# CHAPTER 2—ALTERNATIVES

This chapter describes the **No Action** alternative and alternatives for providing fish passage at the existing Price-Stubb Diversion Dam. Four alternatives for fish passage are given detailed consideration: 1) constructing a **Conventional Fish Ladder**, 2) constructing a **Downstream Rock Fish Passage**, 3) constructing a **Downstream Rock Fish Passage with Whitewater Recreation Features**, and 4) **Dam Removal**.

## *No Action*

Under the No Action alternative, Reclamation would not take action to restore endangered fish passage at the Price-Stubb Diversion Dam. The dam would remain in place and continue to be a barrier to upstream passage for endangered fish species.

The No Action alternative assumes development and operation of the Jacobson Hydro No. 1 Project, as licensed on September 13, 2001, would not occur (FERC, 2001). This 40-year license was originally issued to E.R. Jacobson for the construction, operation, and maintenance of the project by FERC 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 hydro plant upstream to the toe of the dam and decreasing the hydro plant flow from 2,000 cubic feet per second (cfs) to 1,000 cfs.

FERC (2002a) issued a letter dated January 4, 2002 to E.R. 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 a notice, pursuant to Section 375.308(f) of the Commissions regulations, of probable termination of the license for Jacobson Hydro No. 1 Project after 30 days from the date of the letter. An order terminating the license was issued by FERC (2002c) on July 15, 2002. Additional details about the Jacobson Hydro No. 1 Project are included in the 1999 Draft EA (Reclamation, 1999). E.R. Jacobson has not abandoned plans for hydropower development at the site.

## *Conventional Fish Ladder*

Under this alternative, Reclamation would construct a concrete ladder around the dam, similar to the U-shaped ladder (see Figure 2) constructed in 1996 at the Redlands

Diversion Dam on the Gunnison River (Reclamation, 1995). Fish passage use by Colorado pikeminnow and razorback sucker has been documented at the Redlands Fish Ladder by the Service. This alternative would be compatible with private development of the Jacobson Hydro No. 1 Project, as licensed in the 2001 FERC License Amendment (FERC, 2001) if constructed simultaneously. However, this license was terminated by FERC (2002c) in July 2002.

If independently constructed, it could complicate construction of both the hydropower plant and fish ladder. For instance, if the fish passage is constructed first, it would need to incorporate attraction flows. If the fish passage and hydropower plant were

**Figure 2-Redlands Conventional Fish Ladder on the Gunnison River, Colorado**

constructed simultaneously, attraction flows could be incorporated into the hydropower plant. Also if fish passage were constructed first, it would present site constraints on hydropower plant construction. The Biology Committee of the Recovery Program does not support two conventional fish ladders in close proximity due to biological concerns.

## Design

The fish ladder would be built on the right bank of the river on the E.R. Jacobson Property. Conceptual designs for the development of the site show the ladder on the same side of the river as the power plant intake of the proposed Jacobson Hydro No. 1 Project (see Figure 3). The ladder would consist of a 200 to 300 foot-long concrete channel, 6 feet in width, and 8 to 10 feet deep similar to the fish passage constructed at the Redlands Diversion Dam (Figure 2). About 25 cfs of river flow 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 the fish ladder. Baffles (vertically placed plates) would divide the ladder 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 site would be fenced with a 6 foot-high fence for facility and public safety. An existing access road adjacent to the

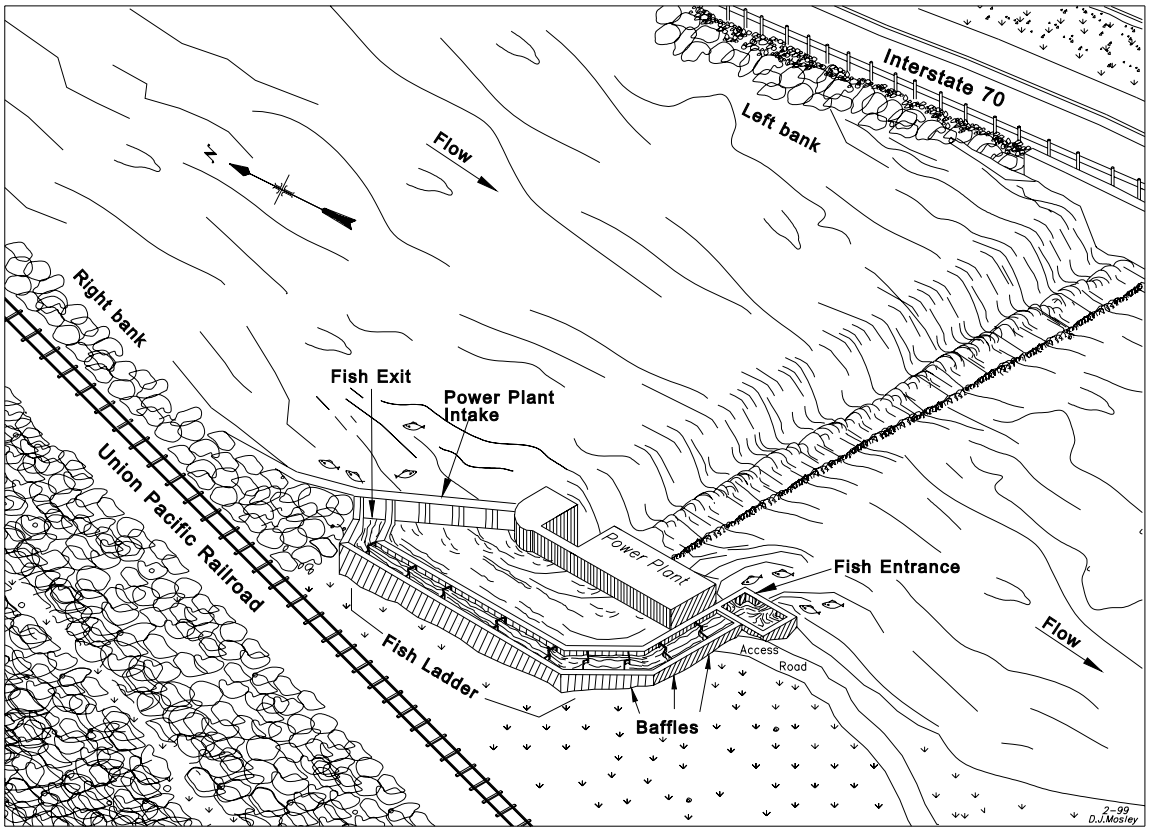


**Figure 3-Conceptual Design for Conventional Fish Ladder**[1]

Union Pacific Railroad and E.R. Jacobson properties would be used along the right-bank of the river to provide construction and maintenance access.

A fish trap to control upstream movement of nonnative fish was also considered in the preliminary designs for the fish ladder. However, factors such as cost, site limitations, and land ownership at the dam site may make it infeasible to include a fish trap at this location. A fish trap was constructed at the Grand Valley Project Fish Passage located about 5.3 miles upstream of the Price-Stubb Diversion Dam to prevent upstream movements of nonnative fish above the Grand Valley Project Diversion Dam.

Reclamation also examined constructing a conventional fish ladder on the river-left bank of the Price-Stubb Diversion Dam but determine the design to be cost prohibitive.

[1] Hydro plant is not included in the proposed action and is shown for illustration purposes only.

Limited space between the dam and Interstate 70 and the lack of access for maintenance also made the design infeasible.

## Construction

The fish ladder 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 and adjoining land 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, rights-of-ways and facilities. Following construction, any damaged area would be restored, as near as practicable, to its original condition. Access to the dam for construction would be from a existing road paralleling the Colorado River along the right riverbank from the Interstate 70 Bridge to the Price-Stubb Diversion Dam through property owned by Union Pacific Railroad and E.R. Jacobson. Construction staging and material storage would be on adjacent vacant land owned by E.R. Jacobson. Construction access is limited near the dam because of its proximity to the railroad tracks and Interstate 70.

A cofferdam would be used to direct the river around the construction area and river flows would not be reduced. Before construction, Reclamation and the contractor would obtain necessary approvals required by the Clean Water Act. Reclamation would request Section 404 authorization under Regional General Permit No. 057 for projects that benefit recovery of endangered fishes. If discharging water for construction dewatering is needed, the contractor would obtain a Section 402 permit. Reclamation would also coordinate construction activities within the 100-year floodplain with Mesa County. Construction would be scheduled during low river conditions in the fall and winter of 2005—2006.

Reclamation recently constructed a similar passage at the Grand Valley Project Diversion Dam and estimates the construction costs of this alternative to be about $4,300,000.

## 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.

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 until operation, maintenance, and replacement funding mechanisms were agreed upon and the agreements 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 costs are estimated to be $15,000—$25,000 per year. 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 520 cfs is present in this reach of the river under all but the most severe drought conditions. The Service also has up to 37,650 acre-feet of storage water available from upstream reservoirs for 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 Jacobson Hydro No. 1 Project were independently constructed, the power plant's tailrace could also provide the necessary attraction flow.

## *Downstream Rock Fish Passage*

This alternative was developed in response to public comments on the 1999 Draft EA with input from affected parties. The Downstream Rock Fish Passage Alternative would notch the Price-Stubb Diversion Dam and leave the Dam in place. A rock ramp fish passage would be constructed on river left[2] of the downstream face of the dam. This type of fish passage would not prevent construction of the Jacobson Hydro No. 1 Project; however, the proposed hydro project would require additional modification and design. Significant modifications include elimination of the 4-foot flashboards on the dam and moving the hydro plant downstream or extending the hydro plant discharge to the downstream entrance of the fish passage.

Similar rock fish passages were constructed in the San Juan River by the San Juan River Basin Recovery Implementation Program to restore endangered fish passage. An "in-river" rock fish passage was constructed in 2002 at the Hogback Diversion Dam on the San Juan River in near Shiprock, New Mexico (Figure 4). An "out-of-channel" rock fish passage with selective fish passage (fish trap) was constructed in 2003 at the Public Service Company of New Mexico Diversion Dam on the San Juan River near Fruitland, New Mexico (Figure 5). Fish passage use by Colorado pikeminnow and razorback sucker has been documented at the Public Service Company of New Mexico fish passage.

### Design

Conceptual designs (Figure 6) propose placing fill material on the downstream face of the Price-Stubb Diversion Dam to create fish passage. The fish passage would consist of 1) a 30 foot-wide by 550 foot-long downstream fish passage channel with a 2.5 percent gradient along the river-left bank of the Colorado River, 2) a 80 cfs low flow fish passage notch in the Price-Stubb Diversion Dam, 3) the remaining 250-foot-width of the dam would be stabilized with riprap material to create a 2.5% sloped ramp, 4) a divider-berm constructed between the fish passage channel and the 2.5% ramp to protect the fish passage, and 5) a rock barrier or sheet pile barrier to assist in directing fish to the passage

[2] River left refers to the left side of the river as viewed when looking downstream.

entrance. In discussions with CDOT, a 33 foot offset of the fish passage channel was established to allow for future widening of Interstate 70. Stop-log channels were added to the fish passage notch to address Ute Waters concerns about maintaining service during extreme low river conditions if their main pipeline was out of service.

Reclamation would construct this alternative if any of the following conditions are not met. Conditions include: 1) a local governmental entity securing non-recovery program funding for the incremental costs associated with construction of the Downstream Rock Fish Passage with Whitewater Features Alternative, 2) obtain the necessary permits and easements from underlying land owners (Palisade and Mesa County Irrigation Districts, E.R. Jacobson, Union Pacific Railroad, and CDOT), and 3) a local governmental entity to sponsor and assume liability and maintenance responsibility for the whitewater features. This alternative includes only the existing public access to the diversion dam via access to the Colorado River from Colorado River State Park-Island Acres.

**Figure 4-Hogback Diversion Dam Rock Fish Passage on the San Juan River, New Mexico**

## Construction

The rock fish passage structure would be completed under a construction contract. Before fish passage could be constructed, authorization for modification of the dam would be obtained from the owners of the dam, Palisade and Mesa County Irrigation Districts. Temporary construction easements, permanent easements and intergovernmental agreements would also be acquired from all affected land owners before construction. Reclamation would negotiate protective measures to reduce impacts

to private and State properties, rights-of-ways, and facilities. Following construction, any damaged area would be restored, as near as practicable, to its original condition. Temporary construction access to the dam would be from an existing trail that lies within the railroad right-of-way that parallels the railroad tracks and through E.R. Jacobson property downstream of the dam. Construction staging and material storage would be on adjacent vacant land owned by Eric Jacobson.

**Figure 5-Public Service Company of New Mexico Diversion Dam Rock Fish Passage on the San Juan River, New Mexico**

Construction access and staging areas are limited near the dam because of its proximity to the railroad tracks. However, because the fish passage would be located in the river channel and not between the dam, head gates and railroad; construction access would be less constricted when compared to the conventional fish ladder alternative.

A cofferdam and/or bypass channel may be used to direct the river around the construction area and river flows would not be reduced. Before construction, Reclamation and the contractor would obtain necessary approvals required by the Clean Water Act. Reclamation would request Section 404 authorization under Regional General Permit No. 057 for projects that benefit recovery of endangered fishes. If discharging water for construction dewatering is needed, the contractor would obtain a Section 402 permit. Reclamation would also coordinate construction activities within the 100-year floodplain with Mesa County. Construction would be scheduled during low river conditions in 2005.

The estimated construction cost for this alternative is approximately $4,800,000. Costs for operations and maintenance for this alternative would be negligible. Recovery Program cost for this alternative would be comparable to the Downstream Rock Fish Passage with Whitewater Features Alternative.

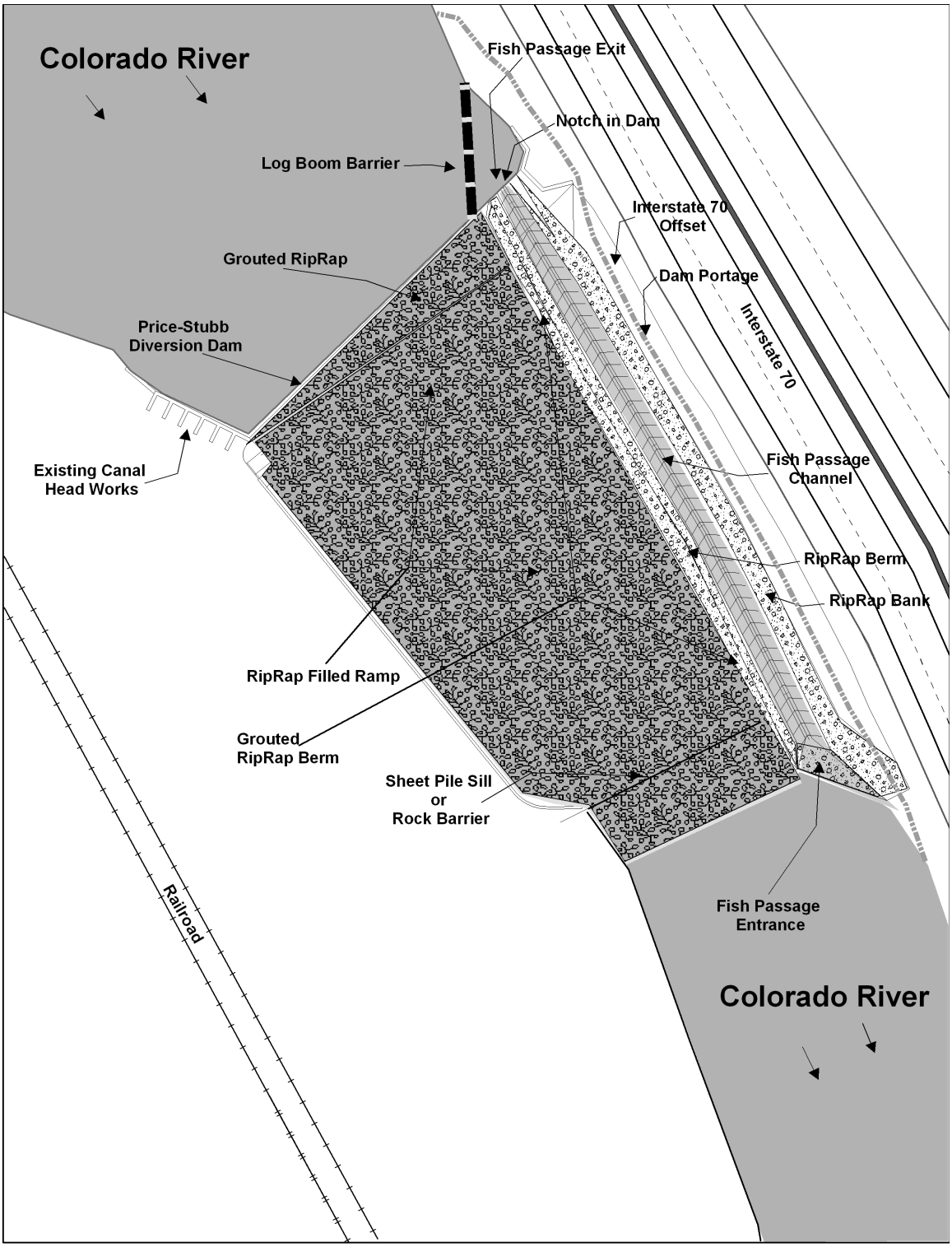


**Figure 6- Downstream Rock Fish Passage Conceptual Drawing**

## Operation, Maintenance and Replacement Measures

The downstream rock passage would require no regularly scheduled actions related to operation and maintenance, other than inspection. Reclamation would enter into a contract with Palisade and Mesa County Irrigation Districts to provide inspection and maintenance as needed. Temporary maintenance access for maintenance and repairs would be requested from the Union Pacific Railroad and E.R. Jacobson on an as-needed basis.

## Water Supply for Fish Passage

Because of downstream senior water rights, a flow of at least 520 cfs is present in this reach of the river under all but the most severe drought conditions. The Service also has up to 37,650 acre-feet of storage water available from upstream reservoirs for endangered fish uses in drought years. About 80 cfs of Colorado River flow would be needed to operate the fish ladder. The fish passage notch would be designed to direct the first 80 cfs in the river to the fish passage channel. Additional flows would begin to spill over the rest of the dam at higher flows until the dam is completely submerged. If built, the Service would require the Jacobson Hydro No. 1 Project to discharge near the fish passage entrance to serve as an attraction flow using pipe across the river, or defuse the discharge at various locations. Without the Jacobson Hydro No. 1 Project, flows over the rock ramp would be directed towards the fish passage entrance to attract fish. Attraction flows would vary, dependant on flows in the river.

# *Downstream Rock Fish Passage*

# *With Whitewater Recreation Features*

This alternative was developed through various meetings with representatives of the Western Association to Enjoy Rivers (WATER), CDOT and the Town of Palisade. The alternative requires that the following conditions be met before construction could proceed. These conditions include: 1) a local governmental entity securing non-recovery program funding for the incremental costs associated with construction of the Downstream Rock Fish Passage with Whitewater Features Alternative, 2) obtaining necessary permits from underlying land owners (Palisade and Mesa County Irrigation Districts, E.R. Jacobson, and CDOT), 3) the Town of Palisade sponsoring and assume liability and maintenance responsibility for the whitewater features, and 4) the Town of Palisade obtaining public access below the dam from the Union Pacific Railroad and E.R. Jacobson. The alternative would incorporate whitewater features into the Downstream Rock Fish Passage Alternative. The Town of Palisade submitted an application to Great Outdoors Colorado for additional funding to construct the whitewater features concurrent with construction of the fish passage. CDOT has conditioned its approval of this alternative, subject to the Town of Palisade acquiring the public access easements below the dam prior to approving construction of the whitewater features and Federal Highways Administration approval. Under this alternative, if any of the conditions identified above

are not met prior to construction, Reclamation would construct the Downstream Rock Fish Passage Alternative.

Recreational features include constructing a second notch in the Price-Stubb Diversion Dam for rafts and kayaks, and constructing a series of four rock weirs using grouted riprap to create desired whitewater conditions adjacent to the fish passage channel. The fish passage channel would be lengthened from 550 feet to 860 feet to create safer boating conditions for rafts and kayaks. Under this alternative, the Town of Palisade would obtain public access below the dam via an existing road through Union Pacific Railroad and E.R. Jacobson properties. A foot path from a parking area on the E.R Jacobson property to the whitewater features would also be constructed. The public could also access the features from Colorado River State Park-Island Acres via the Colorado River. An emergency portage around the dam would also be developed. The Town of Palisade may pursue future recreation improvements within the E.R. Jacobson property (parking areas, restrooms, kiosk, trails. etc.) which are discussed in the cumulative impacts section of this document.

## Design

This alternative proposes constructing three grouted riprap weirs downstream of the Price-Stubb Diversion Dam adjacent to the fish passage channel to create whitewater features (see Figure 7). The fish passage would consist of 1) a 860 foot-long fish passage channel with a 2.0 % gradient below the dam on the river-left bank of the Colorado River, 2) a 80 cfs low flow fish passage notch in the Price-Stubb Diversion Dam, 3) a second boater notch to provide for raft and kayak use, 4) three grouted riprap weir structures downstream of the Price-Stubb Diversion Dam, 5) an emergency portage around the diversion dam on river left, 6) a divider-berm between the fish passage channel and riprap weirs, and 7) a foot path to access the whitewater features on river-right below the dam. In discussions with CDOT, a 33 foot offset of the fish passage channel was established to allow for widening of Interstate 70. Additional visual screening along Interstate 70 may be required and funded with non-Recovery Program funds. Stop- log channels have been added to both the fish passage notch and the boater notch to address Ute Waters concerns about maintaining service during extreme low river conditions if their main pipeline was out of service.

## Construction

This alternative would be completed under a construction contract. The Town of Palisade would secure non-Recovery Program funding for the additional construction costs associated with construction of the whitewater features (the second notch, additional riprap and grouting, potential visual screening along Interstate 70, etc.). Before the fish passage and whitewater features could be constructed, authorization for the dam modifications would be obtained from the owners of the dam. Temporary construction easements, permanent easements, and intergovernmental agreements would be acquired from Palisade and Mesa County Irrigation Districts, E.R. Jacobson, CDOT,

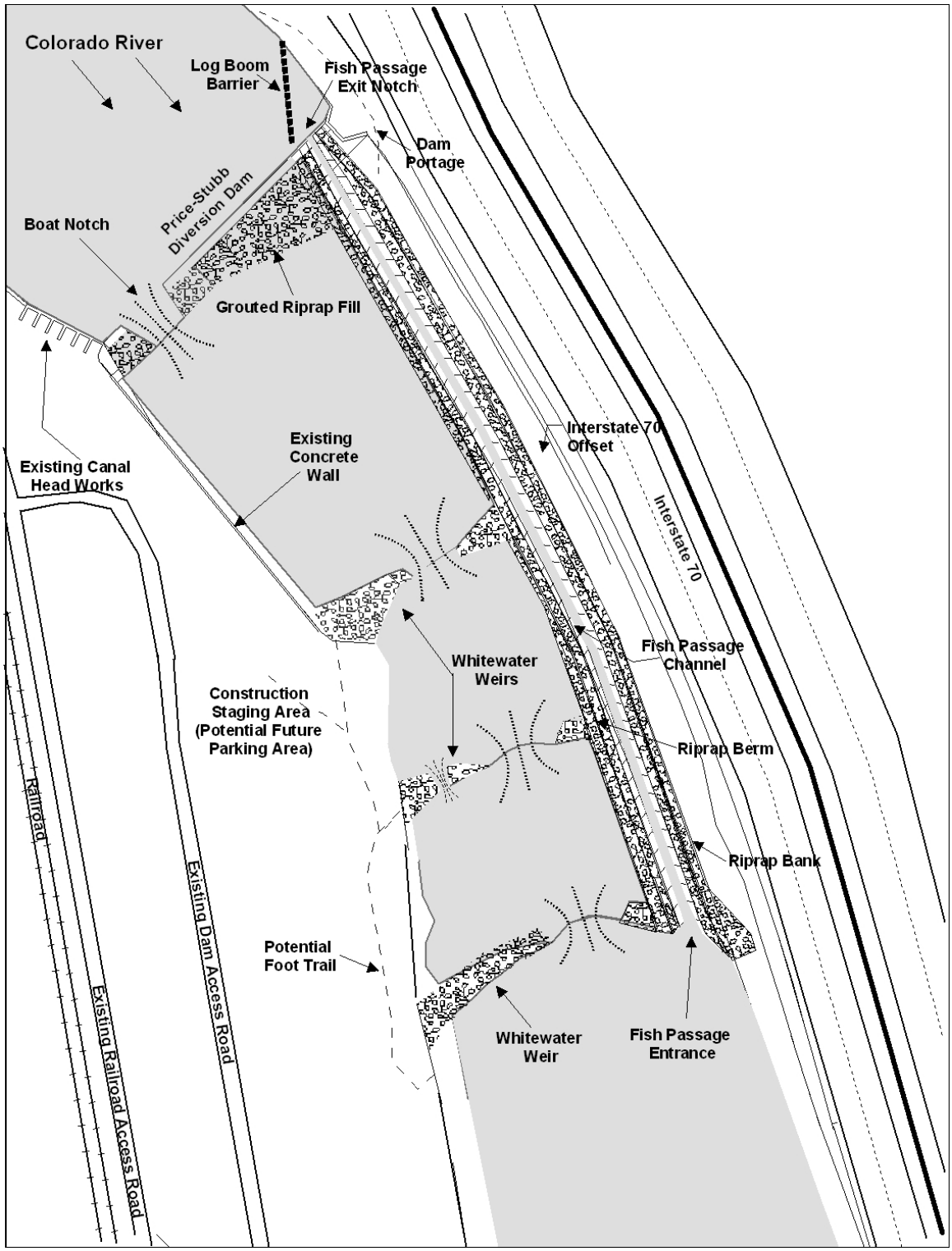


**Figure 7-Downstream Rock Fish Passage with Whitewater Features Conceptual Drawing**

and the Union Pacific Railroad for the fish passage. Reclamation would negotiate protective measures to reduce impacts to private and State property, rights-of-ways, and facilities.

Additional permits and easements associated with the whitewater features would be obtained by the Town of Palisade prior to construction. Following construction, any damaged area would be restored, as near as practicable, to its original condition. Access to the dam would be from the existing trail that parallels the railroad tracks within the Union Pacific Railroad's right-of-way and the E.R. Jacobson property. Reclamation would request temporary construction access to construct the fish passage and whitewater features and the Town of Palisade would obtain a permanent easement for public access through these properties to access the whitewater features. Construction staging and material storage would be on adjacent vacant lands owned by E.R. Jacobson.

A cofferdam and/or bypass channel may be used to direct the river around the construction area and river flows would not be reduced. Before construction, Reclamation and the contractor would obtain necessary approvals required by the Clean Water Act. Reclamation would request Section 404 authorization for the fish passage under Regional General Permit No. 057 for projects that benefit recovery of endangered fishes. A separated Section 404 authorization may be needed for construction of the whitewater features. If discharging water for construction dewatering is needed, the contractor would obtain a Section 402 permit. Reclamation would also coordinate construction activities within the 100-year floodplain with Mesa County. Construction would be scheduled during low river conditions in the fall of 2005.

Reclamation estimates that the construction costs for this alternative would be the about $5,400,000. The incremental costs associated with the construction of this alternative would be funded with Non-Recovery Program funds (i.e. Great Outdoors Colorado, W.A.T.E.R). The Town of Palisade and recreational interests have been working with a private consultant to design the whitewater features and refine cost estimates. It is estimated that the additional construction costs of the Downstream Rock Fish Passage with Whitewater Features Alternative when compared to the Downstream Rock Fish Passage Alternative are between $400,000 to $600,000. Operation and maintenance costs for this alternative would be negligible.

## Operation, Maintenance and Replacement Measures

This alternative would require no regularly scheduled actions related to operation and maintenance of the fish passage, other than inspection. Reclamation would enter into a contract with Palisade and Mesa County Irrigation Districts to provide inspection and maintenance as needed. The Town of Palisade would provide maintenance, as needed, for the whitewater features including but not limited to onsite management, enforcement, and repairing whitewater features after large river flow events if needed.

### Water Supply for Fish Passage

Because of downstream senior water rights, a flow of at least 520 cfs is present in this reach of the river under all but the most severe drought conditions. The Service also has up to 37,650 acre-feet of storage water available from upstream reservoirs for endangered fish uses in drought years. About 80 cfs of Colorado River flow would be needed to operate the fish ladder. The fish passage notch would be designed to direct the first 80 cfs in the river to the fish passage channel. Additional flows would begin to flow through the boater notch and then over the rest of the dam at higher flows until the dam is completely submerged. Flows over the whitewater weirs would be directed towards the fish passage entrance to attract fish. If built, the Service would require the Jacobson Hydro No. 1 Project ensure delivery of attraction flow for the fish passage entrance. Without the Jacobson Hydro No. 1 Project, attraction flows would vary, dependant on flows in the river. The Town of Palisade, W.A.T.E.R. and E.R. Jacobson have discussed entering into an agreement to insure water availability for recreation on weekends and holidays if the Jacobson Hydro No. 1 Project is built.

## *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 expressed support for dam removal, but the Palisade Irrigation District is currently opposed to dam removal.
4) Geologic investigations indicate landslide stability is an issue; however, no impacts to the slide movement caused by dam removal are anticipated. If the dam is removed and a landslide were to occur, potential for damage liability exists.

### Design

The Dam Removal Alternative would allow the foundation, abutments, and canal head works to remain in place (see Figure 8). The left abutment[3] of the dam may provide some erosion protection for Interstate 70. 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.

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

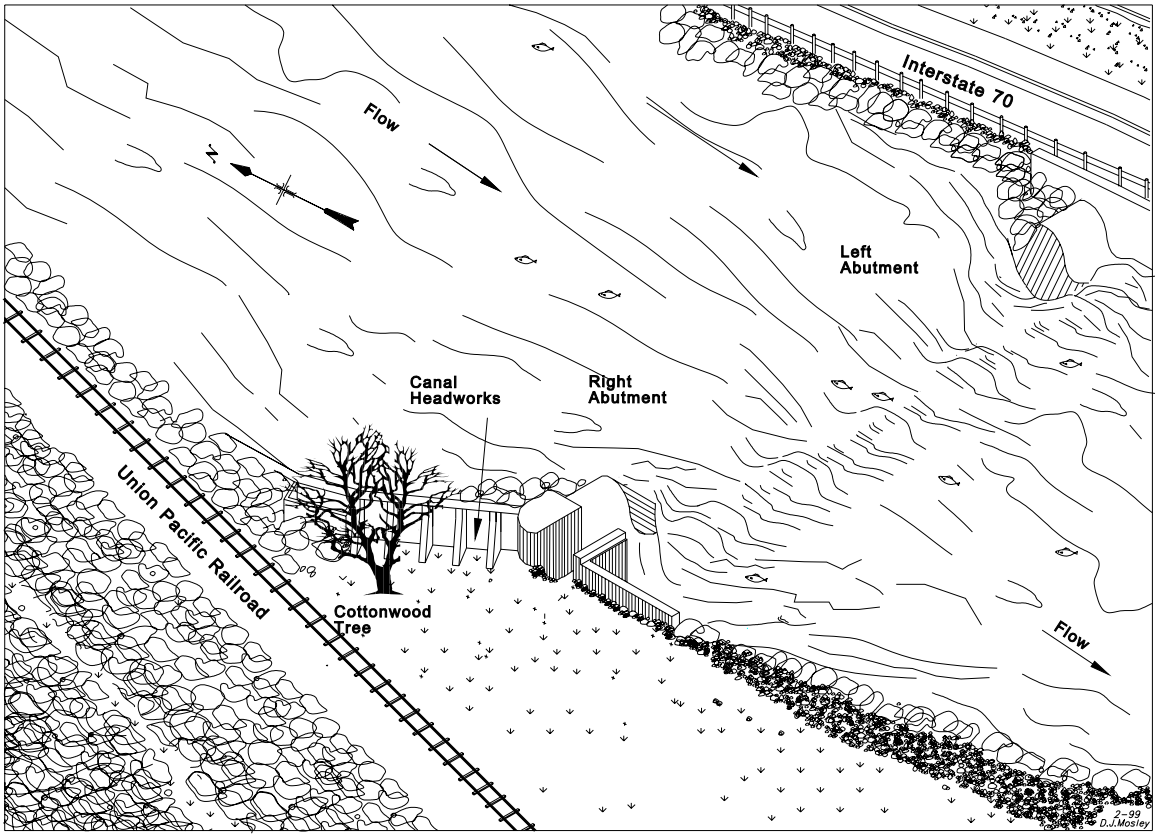


**Figure 8-Dam Removal Conceptual Design Drawing**

Removal activities would require measures, such as placement of boulders or riprap in the riverbed or along the banks, to restore or enhance natural fish passage in the river channel by native and endangered fish.

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. These possible options include;

1. Deliver Colorado River water to the Ute Water pump plant via the Orchard Mesa Power Canal[4]. 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 option would require the following measures:

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

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 Xcel Energy 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 CDOT for a pipeline through the Rapid Creek culvert under Interstate 70.

2. Lower the sump (submerged pump) 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 about $1,000,000 (due to the lack of construction access and the 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 to costly too 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 would be required. Temporary construction easements or permits would also be required before construction. Reclamation would negotiate protective measures to reduce impacts to private property, rights-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 Old Highway 6 along a trail that lies within the railroad right-of-way and the E.R. Jacobson property. Construction staging and material storage would be on adjacent vacant land owned by E.R. Jacobson. Construction access is limited near the dam because of its proximity to the railroad tracks and Interstate 70.

A cofferdam and or bypass channel may be used to direct the river around the construction area and river flows would not be reduced. Before construction, Reclamation and the contractor would obtain necessary approvals required by the Clean Water Act. Reclamation would request Section 404 authorization for the fish passage under Regional General Permit No. 057 for projects that benefit recovery of endangered fishes. A separate Section 404 authorization would likely be needed for construction of the whitewater features. If discharging water for construction dewatering is needed, the contractor would obtain a Section 402 permit. Reclamation would also coordinate construction activities within the 100-year floodplain with Mesa County. Construction would be scheduled during low river conditions in the fall of 2005.

Reclamation estimates the total costs for dam removal to be between $1,900,000 and $2,900,000 depending on mitigation measures selected for impacts to the Ute Water pump plant. The cost includes all preconstruction activities, permitting, construction, construction administration, and mitigation measures.

### Operation and Maintenance

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

### Water Supply

Because of downstream senior water rights, a flow of at least 520 cfs is present in this reach of the river under all but the most severe drought conditions. The Service also has up to 37,650 acre-feet of upstream reservoir 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.

## *Selection of Recommended Alternative*

Reclamation has selected the **Downstream Rock Fish Passage with Whitewater Recreational Features Alternative** as its recommended alternative contingent on securing permits and easements from affected land owners, available non-Recovery Program funding for the whitewater features, local governmental sponsorship to assume liability, maintenance, and obtain public access for the whitewater features. Reclamation and the Recovery Program believe this alternative would best meet project purposes while protecting existing upstream uses and providing desired public safety and recreation. The alternative also minimizes the need for fish passage operation and maintenance.

Construction access is limited near the Price-Stubb Diversion Dam and head works. The dam is constricted by the Union Pacific Railroad on river-right[5] and Interstate 70 on river- left. The Conventional Fish Passage alternative is compatible with the Jacobson Hydro No.1 Project. However, if constructed independently, access for construction of the Jacobson Hydro No. 1 Project would be severely limited. The dam would continue to be a hazard to river recreation and the general public. In addition, having two concurrent concrete fish ladders (Price-Stubb and Grand Valley Project Diversion Dams) within a short reach of the river would likely be less beneficial to endangered fish. Therefore, Reclamation has not selected the Conventional Fish Ladder alternative as its preferred alternative.

The Dam Removal alternative would be most beneficial to endangered fish and river recreation, but would adversely affect upstream water rights and hydropower, and may affect existing facilities (Ute Water Pumping Plant, railroad, Interstate 70 and Colorado River Siphon). Therefore, Reclamation has not selected the Dam Removal alternative as its preferred alternative.

The Downstream Rock Fish Passage alternative provides benefit to endangered fish while protecting existing water rights, existing facilities, and hydropower potential. The Downstream Rock Fish Passage alternative addresses public safety issues associated with the dam and improves conditions for river recreation, but the dam would continue to be impassible to watercraft. A portage around the dam and 2.5 rock ramp would help reduce the dangers associated with the dam.

## *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,
- mitigate impacts to the historic qualities of the Price-Stubb Diversion Dam,
- address public safety issues associated with the Price-Stubb Diversion Dam, Interstate 70 and the Union Pacific Railroad,
- accommodate future hydropower development at the Price-Stubb Diversion Dam, and
- accommodate development of whitewater recreation features.

[5] River-right refers to the right bank of the river as viewed when looking downstream.

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

To comply with requirements of the Endangered Species Act and the National Historic Preservation Act, Reclamation consulted with the Service and the Colorado State Historic Preservation Office on the Preferred Alternative. Consultation results are discussed in the next chapter.

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