right bank refers to the right side of the river as viewed when looking downstream.

A cofferdam would be used to direct the river around the work area and river flows would not be affected. Before construction, Reclamation and the contractor would obtain any necessary approvals required by the Clean Water Act. Reclamation would request Section 404 approval under Regional General Permit No. 057 for projects that benefit recovery of endangered fish. The contractor or Reclamation would request water quality certification under Section 401. If discharging water for construction dewatering is needed, the contractor would obtain a Section 402 permit. Construction would be scheduled during low water conditions in the fall and winter of 2004 or 2005.

Reclamation estimates costs to be about \$2,300,000. This cost includes all preconstruction activities, permitting, construction, construction administration, and operations and maintenance. Additional construction costs for a fish trap would be approximately \$200,000.

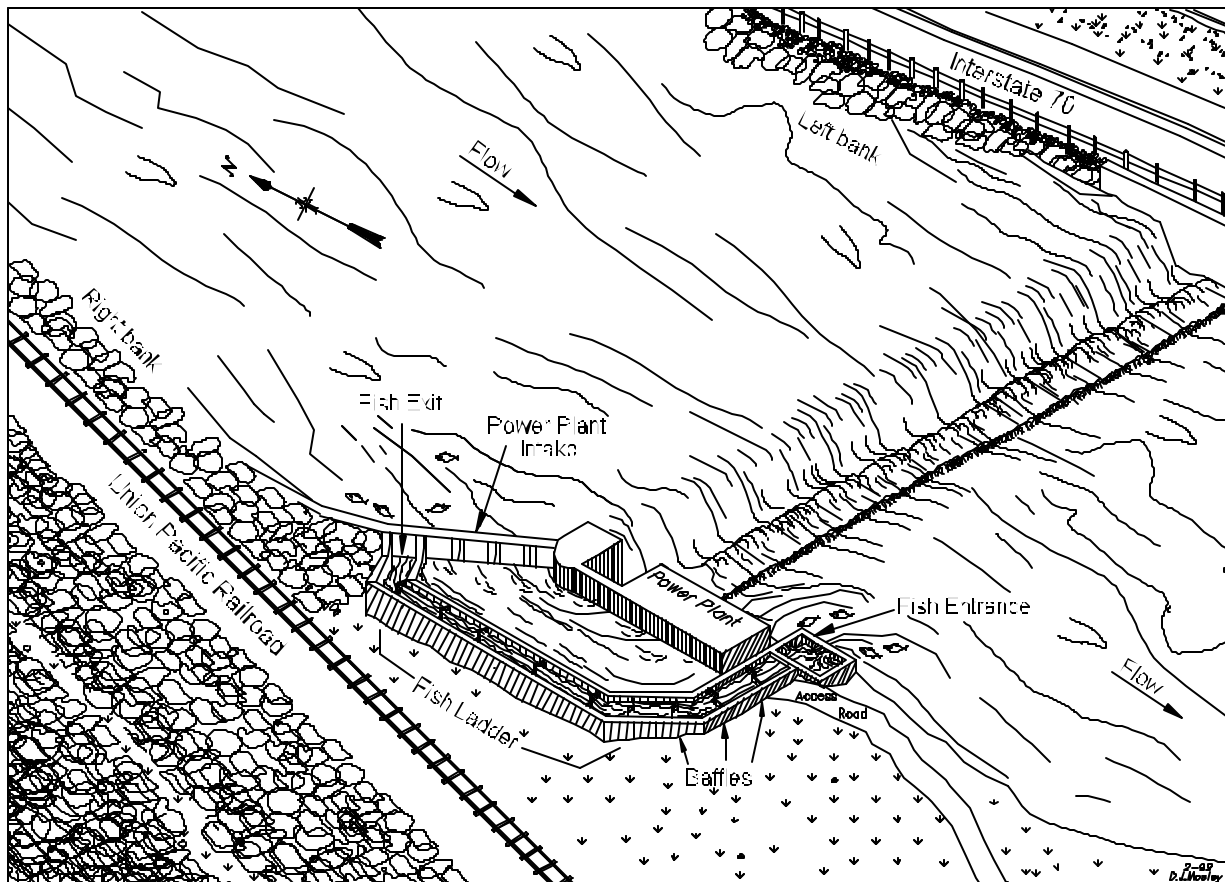


Figure 2 - Conceptual Design for Fish Ladder with Hydropower Plant

Operation, Maintenance and Replacement Measures

The Service would operate the fish ladder from April through October of each year. They would monitor native and endangered fish use of the ladder. If the fish trap is installed in this facility, decisions concerning future operation of the fish trap would consider results of ladder use and other Recovery Program activities (flow management, nonnative fish control, and habitat restoration) (U.S. Fish and Wildlife Service, 1998).

An agreement among Palisade and Mesa County Irrigation Districts, the Service and the Recovery Program would define operation and maintenance, and replacement responsibilities. Construction would not begin on the project until operation, maintenance, and replacement funding mechanisms were agreed upon and the agreement was signed. Permission would also be obtained from all affected land owners for perpetual access and use of the site for operation and maintenance. Long-term operation and maintenance cost is estimated at \$15,000 to \$25,000 per year, depending on whether a fish trap is included in the ladder. The Recovery Program or the Service would fund all activities for the fish ladder, with no costs to local water users.

Water Supply for Fish Ladder

Because of downstream senior water rights, a flow of at least 640 cfs is present in this reach of the river under all but the most severe drought conditions. The Service also has up to 31,650 acre-feet of storage water available from endangered fish uses in drought years. About 25 cfs of Colorado River flow would be needed to operate the fish ladder. An additional 75 cfs would be used to provide attraction flows necessary to direct fish to the fish ladder entrance. If the hydroplant were independently constructed, the hydroplant tail race would provide the necessary attractive flow.

Downstream Rock Fish Passage

The **Downstream Rock Fish Passage Alternative** was developed in response to public comments after the 1999 Draft EA with input from affected parties. This alternative would create a 640 cfs notch in the Price-Stubb Diversion Dam while leaving the Dam in place and construct a rock-ramp fish passage downstream of the dam on the left side of the river². This type of fish passage would not prevent construction of the Jacobson Hydro Plant. However, the proposed plant facility included in the 2001 FERC License Amendment would require additional modification and design. Significant modifications include elimination of the 4-foot flashboards on the dam and the extension of the hydroplant discharge to the downstream entrance of the fish passage. As discussed previously, the Jacobson license was terminated by FERC in July 2002.

²Left side of river refers to the left side of the Colorado River as viewed when looking downstream.

Design

Conceptual designs (Figure 3) propose placing fill material on the downstream face of the Price-Stubb Diversion Dam. The fish passage would consist of an 800-foot long downstream fish passage channel along river left with a 1.5 percent gradient, a 640 ft³/s low flow notch in the Price-Stubb Diversion Dam, a 400-foot long rock-ramp structure; and a divider-berm between the fish passage channel and the 400-foot rock-ramp.

Construction

The rock fish passage structure would be completed under a construction contract. Before the fish passage could be constructed, authorization for modification of the dam would have to be obtained from the owners of the dam, the Palisade and Mesa County Irrigation Districts. Temporary construction easements or permits, and permanent easements and access would also be acquired from all affected land owners before construction. Reclamation would negotiate protective measures to reduce impacts to private property, right-of-ways and facilities. Following construction, any damaged area would be restored, as near as practicable, to its original condition. Access to the dam would be from Highway 6 along a trail that lies within the railroad right-of-way. Construction staging and material storage would be on adjacent vacant land. Construction access is limited near the dam because of its proximity to the railroad tracks. However, because this facility is located in the river channel and not between the dam headgates and the railroad, construction access would not be as constricted as compared to the conventional fish ladder alternative.

A cofferdam may be used to direct the river around the work area, however river flows would not be affected. Before construction, Reclamation and the contractor would obtain any necessary approvals required by the Clean Water Act. Reclamation would request Section 404 approval under Regional General Permit No. 057 for projects that benefit recovery of endangered fish. The contractor or Reclamation would request water quality certification under Section 401. If discharging water for construction dewatering is needed, the contractor would obtain a Section 402 permit. Construction would be scheduled during low water conditions in the fall and winter of 2004 or 2005.

The estimated \$3,100,000 cost of this alternative includes all preconstruction activities, permitting, construction, and construction administration. Costs for operations and maintenance for this alternative would be minimal.

Operation, Maintenance and Replacement Measures

The downstream rock passage would require no regularly scheduled actions related to operation and maintenance other than inspection. The passage would operate as part of the natural river channel, so maintenance would be minimal.

Water Supply for Fish Passage

Because of downstream senior water rights, a flow of at least 640 cfs is present in this reach of the river under all but the most severe drought conditions. The Service also has up to 31,650 acre-feet of storage water available for endangered fish uses in drought years. The fish passage would be designed to direct the first 640 cfs to the river left portion of the dam through the downstream fish passage. Additional flows would begin to spill over the rest of the dam at higher flows until the dam is completely submerged. Therefore, no measures would be needed to augment existing water supplies to enable fish to swim upstream.

Dam Removal

This alternative would involve partial removal of the dam to restore natural fish passage in the river channel. This alternative would not be compatible with hydropower development. Before Reclamation could remove the dam, four outstanding issues (discussed in Chapter 3) would have to be resolved:

- 1) Develop mitigation measures to resolve the Ute Water pump plant issue
- 2) Determine whether a hydropower plant would be developed at the dam site
- 3) Obtain permission for dam removal from owners of the dam. The Mesa County Irrigation District has expressed support for dam removal, but the Palisade Irrigation District is currently opposed to removal.

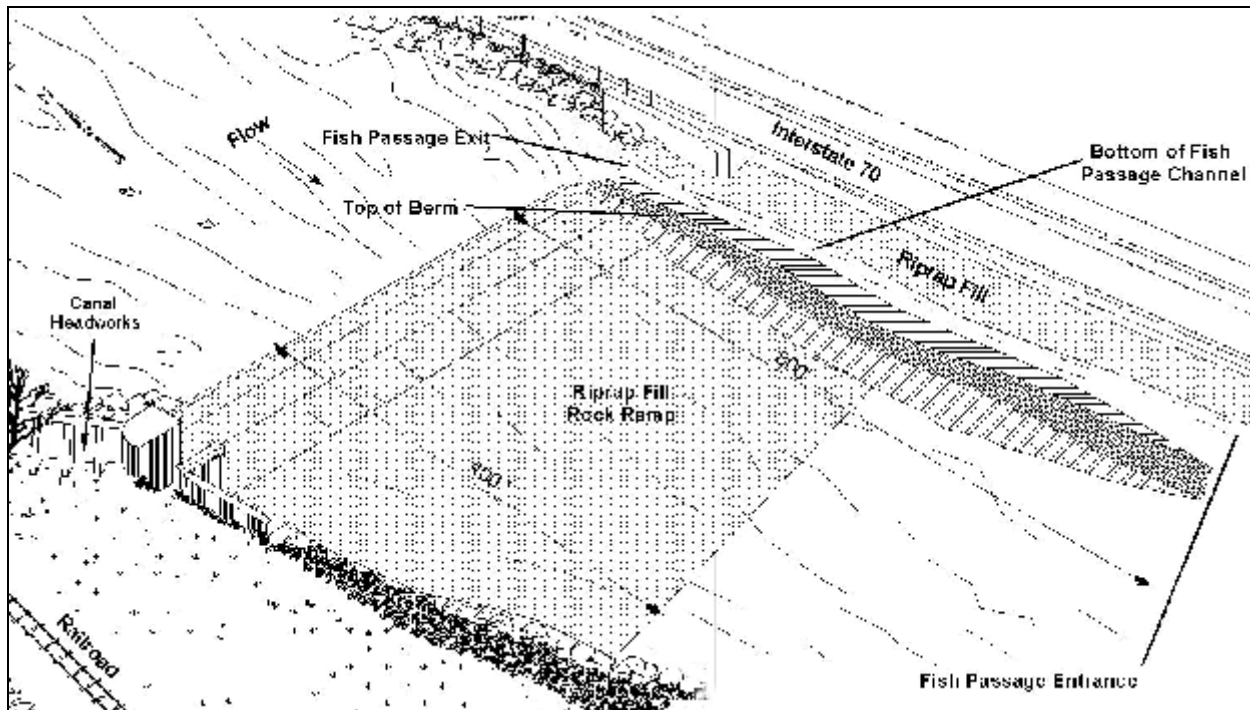


Figure 3 - Conceptual Drawing for Downstream Rock Fish Passage

- 4) Geologic investigations indicate landslide stability is an issue; however, impacts to the slide movement would probably be minimal. If the dam is removed and a landslide were to occur, potential for damage liability exists.

Design

The removal alternative would allow the foundation, abutments, and canal headworks to remain (see conceptual drawing, Figure 4). The left abutment³ of the dam may provide some erosion protection for the Interstate 70 highway. The right abutment may protect the Union Pacific's railroad tracks from erosion. The portion of the dam below the riverbed does not present a barrier to fish and leaving it in place would help reduce scouring of the riverbed.

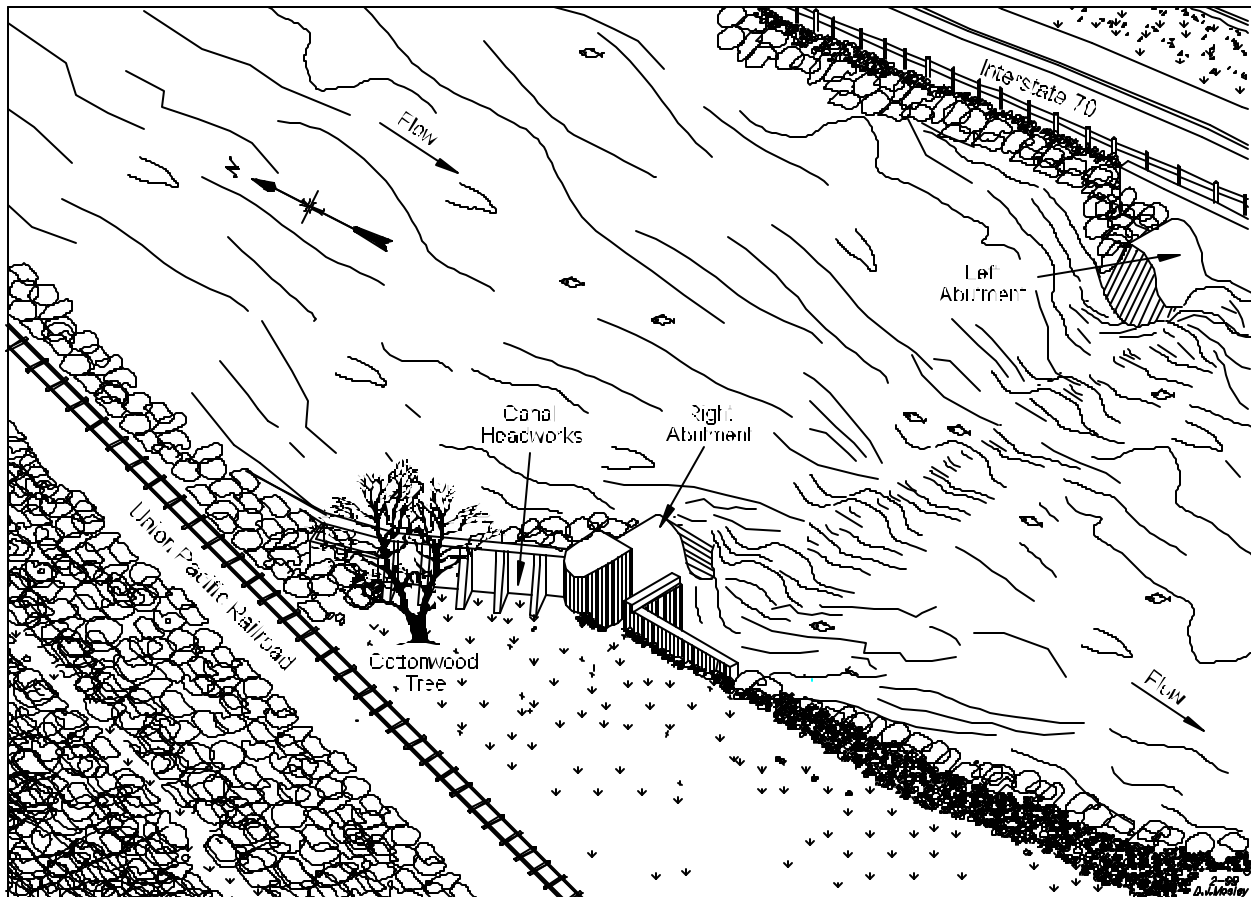


Figure 4 - Conceptual Design for Dam Removal

³ The left abutment is on the left side of the dam, as viewed looking downstream.

Removal activities would require measures, such as placement of boulders or riprap in the riverbed or along the banks, to restore or enhance natural passage in the river channel by native fish. Incorporating a fish trap in the designs for the dam removal alternative is not possible.

Therefore, a fish trap would be included in the design of the fish ladder proposed for the Grand Valley Project Diversion Dam.

Boating safety would also be considered in removal designs (addition of boulders or riprap to protect boaters from the dam abutments, and removal of hazards such as rebar protruding from the remaining concrete). To the extent that costs to the Recovery Program would not increase and create liability issues, designs for removal could also consider incorporating measures to enhance recreational boating.

Measures would also be required to protect the ability of Ute Water to deliver Colorado River water to their treatment plant. Three possible options include:

1. Deliver Colorado River water to the Ute Water pump plant via the Orchard Mesa Power Canal⁴. Water would be available year round, except for about 2 to 3 weeks in the spring and fall during maintenance of the power canal and Grand Valley Power Plant. Reclamation estimates this option would cost from \$150,000 to \$300,000. This cost is included in the total cost of the Dam Removal alternative, and would require the following measures:
 - a. Secure a firm supply of water
 - b. Agreement among Ute Water, Orchard Mesa Irrigation District (OMID), Grand Valley Water Users Association (GVWUA) and Reclamation to deliver water to the Ute Water pump plant
 - c. Execute a ‘power interference’ agreement among the Recovery Program, Reclamation, OMID, GVWUA, and Public Service Company of Colorado to compensate for lost power revenues. Ute Water would divert about 15 cfs from the 800 cfs Orchard Mesa Power Canal, which would decrease the ability to deliver water to the Grand Valley Power Plant.
 - d. Execute a crossing agreement with the Colorado Department of Transportation for a pipeline through the Rapid Creek culvert under Interstate 70.
2. Lower the sump in the Ute Water pump plant. Reclamation estimates this option would cost about \$600,000, and would require the following:
 - a. Extend the foundation of the pump plant down 6 feet
 - b. Extend the intake structure and trash rack down 6 feet
 - c. Extend the discharge piping
 - d. Modify or replace pumps to allow for pumping from a lower elevation
3. Modify the river channel to assure an adequate water surface elevation during low flow conditions. Reclamation estimates the cost of this option at \$1,000,000 (due to lack of construction access

⁴The Grand Valley Project is not authorized to carry municipal and industrial (M&I) water. Only Congress can authorize the carrying of through the Grand Valley Project Canals.

and magnitude of Colorado River flows). This option would involve constructing a low head dam immediately downstream from the Ute Water pump plant. The dam crest would be about 100 feet long, and the dam foundation would extend down into the riverbed. The dam design would permit upstream fish passage in a manner similar to the riffle-pool design used at the GVIC Diversion Dam.

Other options for protecting the Ute Water pump plant intake were too costly to consider further: 1) acquire alternate water sources, possibly from the Rapid Creek drainage; and 2) construct a new pump plant at a different location.

Construction

Removal of the Price-Stubb Diversion Dam would be completed under a construction contract. Approval of the owners of the dam, the Mesa County and Palisade Irrigation Districts, would be required. Temporary construction easements or permits and permanent easements and access would also be acquired from all affected land owners before construction. Reclamation would negotiate protective measures to reduce impacts to private property, right-of-way(s) and facilities. Following construction, any damaged area would be restored, as near as practicable, to its original condition. Access to the dam would be from Highway 6 along a trail that lies within the railroad right-of-way. Construction staging and material storage would be on adjacent vacant land. Construction access is limited near the dam because of its proximity to the railroad track and Interstate 70.

A cofferdam would be needed to direct the river around the work area and river flows would not be affected. Reclamation and the contractor would obtain any necessary approvals required by the Clean Water Act before construction begins. Reclamation would request Section 404 approval under Regional General Permit No. 057 for projects that benefit recovery of endangered fish, along with water quality certification under Section 401. If discharging water from dewatering is needed, the contractor would obtain a Section 402 permit. Construction would be scheduled during low flow conditions in the fall and winter of 2004 or 2005.

Reclamation estimates the total costs for dam removal to be \$1,900,000. This cost includes all preconstruction activities, permitting, construction, construction administration, mitigation measures for the Ute Water pump plant and mitigation of adverse effects to historic qualities of the dam. To facilitate comparison with the other fish passage alternatives, costs for a fish trap at the Grand Valley Project Diversion Dam are not included in this total.

Operation and Maintenance

If the dam is removed to restore natural passage, no regularly scheduled actions related to operation and maintenance of a passage facility are anticipated. The passage would operate as a natural river channel, so maintenance would be minimal.

Water Supply for Fish Passage

Because of downstream senior water rights, a flow of at least 640 cfs is present in this reach of the river under all but the most severe drought conditions. The Service also has up to 31,650 acre-feet of storage water available for endangered fish uses in drought years. Therefore, no measures would be needed to augment existing water supplies to enable fish to swim upstream after dam removal.

Environmental Commitments

The fish passage alternatives include measures as needed to:

- protect the ability of Ute Water to pump from the Colorado River
- protect Interstate 70 and the railroad bed from erosion
- ensure ease of fish movement and selectively reduce upstream passage of nonnative fish
- mitigate impacts to the historic qualities of the Price-Stubb Diversion Dam

The degree to which proposed measures would alleviate concerns for potentially affected resources and interests are discussed within the applicable sections of the next chapter.

To comply with requirements of the Endangered Species Act and the National Historic Preservation Act, Reclamation would consult with the Service and the State Historic Preservation Office on the Proposed Action. Consultation results would be reported in the Final Environmental Assessment.

Reclamation and/or construction contractors would obtain approvals under the Clean Water Act before beginning work in the river. Permit conditions would be environmental commitments for the fish passage action.

CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

General

This chapter discusses resources that may be affected by actions taken to provide fish passage at the Price-Stubb Diversion Dam. During preparation of this Supplemental Draft EA, information on issues and concerns was received from affected water users, resource agencies, private interests, recreational interest groups and citizens, and other parties (see Chapter 4, Consultation and Coordination, for further details).

For each resource, the potentially affected area and/or interests are identified. For significant issues, existing conditions are described, and impacts expected under the No Action alternative and each passage alternative are discussed. Impacts under the fish passage alternatives are usually similar for most resources. Where there are differences, the alternatives are discussed separately. The chapter concludes with a summary comparison of the alternatives and a list of mitigation measures.

The project is in Mesa County, Colorado along the Colorado River. Mesa County has a population of approximately 110,000. Grand Junction, the largest city in the area, was founded in 1881. The Rio Grande Railroad extended into the area in 1882 and, soon afterward, major irrigation of the valley began. The Price-Stubb Diversion Dam was completed in 1911. It was used to divert irrigation water to lands in the east end of the valley until 1918, when Reclamation's Grand Valley Project Diversion Dam and the Government Highline Canal were constructed. Although agriculture remains important in the valley today, some light manufacturing and service industries influence the economy. Tourism is also a significant source of economic activity for the area. The project area is within a major transportation corridor, with the Union Pacific's railroad tracks along the right bank of the river and the Interstate 70 highway on the left bank.

The upstream extent of the area affected by the fish passage proposals, and other endangered fish recovery activities for the Upper Colorado River, is the Town of Rifle in Garfield County. Rifle has around 5,500 residents involved in agriculture, mining and services. Streamflows and floodplain habitat of the river have been significantly altered by water diversions and uses, infringement by railroads, gravel operations, highways and bridges, and by the operations of upstream storage reservoirs, flood control dikes and channelization.

Water Resources

Ute Water Conservancy District Pump Plant Intake

Issue: Dam modification or removal could adversely affect Ute Water's ability to pump water from the Colorado River.

Existing Conditions: Ute Water provides water to about 60,000 residents of the Grand Valley. Their primary water supply is transported via a pipeline from the Plateau Creek drainage off the Grand Mesa. Ute Water's pump plant, located approximately 2,000 feet upstream of the dam, is normally used as an emergency backup water supply.

Pumping operations require a water surface elevation of about 4,722 feet in the river (Collins, 1999). The dam helps maintain the required water elevation for pumping operations, especially during low flow conditions.

Impacts

No Action: The No Action alternative would allow Ute Water to operate their pump plant as they have historically.

Conventional Fish Ladder : Same impacts as No Action Alternative.

Downstream Rock Fish Passage: Predicted similar to the No Action Alternative.

Dam Removal: As discussed above, the Ute Water pump plant requires a river elevation of at least 4,722 feet. With the dam removed, the river elevation would drop below 4,722 feet whenever the flow is less than 5,500 cfs. Review of historic flow data (average of monthly mean flows from 1933 through 1996) shows Colorado River flows are usually below 5,500 cfs for 9 months each year, from August through April.

Water Rights

Issue: Owners of existing water rights with decreed points of diversion at the Price-Stubb Diversion Dam have raised issues regarding potential impacts and the future utilization of their water rights under the Dam Removal alternative.

Existing Conditions: Three existing water rights cite the Price-Stubb Diversion Dam as their decreed point of diversion. The first of these is a 573 cfs water right for power generation with an

appropriation⁵ date of October 1, 1889 and adjudication⁶ date of July 22, 1912. This right is owned by the Palisade Irrigation District (PID) and was used to operate hydraulic pumps to lift their irrigation water. The power right has not been used since 1918; since then, PID's water has been delivered through the Government Highline Canal. The Palisade Irrigation District has retained the right to use the power right to pump irrigation water if irrigation deliveries cannot be made through the Government Highline Canal.

The second right is a 2,100 cfs conditional water right⁷ for hydroelectric power generation with an appropriation date of December 20, 1980 and an adjudication date of December 31, 1983. This right is owned by Mr. Eric Jacobson and is associated with the proposed Jacobson Hydro No. 1 Project, which would use the Price-Stubb Diversion Dam to divert Colorado River flows to its hydropower plant. As discussed previously, it is assumed that the Hydro No. 1 Project would not be constructed.

The third right is a 120 cfs water right for domestic, municipal and industrial uses with an appropriation date of February 17, 1947 and adjudication date of July 25, 1959. Eighty cfs of this right is owned by the City of Grand Junction, 20 cfs by the Clifton Water District and 20 cfs by the Water Development Company. The decree for this right lists five alternate points of diversion, with the Price-Stubb Diversion Dam being one of the decreed points. Approximately 19 cfs of this right has been made absolute⁸. The right was perfected by pumping from the Colorado River at the Clifton Water District Treatment Plant approximately 6 miles downstream from the Price-Stubb Diversion Dam. No water has been diverted at the Price-Stubb Diversion Dam under this water right.

Impacts

No Action: The No Action alternative would have no effect on these water rights. The opportunity to use PID's power right to lift irrigation water if the Government Highline Canal was unable to make deliveries would continue. The probability of using the Price-Stubb Diversion Dam to provide an emergency irrigation water supply is very remote. Pumping and conveyance facilities to support this use no longer exist, and it would require a substantial amount of time and money to reestablish them. Likewise, the opportunity to use the Price-Stubb Diversion Dam as a forebay to pump domestic, municipal and industrial water would continue. However, the probability of using this water right at this location is remote, since the City of Grand Junction and the Clifton Water District do not have any distribution systems in this area. In addition, FERC established a prescriptive easement for fish passage and providing fish passage as a condition of the Jacobson Hydro No. 1 Project permit which has been terminated by FERC..

⁵ *Appropriation*: applying water to a beneficial use. Often used interchangeably with the term water right.

⁶ *Adjudication*: the judicial process through which existence of a water right is confirmed by court decree.

⁷ *Conditional water right*: an appropriation that has not yet been made *absolute* by the water court.

⁸ *Absolute*: In Colorado, a conditional water right owner must prove diligence in completing work necessary to apply the water to a beneficial use before the water court makes the water right absolute (also termed perfected).

Conventional Fish Ladder: This alternative would have the same effect on these water rights as the No Action alternative. If constructed, only about 1,000 cfs of the 2,100 cfs water right associated with the terminated Jacobson Hydro No. 1 Project would be needed under the amended FERC license (FERC 2001).

Downstream Rock Fish Passage: This alternative would have the same effect on these water rights as the No Action alternative.

Dam Removal: The Dam Removal alternative would preclude PID from pursuing development of a backup irrigation water system or hydropower facility at the dam. Consequently, PID opposes removal of the dam. As a co-owner of the dam, PID can prohibit the partial dam removal alternative.

This alternative would also preclude using the dam as a forebay to pump domestic, municipal and industrial water. The owners of this right have said that this impact would not affect their ability to meet their existing and future needs. The option of constructing and operating the Jacobson Hydro No. 1 Project would also be precluded by dam removal and would likely result in the abandonment of hydropower rights..

Mr. Jacobson and PID have both suggested using their decreed rights and facilities as a point of delivery for surplus water from the Green Mountain Reservoir Historic Users Pool (HUP). This water is available in some years and under certain hydrologic conditions as part of the Orchard Mesa Check Settlement, with the objective of indirectly benefitting endangered fish species habitat. However, Reclamation recently (in 2001) completed a contract with the cities of Grand Junction and Fruita and the Town of Palisade to deliver water for municipal recreation uses that accomplishes the same objectives for the endangered fish.

Clifton Water District - Downstream Water Quality

Issue: Fish passage construction or dam removal could cause temporary water quality changes downstream. This could affect the ability of the Clifton Water District to meet drinking water standards and protect public health.

Existing Conditions: The Clifton Water District provides domestic water to about 30,000 residents of the Grand Valley. Using the Colorado River as their source of water, Clifton Water District produces potable water that exceeds drinking water standards (Clifton Water District, 1997). Their diversion is approximately 6 miles downstream from the Price-Stubb Diversion Dam.

Impacts

No Action: Water quality would remain unchanged if no fish passage is constructed.

Conventional Fish Ladder: Fish ladder construction activities could cause a temporary increase in erosion and sediment, but impacts are expected to be minor. Construction would occur when the Colorado River is low and a temporary cofferdam would be used to divert water away from construction areas.

Downstream Rock Fish Passage: Effects on water quality are predicted to be more than to the Conventional Fish Ladder alternative since more of the construction activities take place in the river channel.

Dam Removal: Removing the dam would result in sediment deposits being washed downstream by the river. Sediments are deposited in the riverbed as the velocity of the water slows. The geometry of the river near the dam, the steepness of the river bottom, and the constriction caused by the highway and railroad tracks keep the velocity higher than what is commonly found behind a dam. Surveys of the river bottom upstream from the dam revealed a thin layer of sediment behind the dam, but due to the water velocities, most of the river bottom is composed of gravels and cobbles (Collins, 1999).

The manager of Clifton Water District has said the District's main concern is knowing what to expect and when. They need to know what sediments exist, their composition, volume, and when the sediments would reach their river diversion. Consequently, Reclamation and the U.S. Geological Survey conducted a sediment study in the area above the dam. To ensure that the study addresses Clifton Water District's concerns, the District reviewed the sediment study proposal. This study identified volume and composition of the sediment (USGS, 2000). If dam removal was selected, additional sampling and monitoring may be necessary.

Ute Water Conservancy District Pump Plant - Spring Flooding

Issue: Effects of each alternative on spring flooding of Ute Water pump plant.

Existing Conditions: The Ute Water pump plant historically flooded when river flows were high and the Colorado River exceeded elevation 4,732 feet. Ute Water constructed a concrete retaining wall to an approximate elevation of 4,738 feet to protect their pump plant from flooding. The estimated 100- and 500-year floods at the dam are 44,500 and 52,800 cfs, respectively (Norval, 1998). The highest recorded flow in this stretch of the Colorado River was 36,000 cfs in 1983. According to Ute Water, the river elevation at that flow was just below their retaining wall (4,738 feet). They placed sandbags on top of the wall as a precautionary measure, and subsequently have raised the wall to elevation 4739.8 feet.

Impacts

No Action: The No Action alternative would allow Ute Water to operate their pump plant as they have historically.

Conventional Fish Ladder: The fish ladder would be designed so it would not have any affect on flood flows in the Colorado River.

Downstream Rock Fish Passage: The fish ladder would also be designed so it would not have any affect on flood flows in the Colorado River.

Dam Removal: With the dam removed, the Colorado River elevation at the Ute Water pump plant would be lower at all flow conditions. Flood flow elevations at the pump plant would be reduced by approximately 1.5 feet by removing the dam. Dam removal would, therefore, provide some additional protection from flooding.

In conjunction with dam removal, one of the options for protecting the ability of Ute Water to pump from the Colorado River (see page 14) would be implemented. Protection from flooding as described above would not change if option 1 or 2 was used. However, option 3, which involves constructing a low head dam immediately downstream from the pump plant, would change existing river elevations, and would not provide any protection from flooding.

Recreation Resources

River Boating

Issue: Effects on Colorado River boating in the Grand Valley vicinity.

Existing Conditions: The Colorado River provides recreation opportunities for a growing population with an increasing interest in whitewater boating. The 8-foot-high Price-Stubb Diversion Dam is an extremely dangerous barrier to river navigation, and boaters must currently trespass to portage around the dam. No established take-out sites are near the dam; an undeveloped access site exists about 0.6 miles downstream. The dam is at the lower end of DeBeque Canyon, which runs about 23 miles from the Town of DeBeque to the Town of Palisade. Through most of the canyon, the river is bordered by Interstate 70 on the left bank of the river, and the Union Pacific Railroad on the right bank of the river. A potential take-out/put-in site within the canyon is at Island Acres State Park, about 3 miles upstream from the dam; however, there currently is no established boat ramp or boat launch site (telephone conversation with Colorado State Parks, 2/24/99). Limited access and the navigation barriers of the GVIC Diversion Dam, Price-Stubb Diversion Dam and Grand Valley Project Diversion Dam have made recreational boating impractical in this stretch of the river.

For a variety of reasons, there is less recreational boating on the Colorado River in DeBeque Canyon and within the Grand Valley than in the Glenwood Canyon, Ruby Canyon, and Westwater Canyon areas (described below). Glenwood and Westwater Canyons have superior river conditions for whitewater boating and are advertised by the commercial rafting industry. Ruby Canyon is very scenic and provides access to a wilderness study area.

The Colorado River is primarily flat water (Class I), for about 25 miles from Island Acres State Park to Loma, Colorado. There are a few Class II rapids in this section, depending on river flows (see information block on River Difficulty Classes). Though recreational use data is not available for the Colorado River upstream of the GVIC Dam at Palisade; the Bureau of Land Management (BLM) estimated there were approximately 300 to 400 float trips annually. Little information is available regarding river use within the Grand Valley; the BLM estimates about 2,000 users annually recreate on the river between Palisade and Loma.

For comparison purposes, the BLM estimates approximately 9,000 recreational boaters annually use Ruby Canyon, just downstream from Loma. The 25-mile-long Ruby Canyon is of Class I and Class II difficulty. Immediately downstream from Ruby Canyon, a total of 13,790 commercial and private boaters used Westwater Canyon in 1998. Whitewater boating is controlled by a permit system administered by the BLM. Depending on flow conditions, the rapids in the 16-mile-long canyon are rated at Class II, Class III, and Class IV (telephone conversations with BLM–Moab, UT, and Grand Junction, CO 2/4/99 and 2/19/99).

Also for comparison, the commercial use figure for Glenwood Canyon was 43,146 in 1997. About 90 miles upstream from Palisade, Glenwood Canyon is popular for whitewater boating, with Class II and Class III rapids (telephone conversations with BLM, 2/17/99 and 2/19/99). During the peak tourist season, more than 100 commercial rafts put in each day, and the many access points provide a variety of take-outs along this 20-mile stretch of river (Wheat, 1983).

River Difficulty Classes

<i>Class I</i>	Easy. Riffles and small waves.
<i>Class II</i>	Novice. Easy rapids with waves.
<i>Class III</i>	Intermediate. Large waves, obstacles.
<i>Class IV</i>	Advanced. Long, difficult rapids.
<i>Class V</i>	Expert. Nearly impossible to run.

– from the Internet web page of Colorado State Parks River

Despite the lack of whitewater boating opportunities in the Grand Valley area, it is likely that recreational boating use in the area could double in 5 years (Grand Junction BLM and Reclamation recreation specialists, February 1999). River recreational use would be enhanced by many related activities planned by various entities in the Grand Valley. The Colorado Division of Parks has developed a new riverfront park in the Fruita area and the Colorado Riverfront Commission has ongoing efforts to improve the river corridor. Reclamation has developed a contract with the cities of Grand Junction and Fruita and the Town of Palisade to supplement Colorado River flows with surplus Green Mountain Reservoir releases to benefit recreation, aesthetics and endangered fish habitat.

In 1999, the Colorado Riverfront Commission was investigating the feasibility of constructing water parks at four locations between Palisade and Fruita (Riverbend, Corn Lake, Watson Island, and Old Fruita Bridge) to enhance whitewater boating in the area (Recreation Engineering & Planning, 1999). The Colorado Riverfront Commission applied for Legacy Project funding from Colorado Lottery proceeds for water parks at two of these sites: Riverbend Park (Town of Palisade) and Watson Island (City of Grand Junction). The water parks involved constructing instream structures to create drops, pools, and constrictions for water craft and spectator enjoyment. The funding requests for the instream improvements totaled \$936,000.

Impacts

No Action: If No Action is taken, the 8-foot-high Price-Stubb Diversion Dam would remain a dangerous barrier to river navigation, and portaging around the dam would involve trespassing. River recreation would continue to increase, and local boating enthusiasts predict significant growth of river recreation and day use if planned water parks are constructed. Increased recreational boating is expected to occur whether or not any action is taken to provide fish passage at the Price-Stubb Dam. However, the opportunity to extend the river corridor upstream to Island Acres would be diminished. The river would not be a means to connect the Colorado River State Park sites in the area; Island Acres would remain isolated from the other downstream parks.

Conventional Fish Ladder: As with the No Action alternative, construction of a fish ladder around the dam would provide no recreational benefit.

Downstream Rock Fish Passage: This alternative would provide some limited recreational benefit. The fish passage on the river left-side would not be designed for boat passage and boat passage would be discouraged. However, the remaining area below the dam made from the 400 ft. rock-ramp would create challenging waves for experienced boaters. Future recreational enhancement, with other funding sources, could also improve the remaining portion downstream of the dam as long as it did not interfere with the operation and structural integrity of the fish passage. This would also require approval of the dam owners, underlying fee title land owners, and the Recovery Program.

Dam Removal: As stated in a January 1999 letter from Gary M. Lacy, P.E., “removing the dam could create a naturally appearing, navigable segment of the river. This would open a spectacular canyon segment of the Colorado River to recreational . . . boating.” Removal would significantly increase the potential for recreational boating in this reach of the river. A possible put-in site is about 3 miles upstream at Island Acres State Park, from which boaters could float down the river to a variety of take-out points. Popular day use take-outs include Palisade, Corn Lake State Park, Connected Lakes State Park, Blue Heron Park, Fruita and Loma. Removal of the Price-Stubb Dam would extend the 25-mile segment from Palisade to Loma by more than 3 miles.

Many letters received during the scoping process suggested the Recovery Program construct a whitewater park at the dam site. A December 1998 letter from the City of Grand Junction states “the

City wishes to remain open on the issue of where a kayak or water park might be conceivable based on the . . . conceptual feasibility of such a park.” Kayakers and other recreational users of the Colorado River are raising money to study the Price-Stubb Diversion Dam as a water park site (Daily Sentinel, 2/28/99). It should be noted that funding for dam removal would be provided by the Recovery Program for endangered fish, and does not include funds specifically for recreation enhancement. However, to the extent that costs to the Recovery Program would not increase, designs for removal could also incorporate measures to enhance recreational boating.

In conjunction with dam removal, one of the options for protecting the ability of Ute Water to pump from the Colorado River (see page 14) would be implemented. Options 1 and 2 would have no effect on recreation. However, designs for option 3, which involves constructing a low head dam immediately downstream from the pump plant, would consider boating passage.

Public Safety

Issue: The dam poses a significant safety threat to all forms of water recreation in the vicinity of the dam.

Existing Conditions: The Price-Stubb Diversion Dam is an extremely hazardous structure. A January 1999 letter from Mesa County Irrigation District describes the Price-Stubb Diversion Dam as “. . . a deadly hazard to people who climb on or slide down the dam and to boaters who unwittingly go over the dam.” Drowning fatalities at the dam site were confirmed by several sources, but no statistics were available (conversations with Town of Palisade, Mesa County Health Department Vital Statistics, Mesa County Sheriff, and the Emergency Medical Services Coordinator for Saint Mary’s Hospital). A January 1999 letter from a board member of the Western Association to Enjoy Rivers reports the Price-Stubb Dam is listed as one of the state’s top ten river safety “hotspots.”

Impacts

No Action: The safety hazard would not change. As river recreation grows, more accidents at this dam would be likely. A warning sign is posted upstream of the Price-Stubb Diversion Dam, but due to the restricted access, the narrow river, and corresponding faster river velocities, the dam poses a significant risk to boaters, especially to those who may not be familiar with the hazard.

Conventional Fish Ladder: As for the No Action alternative, constructing a fish ladder around the diversion dam would not change the existing safety hazard.

Downstream Rock Fish Passage: This alternative would not eliminate the safety hazard. However, it would provide a more gentle slope, thus potentially reducing the hazard. As noted in the recreation discussion, future recreation improvements with additional outside funding could provide safe boatable passage at the Price-Stubb Diversion Dam.

Dam Removal: Removal would eliminate the safety hazard. After removal of the dam, the river channel would be typical of similar sections of the Colorado River. All protruding rebar would be removed from the remaining concrete. Riprap would be placed at each abutment to eliminate any vertical concrete faces. The riprap would create sloped surfaces similar to the river banks upstream and downstream of the abutments.

In conjunction with dam removal, one of the options for protecting the ability of Ute Water to pump from the Colorado River (see page 14) would be implemented. Options 1 and 2 would have no effect on public safety. However, designs for option 3, which involves constructing a low head dam immediately downstream from the pump plant, would consider boating safety.

Land and Facility Resources

During construction of any of the action alternatives, an increase in noise and traffic would occur. To date, Reclamation has not been advised of concerns for disturbances during construction. Any complaints would be resolved on a case-by-case basis. The Colorado Department of Transportation has advised Reclamation that access to the site from Interstate 70 would not be granted.

Protect Existing Structures

The fish passage project could affect four existing structures in the project area: 1) the Union Pacific Railroad on the right bank of the river; 2) the Interstate 70 highway on the left bank; 3) Ute Water Pumping Plant; and 4) the Colorado River Siphon about 3,600 feet upstream from the dam. The highway, railroad and siphon were built considering river flow and stream bank conditions that exist with the dam in place. Reclamation constructed the siphon, which is a pipeline under the riverbed that carries water from the Government Highline Canal to the Orchard Mesa Power Canal.

Two factors could affect these structures: 1) scour of the riverbed and banks, and 2) the rate of wetting or dewatering the foundation of the railroad or interstate. River scour is a function of the velocity of the river, the size of the cobbles in the riverbed, and the size of the riprap along the banks. If the dam is removed, the velocity of the water in the river would increase. As the velocity increases, the ability of the water to scour the banks and riverbed increases. If the banks and streambed are not adequately protected, the scour could move horizontally toward the railroad and interstate. Riverbed scour could extend upstream and could expose and damage the siphon.

Wetting (saturating) the foundation of the railroad or highway would weaken the foundation. If actions taken at the site raise or lower existing water levels, there could be impacts to these structures. Since the siphon is buried beneath the riverbed, foundation wetting is not a concern.

Issue: Effect of alternatives on integrity and use of the highway, railroad, and siphon.

Existing Conditions: Upstream and downstream from the Price-Stubb Dam, riprap protects the foundations of I-70 and the railroad. The siphon is located in a stable portion of the riverbed that has not shown significant scour. During flood stages and the corresponding high water levels, the railroad bed has reportedly become weaker due to foundation saturation in the vicinity of the dam. This is not a known issue with the interstate highway.

Impacts

No Action: The No Action alternative assumes a hydropower plant would not be built under the existing terminated FERC license. However if constructed, the hydropower plant would divert water for power generation. The design capacity of the amended power plant is about 1,000 cfs.

Conventional Fish Ladder: Impacts of constructing a fish ladder around the diversion dam would be similar to those of the No Action alternative. If a hydropower plant were constructed with the conventional fish ladder, the tail race of the hydropower plant would serve as an attraction flow for fish to find the fish ladder entrance. If a hydropower plant were not constructed, an attractive flow pipe would be necessary to draw fish to the fish passage entrance. It is estimated that the attractive flow pipe would cost about \$100,000.

Downstream Rock Fish Passage: This alternative would have no effect on existing structures. The fish passage would protect the left bank of the river with additional riprap. If a hydropower facility were constructed, a discharge pipe would need to be installed underneath the rock ramp to the river left side of the river to attract fish to the fish passage channel.

Dam Removal: Dam removal would cause an increase in the water velocity upstream from the dam. Reclamation's Technical Service Center conducted a hydraulic and scour analysis of the project (Collins, 1999). Analysis results in Figures 5 and 6 show the estimated river velocities with and without the dam. Figure 5 shows velocities for a 100-year flood; Figure 6 is for comparison at a lower peak flow of 10,500 cfs.

The velocity increase would be greatest at the dam and would gradually diminish upstream. Existing angular riprap on the west bank of the river would be sufficient to protect the railroad embankment from scour due to increased velocities upstream from the dam (Collins, 1999). Additional riprap would be placed along the Interstate 70 side of the river. At the Colorado River Siphon, about 3,600 feet upstream from the dam, the difference in velocity is negligible. Therefore, no increase in scour should occur at the siphon or further upstream. Downstream from the dam, no change in river velocity is expected, and no increase in scour should result.

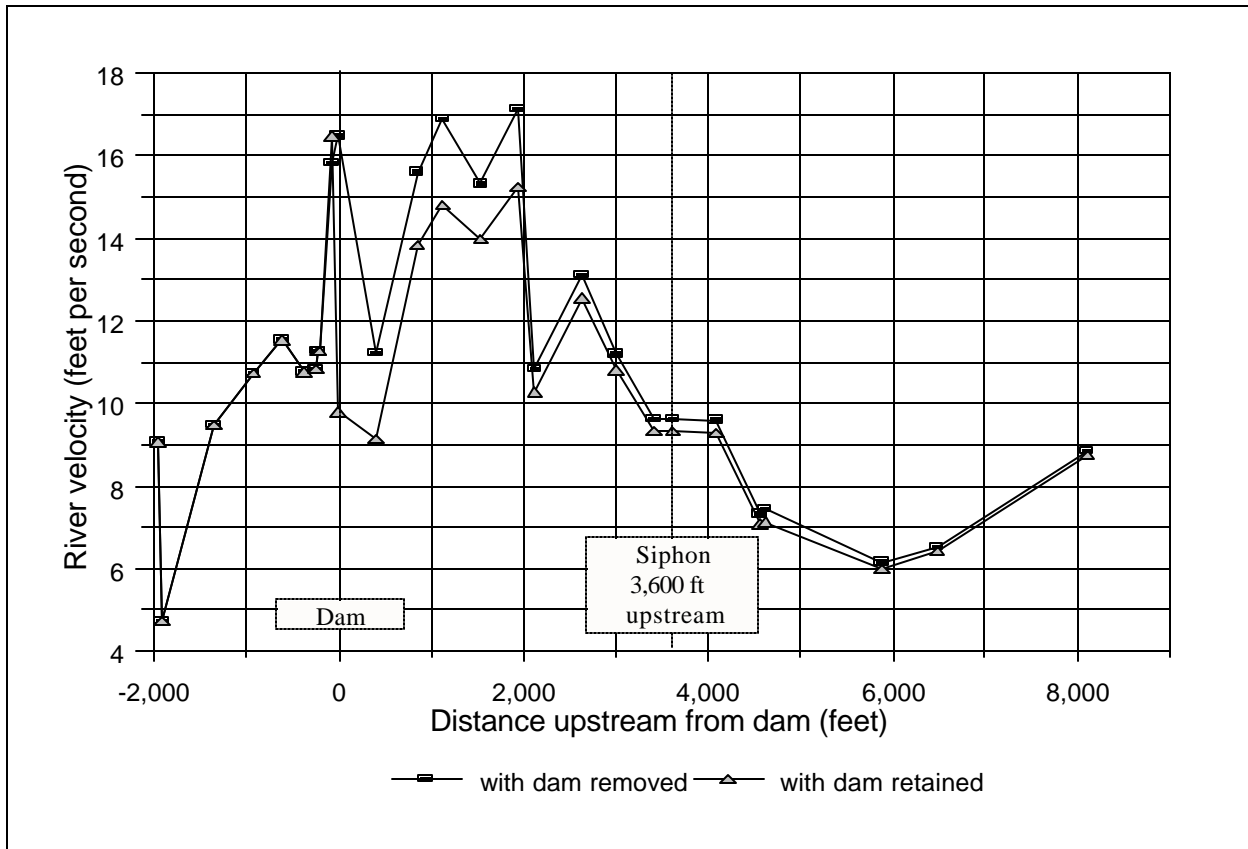


Figure 5 - River velocity at 44,500 cfs

Railroad and Landslide Stability

Approximately 1,000 feet upstream of the Price-Stubb Diversion Dam, on the west side of the Colorado River, is a historically active landslide. This landslide is a small portion of a very large inactive landslide mass that extends upriver 1¼ miles to the Cameo Power Plant and about 1 mile west to Mt. Lincoln. The active portion of the landslide lies between the Colorado River and the steep sandstone cliffs forming the west canyon wall (see Figure 7). Railroad tracks, owned by the Union Pacific Railroad, are between the Colorado River and the over-steepened slopes of the landslide. The railroad grade cuts through the toe of the landslide.

Issue: Fish passage alternatives could affect the stability of an existing landslide and railroad.

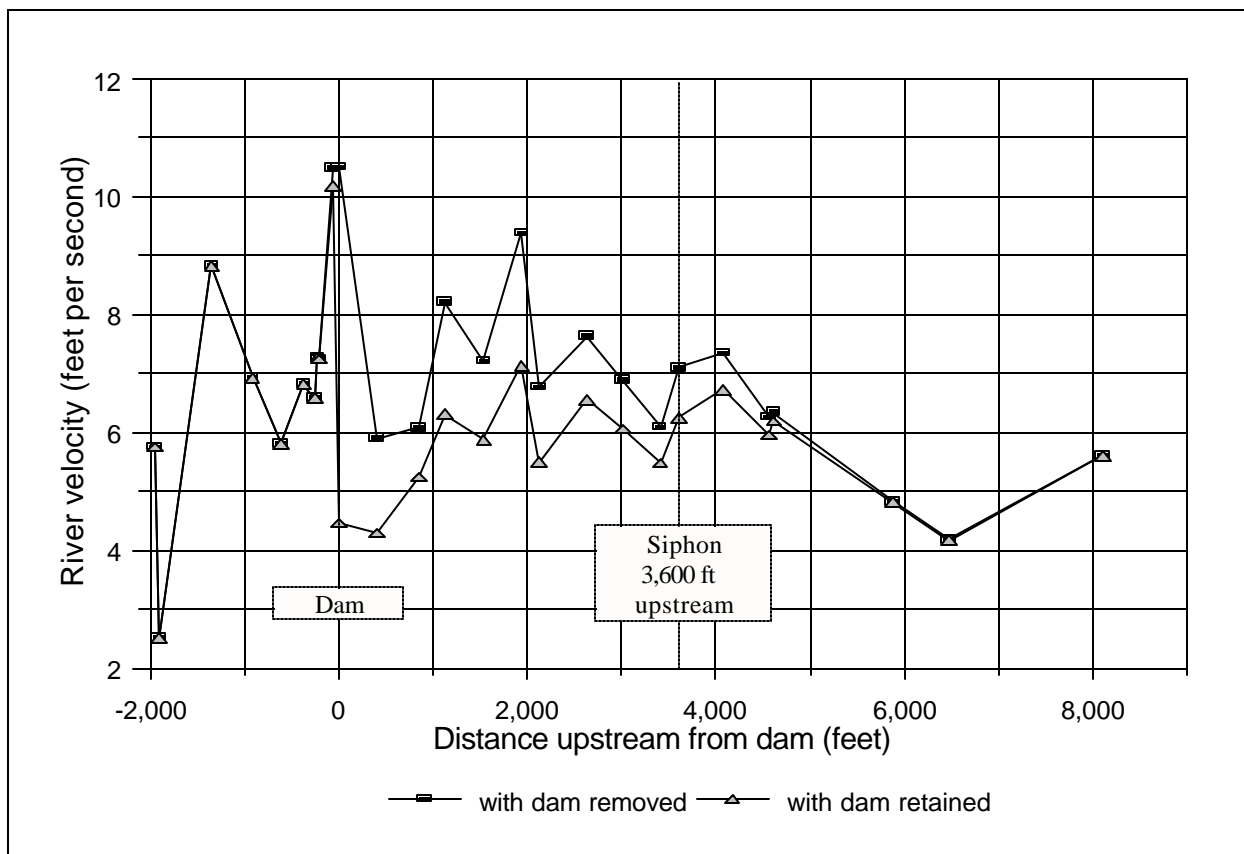


Figure 6 - River velocities at 10,500 cfs

Existing Conditions: The landslide in question is called the Tunnel No. 3 Landslide and is inspected annually as part of Reclamation’s Upper Colorado Regional Landslide Surveillance Program. Since 1988, annual inspections have revealed no visible evidence of movement; however, the slide has been active in the past. In February and March 1950, this slide became active and collapsed part of Tunnel No. 3 through which water for the Government Highline Canal flows. Damage was so extensive that the tunnel had to be rerouted further into the hillside in sandstone bedrock. The slide disrupted railroad traffic as well, and the track alignments had to be reestablished (Murdock, 1950).

In February and March 1988, movement of the landslide occurred again. No damage was done to Reclamation facilities, but railroad traffic was disrupted as the tracks had to continually be realigned. To halt the movement of the landslide, the Denver and Rio Grande Western Railroad, owners of the railroad then, removed material from the top one-third of the slide and stockpiled it just downstream of the slide. No evidence of further movement has been observed or reported since this material was removed.

It is not known what triggered movement of this slide in 1950 and 1988. No clear correlation is evident with high precipitation events. However, the entire area is over-steepened and in a state of delicate

balance. Long-term changes in moisture content within the slide mass, or removal of supportive material at the toe may have contributed to the historic movement.

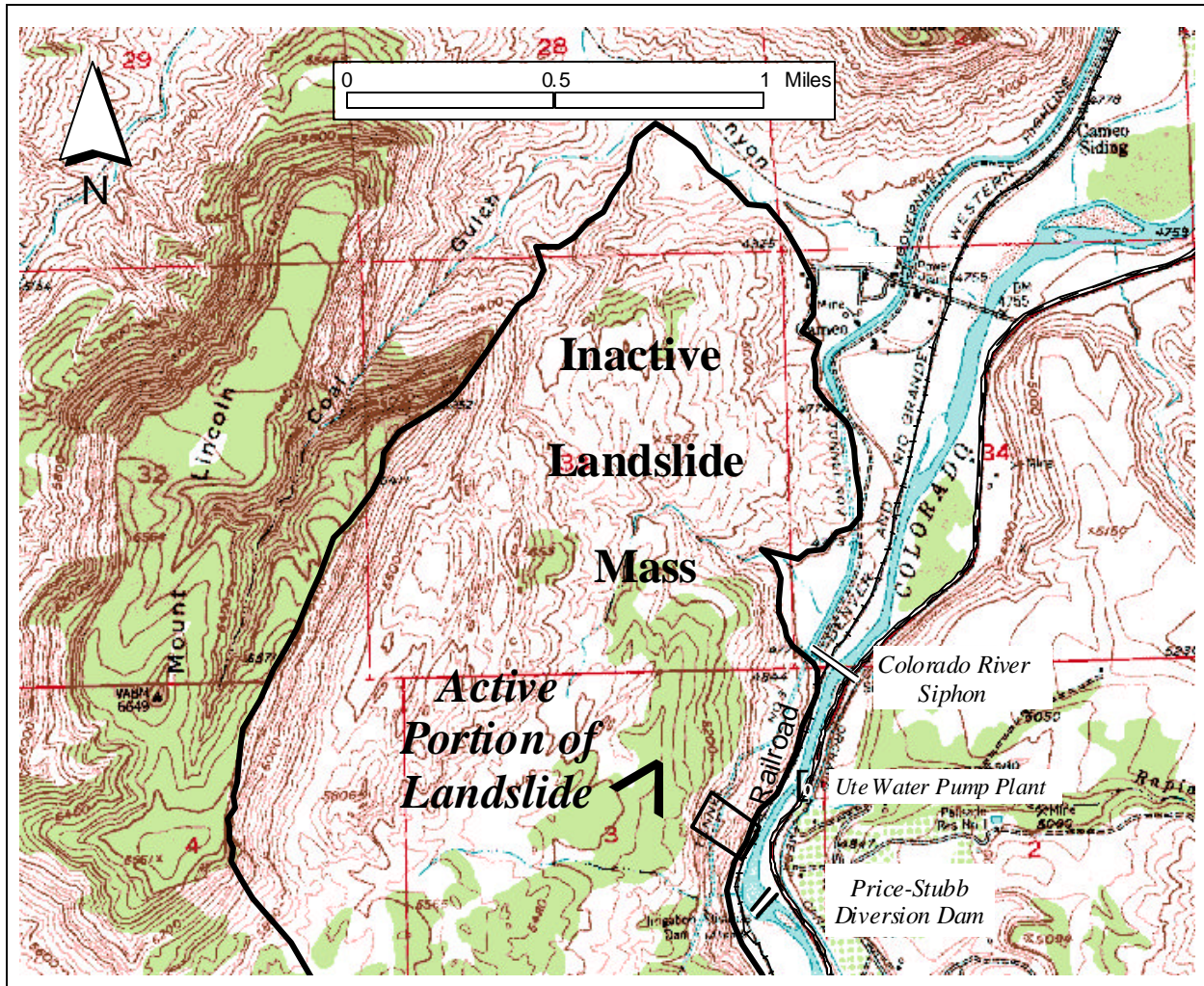


Figure 7 - Landslide location map

The stability of this landslide becomes an issue if the proposed fish passage significantly alters river dynamics. The two basic concerns are: 1) potential erosion of the toe of the landslide caused by increased flow velocities in the river, and 2) potential rise of the water table within the landslide mass. Both conditions would contribute to instability of the landslide mass and may trigger movement that would be detrimental to the railroad.

Erosion of the toe of the landslide mass due to increased flow velocities of the Colorado River would contribute directly to landslide instability. The removal of material by this erosion process essentially removes weight that helps stabilize the landslide mass. Therefore, any erosive action at the toe of the landslide is undesirable. Increased flow velocities would be acceptable if down-cutting or scouring did not occur near the landslide.

A rise of the water table within the landslide mass would also contribute to landslide instability. As water levels rise within a landslide mass, pore-water pressures are increased and slippage along a water-saturated slip plane is more likely to occur. Furthermore, a sudden increase or decrease in the water table may trigger movement. A gradual decline and maintenance of a lower overall water table would increase the stability of the landslide.

The possibility of future movement is high since the area is very unstable and natural climatological and/or hydrological conditions could easily trigger movement of this slide.

Impacts

No Action: The terminated Jacobson Hydro No. 1 Project proposed to raise the water level with flashboards on the dam, and the 1990 FERC license required development of an erosion control plan for review by the railroad. The fixed flashboards would raise the water table by approximately 4 feet. This could cause a slight decrease in landslide stability. Without the terminated Jacobson Hydro No. 1 Project, the No Action alternative would have no effect on the Tunnel No. 3 landslide.

Conventional Fish Ladder : Construction of a fish ladder around the existing diversion dam would have little or no effect on the stability of Tunnel No. 3 Landslide provided there is not an overall increase in the river water surface elevation.

Downstream Rock Fish Passage: Construction of the downstream rock fish passage would have no effect on the stability of Tunnel No. 3 Landslide.

Dam Removal: Removal of the Price-Stubb Diversion Dam would change river dynamics upstream of the dam in the vicinity of the Tunnel No. 3 Landslide. A preliminary scour study conducted by Reclamation's Technical Service Center (Lyons, 1998) shows the average flow velocity of the river would increase in the reach from the diversion dam upstream to the Colorado River Siphon. However, this study indicated no channel degradation would be anticipated since there is no extensive area of sediment deposition upstream of the dam.

In the preliminary study, assumptions were made concerning the composition of the riverbed. A more formal study was subsequently conducted, and riverbed samples were taken and analyzed. In addition, scuba divers conducted a survey of the deeper portion of the riverbed upstream from the dam (Collins, 1999). The results of these studies fundamentally agreed with the initial study, except they anticipate the removal of about 2 to 3 feet of fine materials that have been deposited behind the dam. It is believed that under existing conditions, these materials are flushed annually during spring runoff, and are redeposited after the higher flows subside.

Another study done by Reclamation's Technical Service Center specifically analyzed the effects of dam removal on the stability of Tunnel No. 3 Landslide (Pabst, 1999). Detailed geologic information is limited for this slide and a monitoring program is in place. The main conclusion from this study was that

dam removal should not have a negative impact on slide stability assuming no river scour occurs. Lowering the river water surface would cause a lowering of the water table within the landslide mass, which would slightly increase slide stability. A rapid drawdown of water surface or an overall increase in water surface would contribute to instability of the slide. Since dam removal would occur during low flow conditions and the dam would be breached in a controlled manner, a rapid draw down of the river surface would not occur.

Ownership of Dam and Lands

Issue: Before any modifications to the dam and site could be made, permission would be needed from the dam owners and land owners to access the site and/or use their land and facilities.

Existing Conditions: For the purposes of this project Reclamation considers two separate ownership issues: 1) ownership of the land that could potentially be affected, and 2) ownership of the Price-Stubb Diversion Dam. Land owners that may be affected by the project include:

- Colorado Department of Transportation (CDOT) – land for access to the site for construction and long-term operations and maintenance, and for use during construction
- Palisade Irrigation District – land under the I-70 side (river left) of the diversion dam
- Mr. Eric Jacobson (FERC licensee) – land owned along the railroad side (river right) of the diversion dam and downstream
- Grand Valley Water Users Association – land along the railroad side of the dam
- Union Pacific Railroad – right-of-way next to the dam site; access to the site is within this right-of-way

The Palisade and Mesa County Irrigation Districts built the actual dam structure. Minutes of their board meetings clearly show both Districts consider themselves the joint owners of the dam.

Impacts

No Action: Since no fish ladder or dam removal is considered in this alternative, no land or facility ownership rights would be changed. Current land owners may have to resolve any questions regarding dam ownership.

Conventional Fish Ladder: Access agreements and temporary easements would be necessary from all of the owners identified above. Construction access would be required from CDOT, the Union Pacific Railroad, and Mr. Jacobson. Reaching an agreement with Palisade and Mesa County Irrigation Districts to modify the dam would also be necessary. The FERC license amendment granted a prescriptive easement for the fish passage structure and a long-term access agreement for access to the site on the Jacobson property. Access agreements would also be needed from CDOT and the Union Pacific Railroad for long-term operation and maintenance of the fish ladder.

Downstream Rock Fish Passage: Similar to the Conventional Fish Ladder alternative.

Dam Removal: As for the other action alternatives, access and/or land use agreements would be necessary from all of the owners identified above. Construction access would be required from the CDOT, Palisade Irrigation District, the Union Pacific Railroad, and Mr. Jacobson. Permission from the Mesa County and Palisade Irrigation Districts to remove the dam would also be necessary; the Palisade Irrigation District is currently opposed to dam removal.

Unique Geographical Features

To meet requirements of environmental laws and U.S. Department of the Interior policies, Reclamation specifically addresses potential impacts of any proposed action on unique geographical features — which include prime and unique farmlands, wild or scenic rivers, rivers placed on the nationwide river inventory, refuges, floodplains or wetlands. Providing for fish passage at the Price-Stubb Dam would have no effect on prime or unique farmlands. Affected reaches of the Colorado River are not under study or recommended for designation as a wild or scenic river. Similarly, no refuge exists in the affected area. However, each alternative involves actions that would take place in the Colorado River and its 100-year floodplain.

Floodplain and Wetlands Protection

Issue: The Colorado River provides highly valued habitat and floodplain functions that need to be considered as fish passage is restored.

Existing Conditions: The surface area of the pool upstream of the dam is about one acre, and the stream bank is protected from erosion by riprap along the highway and railroad beds. The plunge pool at the base of the dam is deep, and a long riffle reach extends downstream. Deposition and transport of sediment in the river depends on variations in seasonal and annual river flows.

Narrow strips dominated by willows and the introduced tamarisk occur along the river, but very little riparian vegetation is in the construction area at the Price-Stubb Dam. A small patch of shrubs and a mature cottonwood at the Price-Stubb Dam may be of importance to birds (see Fish and Wildlife section).

Impacts

No Action: The No Action alternative assumes a hydropower plant would not be built under the existing FERC license therefore, no impacts would occur. However, if the hydropower plant were built, mitigation measures required to reduce wetland impacts from its construction would be identified as part of the licensee's 404 permit.

Conventional Fish Ladder: A mature cottonwood tree at the site would be lost. Due to the limited space, routing a fish ladder around the cottonwood tree is not possible. Revegetation of the site would mitigate for temporary losses of other vegetation. 404 permits would be required to discharge fill material for temporary construction cofferdams.

Downstream Rock Fish Passage: 404 permits would be required to discharge boulders and riprap material into the Colorado River to create the downstream fish passage. Construction contracts would require protection of downstream water quality and the mature cottonwood tree, and revegetation of disturbed areas would rapidly mitigate losses of vegetation.

Dam Removal: The contract for removal would require protection of the mature cottonwood tree at the dam site. Revegetation of disturbed areas would rapidly mitigate losses of vegetation.

Fish and Wildlife Resources

The affected area, for purposes of assessing impacts to fish and wildlife, corresponds to the 100-year floodplain of the Colorado River from the Price-Stubb Dam site upstream to Rifle. There are no significant concerns for project effects on fish and wildlife resources in general; concerns focus on avoiding adverse impacts to endangered species (U.S. Fish and Wildlife Service, 1999a) as well as complementing efforts to establish self-sustaining populations of endangered Colorado River fish species.

No Federally-listed threatened or endangered mammals or plants are known to occur in the area affected by the project. Threatened or endangered species of birds that may occur include the bald eagle and the southwestern willow flycatcher. The bald eagle is a regular winter visitor to the Colorado River corridor that occasionally perches and roosts in large cottonwoods along the river. One mature cottonwood tree is at the abandoned canal headworks, but bald eagle use of the tree has not been observed. The migratory southwestern willow flycatcher is known to use patches of willow, tamarisk and small cottonwood trees in Mesa County from May 1 to August 15. The riparian wetland fringe along the river consists of sandbar willow and tamarisk. The single story patches lack diversity and are typically too small to be considered suitable habitat for breeding and nesting use.

Reclamation concludes that the project would not adversely affect the bald eagle or southwestern willow flycatcher. *Contracts would require work to stop if activities are thought to be affecting any listed species.*

Effects on Endangered Colorado River Fishes

Issue: Providing passage at the dam is needed to allow endangered fish access to upstream habitat (see page 3). Passage actions should complement other Recovery Program efforts such as stocking endangered fish, controlling competition or predation by nonnative fish, and restoring habitat.

Existing Conditions: The Price-Stubb Dam excludes access by migratory fish to suitable habitat upstream. Two of the four endangered Colorado River fish species, the humpback chub and bonytail, do not occur in the reach of the Colorado River involved in this fish passage project. However, the Recovery Program plans to stock bonytail between Palisade and Loma in the next 5 years. The affected reach is within designated critical habitat of the endangered Colorado pikeminnow and razorback sucker. These fish are known to occupy habitat downstream from the dam, but the Colorado pikeminnow is absent in the 50 miles of its historic range from the Price-Stubb Dam upstream to Rifle, and the razorback suckers are extremely rare.

A dramatic decline in razorback suckers occurred between 1974 and 1991 in the Colorado River. In 1991 and 1992, 28 adult razorback suckers were collected from isolated ponds adjacent to the Colorado River near DeBeque. No young razorback suckers have been collected in recent surveys of the Colorado River.

Other native fish species found in the Colorado River include flannelmouth sucker, bluehead sucker, mountain sucker, and roundtail chub. Fish surveys upstream and downstream of the dam show a higher composition of native than nonnative species upstream of the dam, and many of the nonnative species found downstream of the dam are absent upstream (Wydoski, 1994). Nonnative fish species that are absent upstream include channel catfish, northern pike, red shiners, large mouth bass, bluegill, and black crappie. Black bullhead, small mouth bass, and green sunfish are rare (U.S. Fish and Wildlife Service, 1998).

Predation by and competition with nonnative fishes are believed to be significant factors in the decline of the Colorado River fishes. Channel catfish and green sunfish, along with other sport fish such as smallmouth and largemouth bass and northern pike, are predators of endangered fish. Off channel ponds have been identified as a source of many of the nonnative sport fishes that occur in the river and endangered fish nursery areas. Small nonnative fish (minnows and shiners) are assumed to be significant predators of fish larvae as well as important competitors (Wydoski, 1998). Fathead minnows and sand shiners are more common downstream from the dam, and red shiners have been found downstream from the dam, but not upstream (U.S. Fish and Wildlife Service, 1998). The distribution of native and nonnative fish upstream and downstream of the dam indicate the dam also serves as a barrier to nonnative fish, and may help control the spread of nonnative fish upstream.

One radio-tagged Colorado pikeminnow was documented using the scour hole below the Price-Stubb Diversion Dam in 1986 and 1987 (Burdick, 2002). The portion of the Colorado River and its 100 year flood plain between the GVIC Diversion Dam and the Grand Valley Diversion Dam (including the

Price-Stubb Diversion Dam) are included in the designation of critical habitat for the Colorado pikeminnow and razorback sucker.

Impacts

No Action: If no passage is provided, a self-sustaining population of endangered fish would be less likely to develop via natural upstream recolonization. Even if stocked fish mature, and succeed in reproducing upstream, young fish that drift or move downstream of the dam could not return as adults. If native fish cannot access upstream habitat, related Recovery Program efforts to acquire and restore floodplain habitat, stock Colorado pikeminnow and razorback sucker, and remove nonnative fishes would be less effective.

Conventional Fish Ladder: The ladder would be similar to the Redlands fish ladder constructed in June 1996. Since its completion, 47 Colorado pikeminnow, 5 razorback sucker and about 36,400 native fish have passed through the Redlands fishway (Burdick, 2002). Installation of a fish trap to allow selective passage would prevent upstream access by nonnative fish. A fish trap at this location has some advantages over a fish trap at the Grand Valley Project Diversion Dam about 5 miles upstream (see Dam Removal impacts below).

Downstream Rock Fish Passage: Concerns for ease of fish use would be similar to those of building a conventional fish ladder. However the passage would be more natural than the conventional type. The Recovery Program has identified concerns with having both the Price-Stubb and Grand Valley Diversion Dam fish passages being concrete ladders. A rock fish passage was identified as the preferred alternative in the Draft Environmental Assessment for fish passage at the Grand Valley Diversion Dam (Reclamation, 2002), however additional design requirements appear to make a rock fish passage at Grand Valley Diversion Dam cost prohibitive. Therefore to avoid constructing 2 concrete passages, rock passage at the Price-Stubb Diversion Dam has been identified as more beneficial than a conventional concrete fish ladder.

Filling the scour hole with riprap material below the Price-Stubb Diversion Dam would likely eliminate its use by Colorado pikeminnow. However, restored fish passage at the Price-Stubb Diversion Dam and Grand Valley Project Diversion Dam would restore access to about 50 miles of critical habitat. Reclamation would be required to consult with the Service on effect of the project on designated critical habitat.

Dam Removal: Removing a man-made barrier and letting the river channel return to natural conditions would be the most beneficial passage alternative for the endangered fish. If the option to modify the river channel upstream of the dam to maintain the water surface elevation at the Ute Water pump plant is pursued (see page 14), designs for that structure would be reviewed to ensure it does not create new passage problems. Dam removal would also require the filling of the scour hole below the dam with riprap material.

Both the Downstream Rock Fish Passage and Dam Removal alternatives assumes a fish ladder with selective passage (fish trap) would be installed at the Grand Valley Project Diversion Dam, which is the last remaining barrier to upstream movement. Nonnative fish would thus be prevented from moving further upstream into the critical habitat extending upstream to Rifle. However, fish passage at Price-Stubb would allow nonnative fish to access Plateau Creek and the 5 miles of the Colorado River upstream to the Grand Valley Project Diversion Dam.

The benefits of dam removal to endangered fish include (Nelson, 1999):

1. Only one fish ladder would be constructed instead of two. Multiple ladders tend to have cumulative effects on migrating fishes. It would be easier and less stressful for fishes to migrate both upstream and downstream. During spawning migration, adults would expend less energy reserves needed for spawning. Migration delays could adversely affect reproduction success.
2. Fish predators tend to congregate below dams. Downstream migration may result in mortality as endangered fish go over the dam spillway, become stunned and disoriented, and fall prey to predators. Removal of the Price-Stubb Dam would remove one of the spillways.
3. With the dam in place, there would always be a threat of hydropower development and associated impacts (entrainment, impingement, mechanical injury, and mortality). Fish that pass through power-generation turbines can be injured or killed.
4. Ladders result in fishes being concentrated in one place, which may result in predation, competition, and disease transfer. Fewer ladders may result in less predation on endangered fishes attempting to migrate upstream. The likelihood of moving greater numbers of fish upstream is better with one ladder than two.

Reclamation concludes each fish passage alternative would have no effect on the humpback chub, and would complement efforts of the Recovery Program to stock bonytail. The Colorado pikeminnow and razorback sucker and their critical habitat may be affected, but in a beneficial manner. Each passage alternative would assure access to critical habitat by the Colorado pikeminnow and razorback sucker to improve chances of their recovery. Measures would be included in each passage alternative to reduce competition and predation by nonnative fish. Instream activities would be avoided from May to September to minimize impacts to endangered fish spawning and larval development. No taking of any listed species is expected as a result of any alternative for restoring fish passage.

Cultural Resources

The area of potential effect for an investigation of cultural resource impacts extends along the Colorado River upstream from Palisade to the Price-Stubb Dam site. Prior to settlement and development of irrigation facilities, the area was part of a Ute Indian reservation that covered western Colorado. After moving the Ute Indians to reservations in Utah and southwestern Colorado, Congress declared the lands public and open for filing in June 1882. By November, the Denver and Rio Grande Railroad was completed from the Gunnison River valley to Grand Junction. In 1889, tracks were extended along the Colorado River, past the site of the Price-Stubb Diversion Dam. The dam and associated pumping facilities were completed in 1911 to supply irrigation water to the Price and Stubb Ditches for use by early settlers in the Palisade area.

Reclamation's review of reports and historic preservation actions for various undertakings in the affected area produced documentation of turn-of-the-century irrigation features of historical importance, including the Price-Stubb Diversion Dam. No significant archaeological sites have been found. *As a standard cultural resource protection measure, all fish passage construction contracts would require work to be stopped if cultural resource sites were encountered.* Work could not resume until measures needed to avoid or minimize adverse impacts to significant resources are agreed to by the State Historic Preservation Officer (SHPO).

Protect Historic Dam

Issue: The Price-Stubb Diversion Dam is eligible for listing on the National Register of Historic Places, and Federal agencies are responsible for ensuring their actions do not adversely affect the historic qualities of the dam.

Existing Conditions: Since 1919, PID and MCID have not used the Price-Stubb Dam and associated facilities to divert flows of the Colorado River to irrigate their lands (see information block titled A Brief History of the Price-Stubb Dam). The Price-Stubb Dam is in good condition despite a long period of non-use. However, the canal headworks have deteriorated, and the associated pump canal and pump plant have been destroyed over the years.

E. R. Jacobson first recorded features of the historic system in 1981 to obtain a preliminary FERC permit to study its water power development potential. Reclamation also recorded the site in 1982, under the name 'Palisade Dam' (5ME769). The Jacobson Hydro No. 1 Project proposed to use each feature of the abandoned system (the diversion dam/headworks, canal and pump plant site) in developing a hydropower project. The application for a license (Jacobson, 1983) notes the stone lining of the diversion pool at the canal headworks is intact only on its northwest side.

After its abandonment, the canal was filled in with earth. A stone wall or lining that is evident on the east side of the canal, next to the river, may be original. Only the foundation of the pump plant remains. Of all the features of the abandoned system, only the Price-Stubb Dam has not undergone extensive change or obliteration.

In 1984, the SHPO determined that the dam was eligible for listing on the National Register of Historic Places—as a classic example of an ogee crest dam built between 1910-20 that retains its integrity, and due to its association with a prominent engineer, Charles D. Vail (FERC, 1989). The Price-Stubb Diversion Dam was constructed early in Vail's career; he is best known for his role in the completion of mountain passes and canyon highways as Colorado's State Highway Engineer after 1930.

As discussed in the Railroad and Landslide section, a landslide occurred upstream of the dam in early 1988. The slide did not affect the dam and canal headworks, but did impact rail service. When the Denver and Rio Grande Railroad 'unloaded' the slide, they removed material from the top one-third of the slide and deposited it over the abandoned canal route. However, the outline of the wall of this canal closest to the river remains apparent on 1994 aerial photos of the area.

Consultation between FERC and the SHPO on the proposed amendment to the Jacobson Hydro

A Brief History of the Price-Stubb Diversion Dam

In 1884, S. J. Price diverted water from the Colorado River near Palisade by means of an earth-filled dam (a 'crib-diverting weir') and constructed a network of ditches. In the 1890's, a water-powered pump plant was installed near the dam to lift water to lands served by the gravity-flow ditch system. These irrigation features were owned by the Mt. Lincoln Land and Water Company until the Palisade Irrigation District, formed in 1904, purchased the crib dam, power canal pump plant, associated water rights (80 cfs for irrigation and 573 cfs for pumping), and the 13-mile long irrigation ditch, known as Canal #1 (Price Ditch). By 1906, the Mesa County Irrigation District was organized out of lands above and east of the Palisade Irrigation District lands, under another ditch referred to as Canal #2, or the Stubb Ditch.

The crib dam and pump plant were subject to many problems, and more reliable irrigation delivery facilities were needed. In 1909, the two irrigation districts each contributed \$88,000 to jointly construct what is now known as the Price-Stubb Diversion Dam. It was designed by, and its construction was supervised by, Charles D. Vail.

The diversion dam is constructed of concrete, wood and iron. Its 324-foot-long span of the river features an ogee (rounded) crest spillway. A stone-lined diverting pool directed flows from the dam into headworks of a canal. The canal headworks consisted of 4 gates. The canal was about 1,750 feet long, 40 feet wide and 8 feet deep, and ran in a southwesterly direction to a pump plant. The subsurface portion of the pump plant was about 20 feet deep, 60 feet long and 15 feet wide (Jacobson, 1983).

The Price-Stubb Diversion Dam and associated canal and pump plant were only used from 1911 to 1918. During this time, the Bureau of Reclamation (then called the U.S. Reclamation Service) was building the Grand Valley Project Diversion Dam and the Government Highline Canal. A May 1918 contract between Reclamation and the two irrigation districts provided for their water to be diverted and delivered by Grand Valley Project facilities for the 1919 irrigation season. Since then, many problems have been collaboratively solved by the various entities with rights and facilities for diverting irrigation water from the Colorado River to irrigate lands in the Grand Valley.

No. 1 Project confirmed the eligibility of the dam for the Register (FERC, 1999). In addition, the SHPO determined the old canal and pump plant had lost their integrity, and were not eligible for the Register.

Impacts

Any undertaking that involves the destruction, damage, or alteration of any property that qualifies for inclusion in the National Register is considered an adverse effect (36CFR Part 800). While FERC has consulted with the SHPO for the Jacobson Hydro No. 1 Project, the consultations do not specifically discuss plans for a fish ladder or its impacts. Reclamation is informally consulting with the SHPO to verify effects of the alternatives, and would determine measures to mitigate any adverse effect for the proposed action. This includes submission of a detailed report to the SHPO and their review of this Supplemental Draft EA. Results of the consultation on the proposed action would be discussed in the Final EA.

No Action: If No Action is taken, no adverse effects to the historic qualities of the Price-Stubb Diversion Dam would occur as a result of a fish passage.

Conventional Fish Ladder: Modifications of the headgate and the diversion of 25 cfs into a ladder and 75 cfs to attract fish to the entrance, by itself, would alter the historic dam. *As for the above alternative, Reclamation would agree to document modifications.*

Downstream Rock Fish Passage: The Price-Stubb Diversion Dam would be adversely affected by a 640 cfs notch in the dam and having the downstream face of the dam buried in boulders and rip rap material. *At this time, Reclamation proposes to collect historical documentation, drawings and photographs of the dam in a report about its design, construction and abandonment, for submission to the proper agency. During construction, photographs would be taken that meet agreed-upon standards for architectural and engineering records.*

Dam Removal: Removal would physically destroy the integrity of the Price-Stubb Dam. Although certain features of the dam would remain, including the abutments and foundation below the river channel, most of the visible portion of the dam would be removed. In addition to significantly altering the appearance of the structure, this action would alter the visual landscape by eliminating the sight of the river flowing over the dam.

Reclamation would also consider development of a historical marker/interpretive sign for public viewing. Reclamation would not agree to place any signs or viewing area along Interstate 70 due to public safety concerns associated with the narrow canyon and high speeds of vehicles on the interstate at the dam site. Signs and/or a viewing area accessed via roads or trails on the opposite side of the river from the interstate may be possible. Reclamation's commitment would be contingent on all potentially affected land owners (Colorado Department of Transportation, the Union Pacific Railroad, E. R. Jacobson) and PID/MCID (joint owners of the dam) giving written approval for the measures.

Indian Trust Assets

Indian trust assets are defined as legal interests in property held in trust by the United States for Indian Tribes or individuals, or property that the United States is otherwise charged by law to protect. No Indian trust assets are known to occur in the project area and therefore no impacts are projected under any of the alternatives.

Environmental Justice

Executive Order 12898 established environmental justice as a federal agency priority to ensure that minority and low-income groups are not disproportionately affected by federal actions. The ethnicity of the majority (90 percent) of the residents in the project area is white (Grand Junction Chamber of Commerce, 1997). Other ethnicities of persons in the area include Hispanic (8 percent); and Native Americans, Asians, and blacks (each less than 1 percent).

There are no disproportionate negative impacts projected on any particular group of individuals under any of the alternatives.

Social and Economic Factors

Construction of any of the passage alternatives would provide a minor amount of local employment for a few months. This would introduce a small amount of money into the local economy, but is not expected to place a strain on public services such as schools or transportation. As discussed previously in the Recreation Resources section, removing the Price-Stubb Diversion Dam would increase the potential for recreational boating upstream from the dam, and may increase economic activity associated with tourism. The Downstream Rock Fish Passage could also provide a recreational boating experience. The potential for hydroelectric power generation at the dam site would vary under each alternative.

Hydropower

Issue: The Price-Stubb Dam could be used to generate hydroelectric power. Fish passage alternatives may reduce potential revenues from power generation, and dam removal would preclude hydropower development.

Existing Conditions: Currently, no hydropower generation is taking place at the dam. In 1990, FERC issued a license to develop hydropower, but the project was put on hold in 1994. The

licensee applied for an amendment to the license in 1996. FERC amended the license in 2001 and terminated the license in 2002 (FERC, 2001; FERC, 2002C)..

Impacts

No Action: If constructed, development of the Jacobson Hydro No. 1 Project, as licensed in 2001, requires the construction, maintenance, and operation by a licensee of such fishways (ladder or passage) as the Secretaries of the U.S. Department of the Interior and of Commerce may prescribe. The licensed hydro project would produce about 6.8 million kWh (kilowatt hours) of power annually (FERC, 1990). For comparison purposes, the coal-fired Public Service Company's Cameo Power Plant generates about 550 million kWh annually (telephone conversation with Public Service Company, 2/24/99). Income from the hydropower project would be used to recover project development costs and provide long-term revenues. As the population of the Grand Valley grows, power demand would increase. Although the proposed unit is a very small percentage of total power generation in the Grand Valley, it may offset associated impacts to air quality and extraction activities related to generating power using fossil fuels. As discussed previously, Reclamation assumes that under the No Action alternative, the Jacobson Hydro No. 1 Project would not be constructed.

Conventional Fish Ladder: Impacts to hydropower would be the same as the no action because of FERC license requirements (FERC 2001).

Downstream Rock Fish Passage: Hydropower generation potential would not be eliminated, however it would be less compatible to hydropower production than the conventional fish passage. Elimination of the flashboards would reduce the total available energy available for hydro generation.

Dam Removal: No power would be generated.

Costs and Benefits

This section discusses the relative costs and benefits of each alternative on the human environment, including benefits to the endangered fish. Success of the Recovery Program in restoring populations of the endangered fish directly affects future development of Colorado River water supplies. Since 1988, the Recovery Program has been relied on to serve as a reasonable and prudent alternative to jeopardizing effects of water development on the endangered fish. Its existence has allowed the Fish and Wildlife Service to issue favorable biological opinions on some 200 water projects in Colorado, Utah and Wyoming with a potential to use more than 585,000 acre-feet of water. Completion of fish passages at the Redlands and GVIC diversion dams contributed to sufficient progress of the Recovery Program in 1996 and 1998.

Issue: Some people question using taxpayers' money to provide passage for endangered fish.

Existing Conditions: The Colorado River is a key factor in the economy of the Grand Valley area. The river supports agricultural enterprises, municipal water supplies, state parks and wildlife areas, tourism and recreational use, and a population of endangered fish. Recovery of the endangered fish is not without significant expense, controversy, or problems. However, many believe the Recovery Program is the best method to avoid conflicts between endangered fish recovery and allowing water to be developed. The Recovery Program would fully fund costs for dam removal or construction of a fish ladder.

Impacts

No Action: According to Article 411 of the existing FERC license, FERC would reserve the authority “to require the licensee to construct, operate and maintain, or provide for the construction, operation and maintenance of, such fishway as may be prescribed by the Secretary of the Interior.” If no action is taken and hydropower is not developed, no fish ladder construction costs would be incurred by the Recovery Program.

Conventional Fish Ladder: Reclamation estimates the cost for a conventional fish ladder to be about \$2,300,000. This includes actual construction costs, operation and maintenance costs, and all costs related to mitigation measures listed in the following section. Additional costs for constructing a fish trap would be approximately \$200,000. The cost of the ladder without the fish trap is used to objectively compare the cost of the Conventional Fish Ladder Alternative to other fish passage alternatives (see Table 1).

Annual operation and maintenance costs are estimated to be approximately \$15,000 for the fish ladder without a fish trap. Assuming 3 percent inflation and 6 percent interest, an initial total cost, including the \$400,000 for long-term operation and maintenance, would be about \$2,300,000.

The Conventional Fish Ladder alternative for the Price-Stubb Diversion Dam would achieve the Recovery Program goal of providing passage for endangered fish. However, since construction of the Grand Valley Diversion Dam passage would likely be a conventional concrete fish passage, a conventional fish ladder at the Price-Stubb Diversion Dam is not desirable. The Conventional Fish Ladder Alternative for the Price-Stubb Diversion Dam would also preserve the dam structure, which could allow future hydropower development.

Downstream Rock Fish Passage: Reclamation estimates the cost for a rock fish passage to be about \$3,100,000. The Downstream Rock Fish Passage Alternative would provide benefit to endangered fish while removing the need to mitigate for upstream affects associated with dam removal. As stated above, the Recovery Program has identified concerns with having two conventional fish ladders in short proximity of each other. Design criteria for fish passage at the Grand Valley

Diversion Dam appear to make a rock fish passage cost prohibitive. In addition, rock fish passage would reduce potential hazards to water recreation when compared with the conventional fish passage alternative. Therefore, rock fish passage at the Price-Stubb Diversion Dam has been identified as the preferred alternative.

From a public safety and cost perspective, it is more appropriate to compare the Conventional Fish Ladder alternative with the addition of a rock fill wedge on the downstream face of the dam to the Downstream Rock Fish Passage alternative. This comparison results in very similar cost and provides an equivalent level of public safety. Reclamation does not believe there is a high probability of recreational boaters attempting to boat over the Price-Stubb Diversion Dam under current conditions because it is a known drowning hazard. However, if Reclamation attempted to construct only the rock fish passage channel without the adjacent riprap fill, we feel that some boaters may attempt to float the passage channel. There is then an increased possibility that boaters may miss the fish passageway and then be exposed to the life-threatening drop of the dam face.

Dam Removal: Reclamation estimates the cost for removing the dam to be about \$1,900,000. This cost includes mitigation measures to eliminate impacts to the Ute Water pump plant, any riverbed stabilization, safety features, and actual dam removal. No long-term operation and maintenance costs are anticipated.

This alternative would provide the most natural conditions for the migratory fish, opens this section of river to boating, could increase tourism, and is the least costly alternative. However, this alternative has the most effects on upstream uses, hydropower generation and water rights and potential liability exposure due to landslide, channel scour and water supply concerns.

Summary and Mitigation Measures

In summary, the primary effect of the fish passage alternatives would be to allow endangered fish to migrate into upstream habitat and assist in the recovery of these species. Each fish passage alternative is designed and would be operated to avoid impacts or harm to existing uses, water users, and water rights. Construction impacts would be minor and temporary. Table 1 on the previous page summarizes and compares impacts among alternatives for each issue discussed in this chapter.

Mitigation Measures:

1. Clifton Water District would be advised of the construction schedule for the selected alternative. If the dam is removed, they would be advised of the composition and volume of sediments that would be released, and when the sediments would reach their diversion and treatment plant.
2. Permission from all affected land owners (Colorado Department of Transportation, Union Pacific Railroad, Eric Jacobson) would be obtained before commencing any construction

Chapter 3 — Affected Environment and Environmental Consequences

activities. Removal of the Price-Stubb Diversion Dam would require prior approval of the dam owners (Palisade Irrigation District and Mesa County Irrigation District).

Issue	No Action*	Conventional Ladder	Downstream Rock Fish Passage	Dam Removal
Ute Water Plant	0	0	0	-
Water Rights	0	0	-	--
Clifton Water Treatment	0	- ^{1/}	- ^{1/}	- ^{1/}
Recreation	-	-	+	++
Public Safety	-	-	+	++
Interstate 70	0	0	0	-
Railroad & Landslide Stability	0	0	0	-
Ownership of Dam & Lands	0	- ^{2/}	- ^{2/}	- ^{2/}
Floodplain & Wetlands	0	- ^{3/}	- ^{3/}	- ^{3/}
Endangered Fish Recovery	---	+ ^{4/}	++ ^{4/}	+++ ^{4/}
Protect Historic Dam	0	- ^{5/}	- ^{5/}	— ^{5/}
Indian Trust Assets	0	0	0	0
Environmental Justice	0	0	0	0
Private Hydropower Revenues	0	-	--	---
Construction Costs	N/A	\$1.9 M ^{6/}	\$3.1 M ^{6/}	\$1.9 M ^{6/}
Long-Term Operation and Maintenance Cost (50 years)	N/A	\$0.4 M ^{6/}	\$ 0	\$ 0
Total Cost	N/A	\$2.3 M	\$3.1 M	\$1.9 M

Table 1 - Summary Comparison of Alternatives

Scale of Potential Impacts

*Predicted Future Condition
with No Action

- +++ greatest positive impact
- + some positive impact
- 0 no known impact
- some negative impact
- greatest negative impact

Footnotes: Numbers within Table 1 (e.g., ^{1/}) correspond to the associated mitigation measures listed on the previous and next page.

3. Reclamation and/or construction contractors would obtain Clean Water Act approvals before beginning work. Construction contract(s) for dam removal would require protection of the mature cottonwood tree at the Price-Stubb Dam site.
4. Construction contract(s) would avoid activities that may affect fish spawning and larval fish development. Contract(s) would also require work to stop if activities are thought to be affecting any species listed under the Endangered Species Act.
5. Modifications to the historic Price-Stubb Diversion Dam would not occur until measures to avoid or minimize adverse effects have been agreed upon in consultation with the SHPO. Reclamation would take photographs that meet agreed-upon standards for architectural and engineering records. Reclamation would also collect historical documentation, drawings and photographs of the dam and prepare a report. Construction contract(s) for any of the alternatives would require work to be stopped if cultural resource sites are encountered, and work would not resume until measures needed to avoid or minimize adverse impacts to significant resources are agreed to by the SHPO.
6. All costs for providing fish passage would be funded by the endangered fish Recovery Program (not local water users).

CHAPTER 4 - CONSULTATION AND COORDINATION

Plan Formulation and Public Scoping Activities

Plans for providing fish passage at the Price-Stubb Diversion Dam have been under development for several years. Initially, the primary participants in the planning process were the Recovery Program agencies and water users. Since 1993, Reclamation staff have formally and informally discussed with water users, the power licensee and land owners, the need to provide fish passage and associated concerns at the Price-Stubb Diversion Dam.

In July 1998, four letters were received from organizations urging an alternative in addition to the Fish Ladder and Dam Removal alternatives (Rocky Mountain Canoe Club, Western Association to Enjoy Rivers (W.A.T.E.R.), Colorado Association of Paddle Racers, and American Whitewater). They suggested construction of a fish ladder channel that would also accommodate river craft such as rafts, kayaks and canoes. Two similar letters were received from individuals, one suggesting a racecourse for kayaks and canoes. In October 1998, Reclamation staff met with representatives of these organizations and local boating enthusiasts to discuss options and issues plus the costs that could be involved.

In December 1998, letters were mailed to 83 agencies, individuals, and organizations who could potentially be affected by a fish passage at the Price-Stubb Diversion Dam or who could be expected to have relevant information on the project. The letters announced Reclamation's intention to prepare a Draft Environmental Assessment, described the fish ladder and dam removal alternatives, and requested that recipients respond with their comments and concerns about the project.

Reclamation announced the project in a December 15 news release that resulted in articles on the subject appearing in several western Colorado newspapers. Also in December 1998, American Rivers, a national conservation organization with more than 20,000 members, posted information about the fish passage project on their Internet web page.

In addition, the following individuals and organizations were contacted directly to obtain information for preparation of the environmental assessment:

- Mesa County Irrigation District
- Palisade Irrigation District
- Ute Water Conservancy District
- Union Pacific Railroad
- Colorado Department of Transportation
- U.S. Fish and Wildlife Service
- Bureau of Land Management
- Clifton Water District
- Federal Energy Regulatory Commission (FERC)

E. R. Jacobson
Gary Lacy, Recreation Engineering & Planning
Pete Atkinson, Whitewater West
Jerry Nolan

More than 100 individuals and organizations provided written comments. Eighty-three of those responding did so via electronic mail. Comments were received from 53 individuals and organizations within Colorado, 36 from outside the state, and 23 who did not provide their mailing address or location. Concerns ranged from “do nothing,” to suggesting construction of a whitewater park. Most encouraged us to remove the dam, citing various benefits such as providing a more natural environment for the fish, improving river recreation, and costing less than building a ladder around the dam. The dam’s safety hazard to boaters and the need for more recreational access were mentioned frequently. Many expressed disappointment that an alternative to create a whitewater park was not included in the scoping document. Comment summaries are included in the April 1999 Draft EA.

A draft EA was distributed for public comment on April 30, 1999. The April 1999 Draft EA evaluated fish passage alternatives including partially removing the dam or constructing a fish ladder around the dam. The identified preferred alternative was dam removal. Reclamation received 22 comments on the April 1999 Draft EA.

In an October 1999 newsletter which provided an update on the Upper Colorado River fish passages, Reclamation announced they were waiting for FERC’s decision on the Jacobson’s hydropower project before resuming planning for fish passage at the Price-Stubb Diversion Dam.

As a result of comments on the draft EA, Reclamation formulated the Downstream Fish Passage alternative (Preferred Alternative), which attempts to more fully address issues and concerns while meeting the underlying purpose and need for the project.

Consultation with other Agencies

Reclamation staff continue to informally coordinate and consult with the Fish and Wildlife Service to comply with the Fish and Wildlife Coordination Act and Endangered Species Act; the Army Corps of Engineers and the Colorado Water Quality Control Division to comply with requirements of the Clean Water Act; and the State Historic Preservation Officer and Federal Advisory Committee to comply with the National Historic Preservation Act. Agency review results for this Draft EA would be incorporated in the Final EA.

Distribution List

Appendix A contains the mailing list for this Draft EA. The list includes all individuals, agencies, and organizations to whom we sent the scoping documents in December 1998. In addition, others who have specifically requested a copy of the Draft EA are included on the list.

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APPENDIX A – DISTRIBUTION LIST

ORGANIZATIONS

Tom Latousek	American Rivers, SW Regional Office	Phoenix, AZ
Andrew Fahlund	American Rivers	Washington, DC
Matt Sicchio	American Rivers	Washington, DC
--	American Whitewater	Silver Spring, MD
Reeves Brown	Club 20	Grand Junction, CO
Bob and Jill Stecker	Colorado Association of Paddle Racers	Boulder, CO
Pete Kolbenschlag	Colorado Environmental Coalition	Grand Junction, CO
Mark Peterson	Colorado River Boat Association	Grand Junction, CO
Leslie James	Colorado River Energy Distributors Agency	Tempe, AZ
Bob Cron	Colorado Riverfront Commission	Grand Junction, CO
John Heideman	Colorado Riverfront Commission	Grand Junction, CO
Nathan Keever	Dufford, Waldeck, Milburn & Krohn, L.L.P.	Grand Junction, CO
William Davies	Ecoplan Associations Inc.	Mesa, AZ
Rod Martinez	Grand Valley Audubon Society	Grand Junction, CO
Steve Glazer	High Country Citizens Alliance	Crested Butte, CO
Eric R. Jacobson	Hydro-West, Inc.	Telluride, CO
--	Mesa County Water Association	Grand Junction, CO
Don Glaser	National Fish and Wildlife Foundation	Commerce City, CO
Gary Lacy, P.E.	Recreation Engineering & Planning	Boulder, CO
Dennis Adams	Rocky Mountain Canoe Club	Grand Junction, CO
Vicky Mercer	Sierra Club, Uncompahgre Chapter	Palisade, CO
Pat Oglesby	Trout Unlimited, Grand Valley Anglers	Grand Junction, CO
Susan Grabler	Union Pacific Railroad	Denver, CO
Wayne Cook	Upper Colorado River Commission	Salt Lake City, UT
--	Western Association To Enjoy Rivers	Grand Junction, CO
Tara Thompson	Western Slope Environmental Resource Council	Paonia, CO
Pete Atkinson	Whitewater West	Grand Junction, CO
Chuck Hogue	Xcel Energy	Palisade, CO

INDIVIDUALS

Bart Allen, Grand Junction, CO
Herman Allmaras, Palisade, CO
Troy Baleria and Margaret Sardeoval-Baleria, Grand Junction, CO
Mr. & Mrs. Lawrence Beagley, Grand Junction, CO
James B. Braden, Grand Junction, CO
John Brennan, Durango, CO
Shelby Coleman, Palisade, CO
Adam Hackley, Grand Junction, CO
Thelma R. Hays, Palisade, CO
Denny Huffman, Grand Junction, CO
Jay P.K. Kenney, Denver, CO
Richard Linsenmann, Valparaiso, IN

Karen K. Mattor, Merrimack, NH
 C.H. Miller, Des Moines, IA
 Jerry Nolan, Grand Junction, CO
 Aida Parkinson, McKinleyville, CA
 Willard Phillips, Palisade, CO
 Robert W. Puck, Jr. and Karen I. Puck, Grand Junction, CO
 Steve Smith, Grand Junction, CO
 Steve Stemmer, Westminster, CO
 William Stoddard, Mesa, CO
 Dave Trappett, Grand Junction, CO
 John Weisheit, Moab, UT
 Pete Winn, Grand Junction, CO

WATER DISTRICTS

Dale Tooker	Clifton Water District	Clifton, CO
Eric Kuhn	Colorado River Water Conservation District	Glenwood Springs, CO
Phil Bertrand	Grand Valley Irrigation Company	Grand Junction, CO
Dick Proctor	Grand Valley Water Users Association	Grand Junction, CO
Wendell Johnson	Hartland Irrigation District	Delta, CO
Sean Norris	Mesa County Irrigation District	Palisade, CO
Larry Clever	Ute Water Conservancy District	Grand Junction, CO
James Rooks	Orchard Mesa Irrigation District	Palisade, CO
John Krizman	Palisade Irrigation District	Clifton, CO

CITY AND COUNTY GOVERNMENT

Stephen Schrock	City of Fruita	Fruita, CO
Greg Trainor	City of Grand Junction, Public Works Dept.	Grand Junction, CO
Shelby Meyers	City of Rifle	Rifle, CO
--	Garfield County Commissioners	Glenwood Springs, CO
--	Mesa County Commissioners	Grand Junction, CO
Kurt Larsen	Mesa County Planning Director	Grand Junction, CO
Debbie Weaver	Town of DeBeque	DeBeque, CO
John Alder	Town of Palisade	Palisade, CO
Juanita Satterfield	Town of Parachute	Parachute, CO

RECOVERY PROGRAM

Reed Kelley		Meeker, CO
Tom Blickensderfer	Colorado Department of Natural Resources	Denver, CO
Bruce McCloskey	Colorado Division of Wildlife	Denver, CO
Tom Nesler	Colorado Division of Wildlife	Fort Collins, CO
Chris Treese	Colorado River Water Conservation District	Glenwood Springs, CO
John Hawkins	Colorado State University	Fort Collins, CO

Tom Pitts	Hall, Pitts & Associates, Consulting Engineers	Loveland, CO
John Reber	National Park Service	Denver, CO
Robert Wigington	The Nature Conservancy	Boulder, CO
Dave Mazour	Tri-State Generation and Transmission, Inc.	Denver, CO
Tom Chart	U.S. Bureau of Reclamation, UC-323	Salt Lake City, UT
Tony Morton	U.S. Bureau of Reclamation	Salt Lake City, UT
Susan Baker	U.S. Fish & Wildlife Service	Denver, CO
Bob Muth	U.S. Fish & Wildlife Service	Denver, CO
Chuck McAda	U.S. Fish & Wildlife Service	Grand Junction, CO
Terry Sexson	U.S. Fish & Wildlife Service	Denver, CO
George Smith	U.S. Fish & Wildlife Service	Denver, CO
Shane Collins	U.S. Western Area Power Administration	Salt Lake City, UT
Art Roybal	U.S. Western Area Power Administration	Golden, CO
Kevin Christopherson	Utah Department of Natural Resources	Vernal, UT
Marty Ott	Utah Department of Natural Resources	Salt Lake City, UT
Barry Saunders	Utah Department of Natural Resources	Salt Lake City, UT
Mark Hadley	Utah Division of Wildlife Resources	Salt Lake City, UT
Randy Radant	Utah Division of Wildlife Resources	Salt Lake City, UT
Paul Dey	Wyoming Game & Fish Department	Cheyenne, WY
John Shields	Wyoming State Engineer's Office	Cheyenne, WY

STATE GOVERNMENT

Jane Norton	Colorado Department of Health	Denver, CO
Sally Schuff	Colorado Department of Agriculture	Denver, CO
Greg Walcher	Colorado Dept. of Natural Resources	Denver, CO
Larry Abbott	Colorado Dept. of Transportation	Grand Junction, CO
Richard Perski	Colorado Dept. of Transportation	Grand Junction, CO
Owen Leonard	Colorado Dept. of Transportation	Grand Junction, CO
Allen Matellero	Colorado Division of Water Resources, Div 5	Glenwood Springs, CO
Hal Simpson	Colorado Division of Water Resources	Denver, CO
John Toolen	Colorado Division of Wildlife	Grand Junction, CO
Georgianna Contiguglia	Colorado State Historic Preservation Officer	Denver, CO
Kurt Mill	Colorado State Parks, West Region	Clifton, CO
Rod Kuharich	Colorado Water Conservation Board	Denver, CO
Randy Seaholm	Colorado Water Conservation Board	Denver, CO

STATE LEGISLATORS

Gayle Berry	Colorado State Representative	Grand Junction, CO
Greg Rippy	Colorado State Representative	Rifle, CO
Matt Smith	Colorado State Representative	Grand Junction, CO
Ron Teck	Colorado State Senator	Grand Junction, CO

FEDERAL GOVERNMENT

Robert Steward	Department of the Interior	Denver, CO
Ken Jacobson	U.S. Army Corps of Engineers	Grand Junction, CO
Carlos Sauvage	U.S. Bureau of Land Management	Grand Junction, CO
Bob Fletcher	U.S. Federal Energy Regulatory Commission	Washington, D.C.
Regina Saizan	U.S. Federal Energy Regulatory Commission	Washington, D.C.
The Secretary	U.S. Federal Energy Regulatory Commission	Washington, D.C.
Al Pfister	U.S. Fish and Wildlife Service	Grand Junction, CO
George Smith	U.S. Fish & Wildlife Service	Denver, CO
Newell Hoskins	U.S. Coast Guard Auxiliary	Grand Junction, CO
Jeff Burwell	U.S. Department of Agriculture, NRCS	Grand Junction, CO
Paul von Guerard	U.S. Geological Survey, Water Resources Div.	Grand Junction, CO
Jeff Burwell	U.S. Natural Resource Conservation Service	Grand Junction, CO
Gary Burton	U.S. Western Area Power Administration	Lakewood, CO

CONGRESSIONAL DELEGATION

George Rossman	Senator Ben Nighthorse Campbell	Grand Junction, CO
Bill Andries	Congressman Scott McInnis	Grand Junction, CO
Beth Washburn	Senator Wayne Allard	Grand Junction, CO

PRESS

Dave Buchanan	Grand Junction Daily Sentinel	Grand Junction, CO
Nancy Lofhola	Denver Post	Grand Junction, CO
--	Palisade Tribune	Palisade, CO
--	Fruita Times	Fruita, CO
--	Glenwood Post Independent	Glenwood, CO
--	Citizens Telegram	Rifle, CO
--	Delta County Independent	Delta, CO
--	Gunnison Country Times	Gunnison, CO
--	High Country News	Paonia, CO
--	KREX TV Station	Grand Junction, CO
--	KJCT TV Station	Grand Junction, CO
--	KKCO TV Station	Grand Junction, CO
--	KCIC FM Radio	Grand Junction, CO
--	KEKB Radio	Grand Junction, CO
--	KEXO/KKNN/KQIL/KQIX Radio	Grand Junction, CO
--	KGLN Radio	Glenwood Springs, CO
--	KJYE/KNZZ Radio	Grand Junction, CO
--	KMTS Radio	Glenwood Springs, CO

--	KPRN Public Radio	Grand Junction, CO
--	KQIX Radio	Glenwood Springs, CO
--	KSTR Radio	Grand Junction, CO
--	KVNF Radio	Paonia, CO

