
FINAL ENVIRONMENTAL ASSESSMENT

**Endangered Fish Passage Project at the
Grand Valley Project Diversion Dam**

And

**Fish Screen in the
Government Highline Canal**

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



Upper Colorado Region
Western Colorado Area Office
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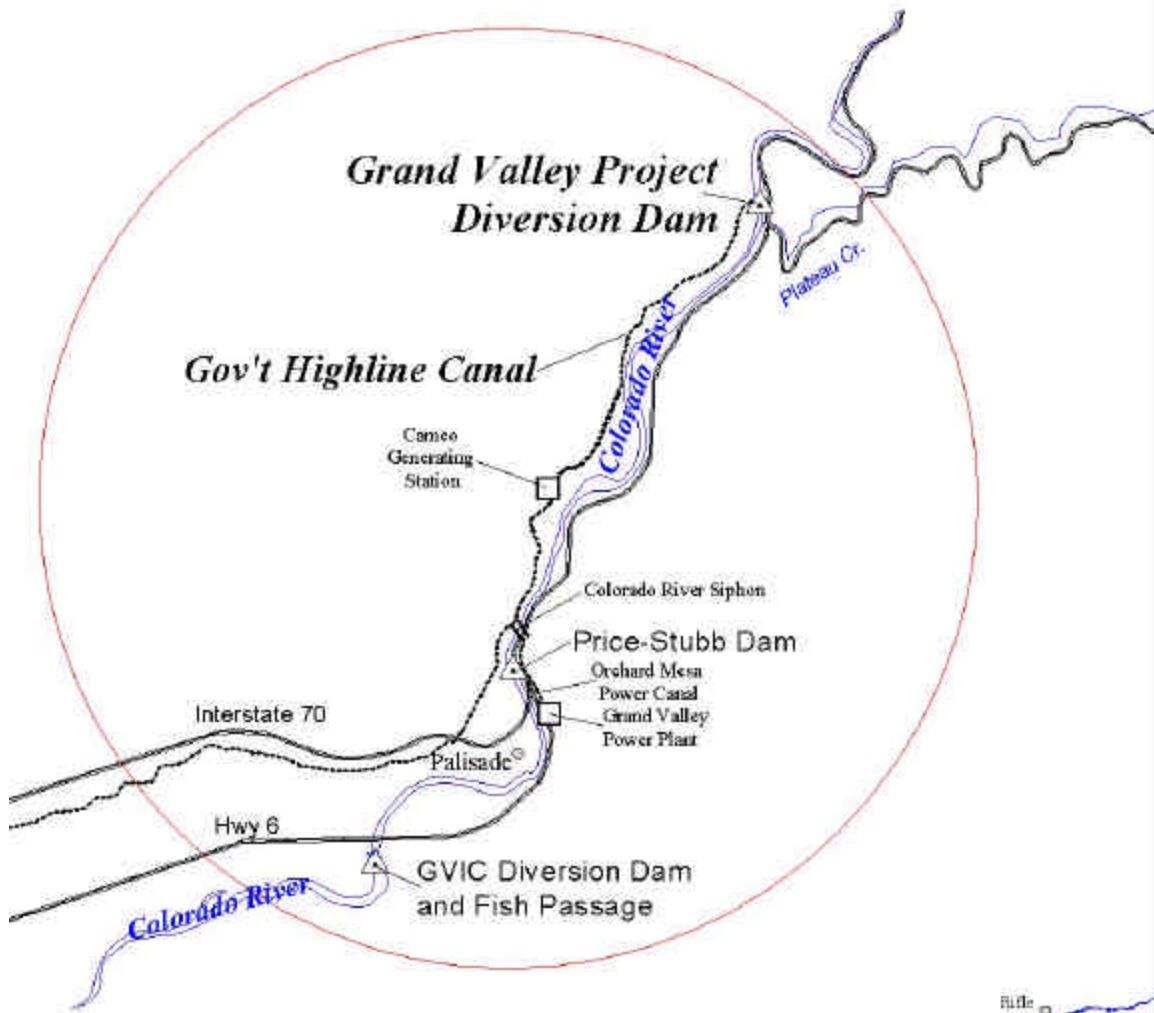


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CHAPTER 1 – INTRODUCTION

Need for and Purpose of Action

This Final Environmental Assessment (EA) discusses providing endangered fish passage at the Grand Valley Project Diversion Dam on the Colorado River and providing a fish screen in the Government Highline Canal in Mesa County, Colorado. The U.S. Bureau of Reclamation (Reclamation) prepared this EA 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 proposed 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.

The Grand Valley Project Diversion Dam (Dam) and Government Highline Canal (GHC) (see Figure 1) are major features of Reclamation's Grand Valley Project, constructed from 1912 to 1917. The 14-foot high diversion Dam is located on the Colorado River about ¼ mile upstream of the Colorado River's confluence with Plateau Creek. The Dam provides water via the GHC to four canals that stretch over 90 miles throughout the Grand Valley. The GHC, completed in 1917, is 55 miles long. The Dam and GHC have been operated and maintained by the Grand Valley Water Users Association since 1949.

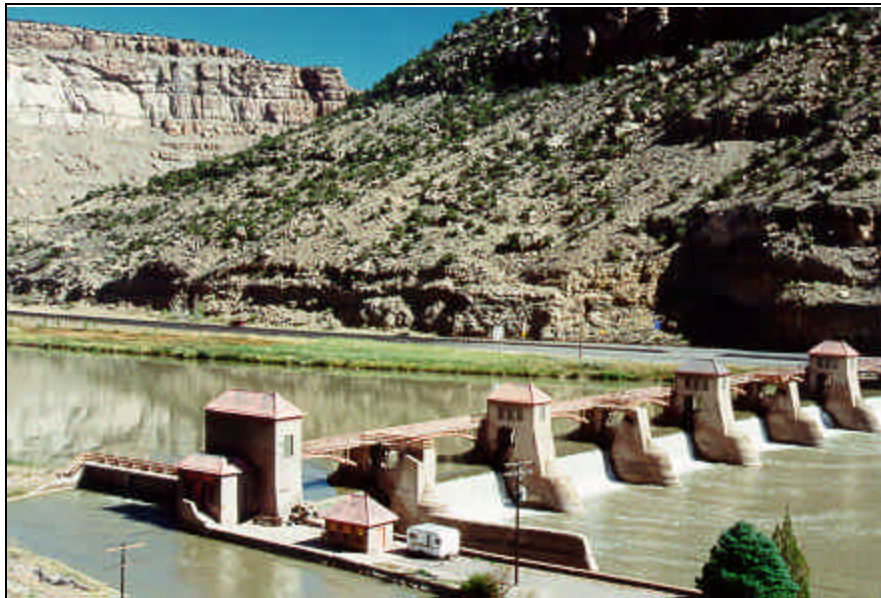


Figure 1 - Grand Valley Project Diversion Dam

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 and installing fish screens at major river diversions and canals.

Access to upstream habitat of these migratory fish species has historically been blocked by three irrigation diversion dams on the Colorado River mainstem above the Gunnison River confluence (see Frontispiece Map):

- 1) The Grand Valley Project Diversion Dam at River Mile 193.6 (discussed in this Draft EA)
- 2) The Price-Stubb Diversion Dam at River Mile 188.2, about 5 miles downstream from the Grand Valley Project Diversion Dam, and
- 3) The Grand Valley Irrigation Company (GVIC) Diversion Dam at River Mile 185.1, about 9 miles downstream from the Grand Valley Project Diversion Dam.

A supplemental draft EA for fish passage at the Price-Stubb Diversion Dam (U.S. Bureau of Reclamation, 2002) discusses a rock fish passage at the dam as the preferred alternative to restore fish passage. The Price-Stubb Dam has not been used to divert irrigation water since 1918 when the Grand Valley Project Dam and the GHC became operational. Construction of a fish passage at Price-Stubb is scheduled to begin in 2004.

In March 1998, a 30-foot-wide notch was removed from the GVIC Diversion Dam and a fish passage was constructed below it. The fish passage consists of riprap placed in the Colorado River channel to form a series of riffles and pools. The final environmental assessment for passage at the GVIC Diversion Dam (U.S. Bureau of Reclamation, 1997a) discusses the need for fish passage and fish screens to help restore populations of the razorback sucker (*Xyrauchen texanus*) and the Colorado pikeminnow (*Ptychocheilus lucius*, formerly called the Colorado squawfish).

The following criteria were used to develop alternatives for fish passage at the Grand Valley Project Diversion Dam:

- Actions taken should be cost effective, timely, and complement related actions to help restore native fish populations. Related Recovery Program actions include stocking endangered fish, reducing predation and competition by controlling/removing nonnative fish species, acquiring and restoring floodplain habitat, and supplying and protecting instream flows.
- Actions taken should protect existing uses of the Dam and GHC, including: providing irrigation water to residents of the Grand Valley, generating hydroelectric power at the existing Grand Valley Power Plant, and providing cooling water for the Cameo Generating Station. Actions taken should also

protect the uses of DeBeque Canyon as a transportation corridor and recreation resource, and protect historic qualities of the Dam and GHC.

Providing fish passage at the three diversion dams would give the fish access to about 50 miles of critical habitat upstream, while protecting the operation of the Grand Valley Project.

Need: Action is needed to restore endangered fish access to critical habitat upstream of the Grand Valley diversions for the Colorado River endangered fish and to make sufficient progress toward establishing self-sustaining populations of the endangered fishes.

Purpose: The purposes of the Grand Valley Project fish passage and fish screen is to further the goals of the Upper Colorado River Endangered Fish Recovery Program.

Background Information

Endangered Fishes – Many studies have been completed on Colorado River endangered fishes (Colorado pikeminnow, razorback sucker, bonytail, and humpback chub), their habitat, their behavior, and factors that led to the decline and listing of these species under the Endangered Species Act (summarized in the Final EA for Fish Passage at the GVIC Diversion Dam, Appendix A, Reclamation 1997a). These studies have increased the understanding of actions needed to recover the fish (establishing 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 (Figure 2).

Colorado pikeminnow and razorback sucker were recently stocked upstream of the Grand Valley Project Diversion Dam by the Recovery Program (Burdick, 2000). Both fishes are extremely rare throughout the Upper Colorado River Basin. Establishing fish passage at the three man-made diversion dams is needed to restore use of historical habitat of endangered fish species. Providing fish exclusion devices (fish screens) in the canals of the GVIC and Government Highline are needed to prevent incidental take (death or injury) to fish that could otherwise become trapped in the canal system. Construction of a fish screen at the GVIC Canal began November 2001.

Habitat Availability Upstream – One factor that has led to the decline of native fish is loss of their historic habitat. In 1997, the Colorado Division of Wildlife assessed the aquatic habitat available to endangered fish species in about 50 miles of the Colorado River upstream of the three diversion dams (Palisade to Rifle). Runs (deep, moving water) and pools are excellent feeding and wintering areas for both Colorado pikeminnow

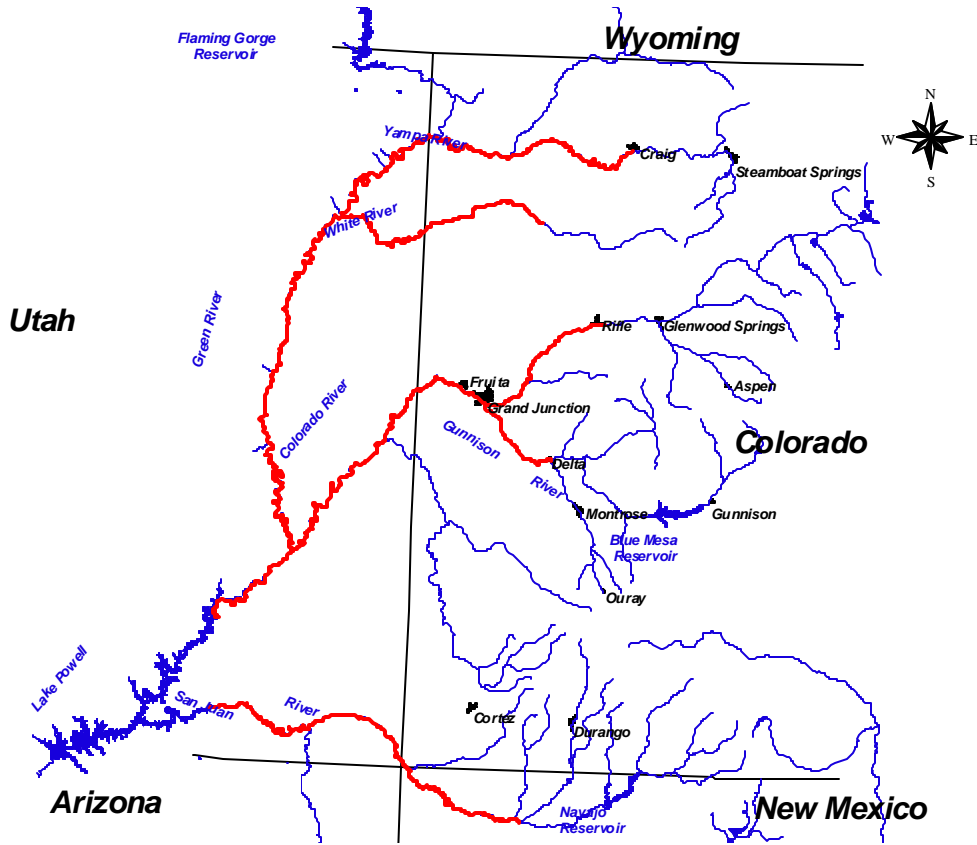


Figure 2 - Upper Colorado River Basin Endangered Fish Critical Habitat

and razorback sucker, 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 the fall survey (Anderson, 1997). Providing passage at the Price-Stubb and the Grand Valley Project Diversion Dams will open about 50 miles of habitat upstream of these dams to help recover these endangered fish species.

Scoping

Reclamation identified issues and concerns with participation from individuals, agencies, and organizations that may be affected by the proposed project. The fish passage alternatives discussed in Chapter 2 are: 1) No Action, 2) Rock Fish Passage, and 3) Concrete Fish Passage Alternative (Preferred Alternative). In addition, four fish screen alternatives at the GHC are evaluated which include: 1) No Action, 2) At Dam Head Works, 3) Above Cameo (Preferred Alternative), and 4) Below Cameo. With the exception of the No Action Alternative, all fish passage alternatives include construction of a fish screen in the GHC. Each issue and concern described below is discussed in Chapter 3. More information on scoping activities is included in Chapter 4.

Water Resources

Diversion Dam Operations and Water Rights – The Grand Valley Project Diversion Dam is used year-round to divert water for irrigation and generating hydroelectric power. Operation of the fish passage and fish screen should not interfere with the operation of the dam or affect the ability to divert water for four irrigation districts and a hydroelectric power plant.

Water Quality – Construction of the fish passage could temporarily affect water quality downstream from the dam and the ability of domestic water providers to meet drinking water standards.

Recreation Resources

River Boating and Public Safety – The dam is a barrier to recreational boating and a fish passage would not remove this barrier. The dam has historically been 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 Interstate and railroad were designed and constructed considering historic operations of the dam. If the proposed action affects the flood capacity of the dam, it could also affect the integrity and use of these structures.

Access – Before modifications to the dam or canal could be made, Reclamation would coordinate activities as needed with the Grand Valley Water Users Association, Colorado Department of Transportation, and Union Pacific Railroad to safely access the site and/or use their land and facilities.

Unique Geographical Features

Floodplain and Wetlands Protections – 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 Federally Threatened and Endangered Species – Federal actions that affect (either adverse or beneficial) federally threatened or endangered species require consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act of 1973. The Service concludes consultation with written concurrence with the Biological Assessment or issuance of a Biological Opinion. Harm, injury or death to a listed species or their designated critical habitat as the result of a proposed action would constitute a “takings” and

require an “incidental take statement” to comply with the Endangered Species Act.

Effects on Endangered Colorado River Fishes – Providing fish passage at the Dam is needed to allow endangered fish access to upstream habitat. 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

Historic Resource Protection – The Grand Valley Project Diversion Dam is listed on the National Register of Historic Places and the Government Highline Canal is eligible for listing. Federal agencies are responsible for ensuring that they take into account the effects of their actions on significant cultural resources, and comply with the National Historic Preservation Act, 36 CFR Part 800, and other historic preservation requirements.

Social and Economic Resources

Hydropower – The Grand Valley Project Diversion Dam diverts water for the existing Grand Valley Power Plant. Operation of the fish passage and fish screen should not interfere with the ability to divert water for the Grand Valley Power Plant. During construction of the fish screen, it may not be possible to supply water for hydroelectric power generation or for cooling at the Cameo Generating Station.

Cost and Benefits – Some people question using taxpayers’ money to recover endangered fishes or provide fish passages and fish screens.

CHAPTER 2 – ALTERNATIVES

This chapter describes the 1) No Action, 2) Rock Fish Passage, and 3) Concrete Fish Passage Alternatives for providing fish passage at the Grand Valley Project Diversion Dam (Dam). Four fish screen alternatives: 1) No Action, 2) At Dam Head Works, 3) Above Cameo, and 4) Below Cameo in the Government Highline Canal (GHC) are also discussed. All fish passage alternatives, with the exception of the No Action Alternative, include construction of a fish screen in the GHC. Alternatives eliminated from detailed analysis are also discussed.

Fish Passage Alternatives

No Action Alternative: Reclamation would take no action to provide for endangered fish passage at the Dam or prevent fish from becoming entrained in the GHC. The Dam would remain unaltered and continue to be a barrier to upstream fish passage. The potential for fish to become entrained in the GHC would continue.

Rock Fish Passage Alternative: Reclamation, on behalf of the Recovery Program, would construct a rock channel-type fish passage structure upstream of the Dam and install a fish screen in the GHC.

Concrete Fish Passage Alternative: Reclamation, on behalf of the Recovery Program, would construct a concrete baffle-type fish passage through the Dam and install a fish screen in the GHC.

Design Criteria

The fish passage and screen alternatives were designed based on the behavior of the two endangered fishes, their swimming abilities, Dam operation and maintenance needs, the need to not interfere with diversion for irrigation and hydropower, and the physical and historical characteristics of the Dam and GHC. Designs for the fish passage and screen would be reviewed by the Grand Valley Water Users Association to ensure compatibility with Dam and GHC operations. Fish passage and screening criteria developed by the National Marine Fisheries Service for the activities in the Pacific Northwest were also used where applicable (i.e. screen approach velocities, passage velocities, slope).

Dam Description

The Dam was constructed from 1912 to 1917 and is 14 feet high, with a crest length of 546 feet. Water levels and flows are controlled via six adjustable roller gates, each about 70 feet wide (see Figure 3). The Dam has one sluiceway roller gate which is 60 feet wide. Each roller is about 7 feet in diameter and has a toothed rim that engages a toothed rack, which is set into each pier at each end of the roller. The rollers are raised and lowered by a chain that is attached to, and partly encircles each roller. The chain is wound around a drum in the hoist house on the top of each Dam pier. When lowered, the

rollers secure a seal against the crest of the Dam. When raised, the openings allow for the passage of large objects such as trees and ice flows over the crest of the dam. The rollers may be raised and/or lowered using many combinations to maintain the proper water level regardless of the rate of flow in the river. These roller gates were the first of their type designed in the United States and at the time of construction, the dam was the largest of its type in the world.



Figure 3 - Left bank (Interstate 70 side) roller gate at the Grand Valley Project Diversion Dam (Photo Dated Winter 2000)

Rock Fish Passage Alternative

The Rock Fish Passage would be built through the dam roller bay closest to the left bank of the Colorado River. The left bank is defined as the left side of the river when facing downstream and is the side where Interstate 70 is located. The fish passage would consist of a riprap-lined channel extending upstream from the Dam with a 2 to 2.5 percent slope and a length of 660 to 925 feet. A cutoff/retaining wall the length of the passage would be constructed between the fish passage and the river. The wall would be constructed of concrete and sheet pile to protect the passage during periods of high river flows. Boulders would be placed in the channel to create low velocity resting areas for migrating fish. A fish trap (selective passage) to control upstream movement of nonnative fish is included in the designs and would be needed if selective passage were not included in a fish passage at the Price-Stubbs Diversion Dam.

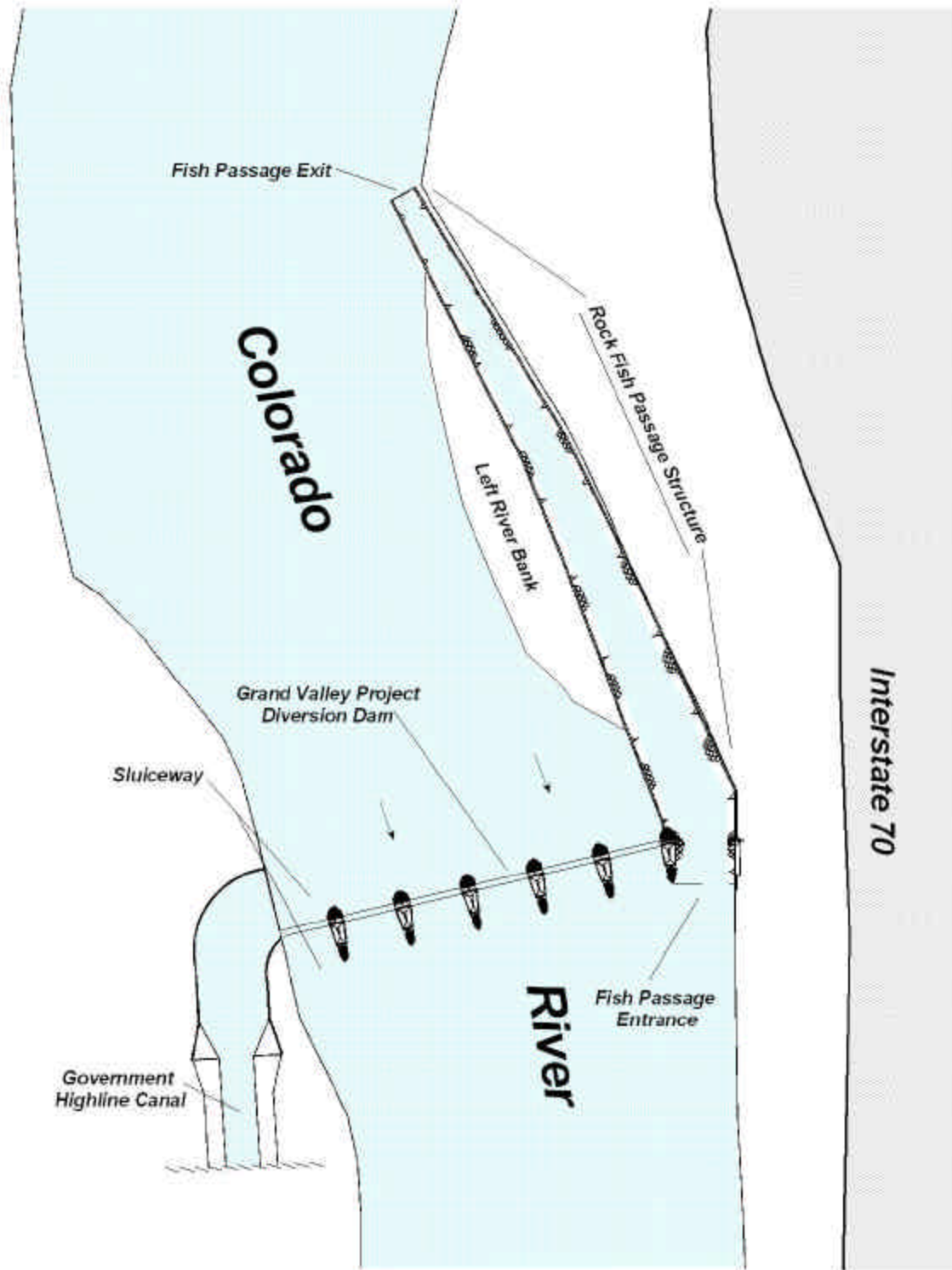


Figure 4-Rock Fish Passage Conceptual Drawing

A trash rack would be installed above the fish passage exit to prevent trash and debris from entering the structure. The Rock Fish Passage conceptual drawing is shown in Figure 4. The passage would be fenced for facility and public safety. The conceptual fish passage is designed for a flow of 130 cubic feet per second (cfs) and to maintain a minimum water depth of 2 feet.

Concrete Fish Passage Alternative

The Concrete Fish Passage Alternative would also be built through the dam roller bay closest to the left bank of the river. Final designs are not complete but the passage would consist of a 250 to 300 foot-long concrete channel, 6 to 8 feet wide (see Figure 5). The channel bottom could be roughened to create additional low velocity areas. The depth of the structure would vary from as little as 6 feet up to 20 feet. The conceptual fish passage is designed for 60 cfs with an additional diversion of 70 cfs for an attractive flow pipe. Flow depth would vary between an estimated 4 to 7 feet in the passage. The total flow diverted for the passage would vary with water availability in the river. The attraction flow would be directed to the downstream inlet of the fish passage to increase the flow near the passageway entrance. This additional flow is necessary to help fish find the passage entrance. The fish passage exit would have a trash rack to prevent debris from entering the passage. 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 the endangered fish can swim against. The fish passage would be fenced for facility and public safety. The passage would also be selective as describe in the Rock Fish Passage Alternative.

Fish Screen Alternatives

A fish screen to prevent fish from becoming entrained in the GHC is also included in the project designs. Three fish screen alternatives in addition to the No Action Alternative are being considered. These three alternatives differ in where the fish screen is placed in the GHC and include: 1) at the GHC head works (Head Works Alternative), 2) above the Cameo Generating Station Plant (Above Cameo Alternative), or 3) below the Cameo Generating Station (Below Cameo Alternative)(see Figure 6).

For the Head Works Alternative, the GHC's head works would be removed and replaced with a fish screen. The existing head works consist of nine 7-foot by 7-foot slide gates. Placing the screen at the canal head works would prevent fish from entering the canal. A trash rack upstream of the head works would be needed to protect the screen from debris such as large trees, which are commonly found in the Colorado River at higher flows, and floating ice.

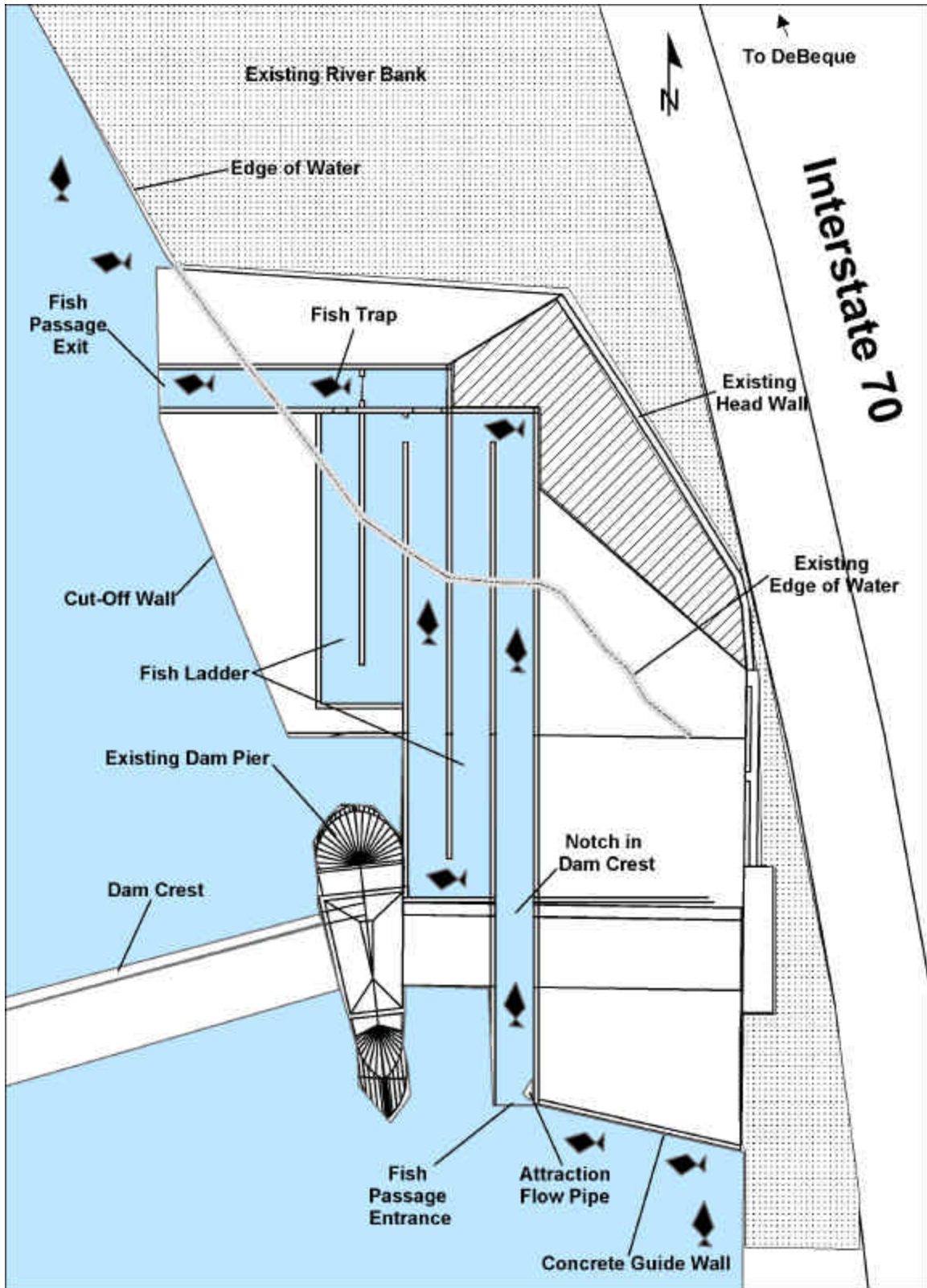


Figure 5-Concrete Fish Passage Conceptual Drawing

The Above Cameo Alternative would place a fish screen in the GHC between the State of Colorado State Engineer’s gaging station (about 4,000 ft. downstream of the canal head works) and the Asbury Creek Siphon above Tunnel No. 1. The Below Cameo Alternative would place a fish screen in the GHC in a 1,000-foot reach between Tunnel No. 2 and Tunnel No. 3.

The Above Cameo Fish Screen would be configured in a “w” or double “v” design. Placing a fish screen in the GHC would prevent fish from moving further downstream in the canal, and would direct the fish to a return pipe (bypass), which would convey the fish directly back to the Colorado River. A similar fish screen was constructed at the Grand Valley Irrigation Company Canal in 2002 (Figure 7). The primary design difference between the GVIC fish screen and the GHC fish screen would be that the GHC screen would be designed to screen 1,620 cfs, while the GVIC fish was designed to screen 660 cfs and is a single or straight screen. This would require a fish screen about twice the length of the GVIC screen, therefore a double v-type or w-type screen would be incorporated in the design of the GHC fish screen because of the additional screening area needed (Figure 8). A fish screen bypass channel around the screen and capable of carrying 1,620 cfs is also included in the design. The bypass channel is necessary to address winter icing issues and allow for maintenance of the screen.

Both the Above and Below Cameo Alternatives would require a bypass flow of 50 to 70 cfs to return the fish to the river and clean the screen of debris. Sweeping velocities across the screen would remove the debris and carry it down the bypass pipe. It would also be necessary to move the Colorado State Engineer’s GHC gaging station downstream of the fish screen structure. A canal bypass channel capable of diverting the entire canal flow around the fish screen was incorporated in conceptual designs for both the Above Cameo and Below Cameo Alternatives. The canal bypass channel would primarily be used to bypass the fish screen during winter months when icing conditions exist. Stop logs and radial-gates would be used to direct flows through the bypass channel during these periods.

The Below Cameo Alternative was evaluated because the Cameo Generating Station (CGS) diverts and returns to the GHC up to 70 cfs of water used for cooling at CGS. The warmer water increases water temperatures in the GHC between the CGS and Tunnel No. 3 between 1° to 2° C, which under certain conditions may be sufficient to reduce the amount of ice collecting on the fish screen in the Below Cameo Alternative. The intake screens for the CGS meet existing Recovery Program guidelines; therefore, no modification of the intake screens to prevent fish from being taken in pumping is anticipated. However, if required, the intake screens could be modified as part of the fish screen project.

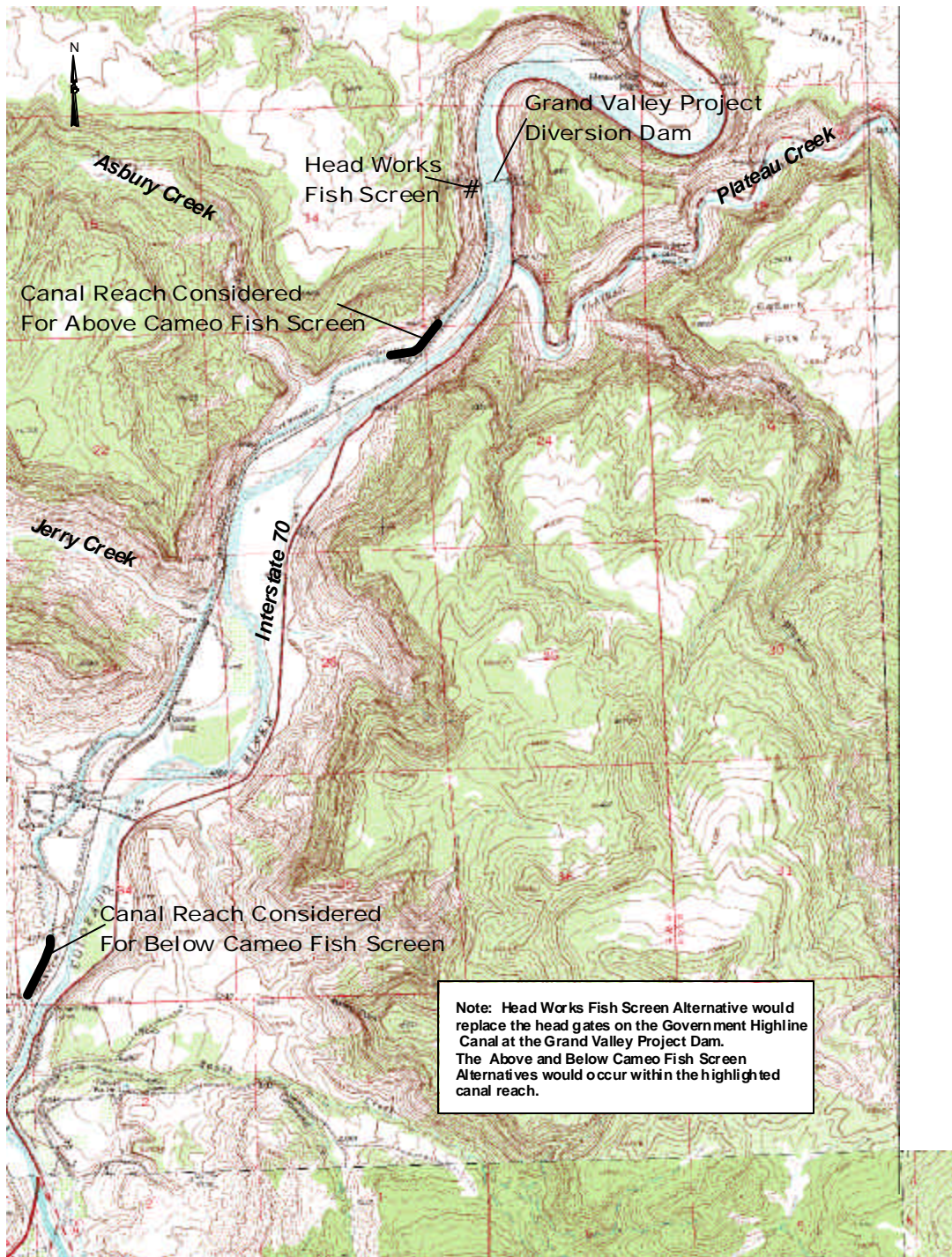


Figure 6-Fish Screen Site Alternatives



Figure 7-Grand Valley Irrigation Company Fish Screen

Selection of Preferred Alternative (Passage and Screening)

Fish Passage Preferred Alternative

The Concrete Fish Passage Alternative is the preferred alternative to restore endangered fish access to critical habitat upstream and to assist in making sufficient progress toward establishing self-sustaining populations of the endangered fishes. It has been identified as the preferred alternative because:

- 1) Construction and design uncertainties associated with the Rock Fish Passage Alternative. Existing geology was not compatible with the use of a sheet pile cut-off wall between the rock passage and the river.
- 2) Additional costs associated with the Rock Fish Passage Alternative. Concrete Fish Passage (\$2,400,000) versus Rock Fish Passage (\$3,400,000).
- 3) The Concrete Fish Passage would result in approximately 0.5 acres of wetland disturbance compared to 2.5 acres for the Rock Fish Passage.

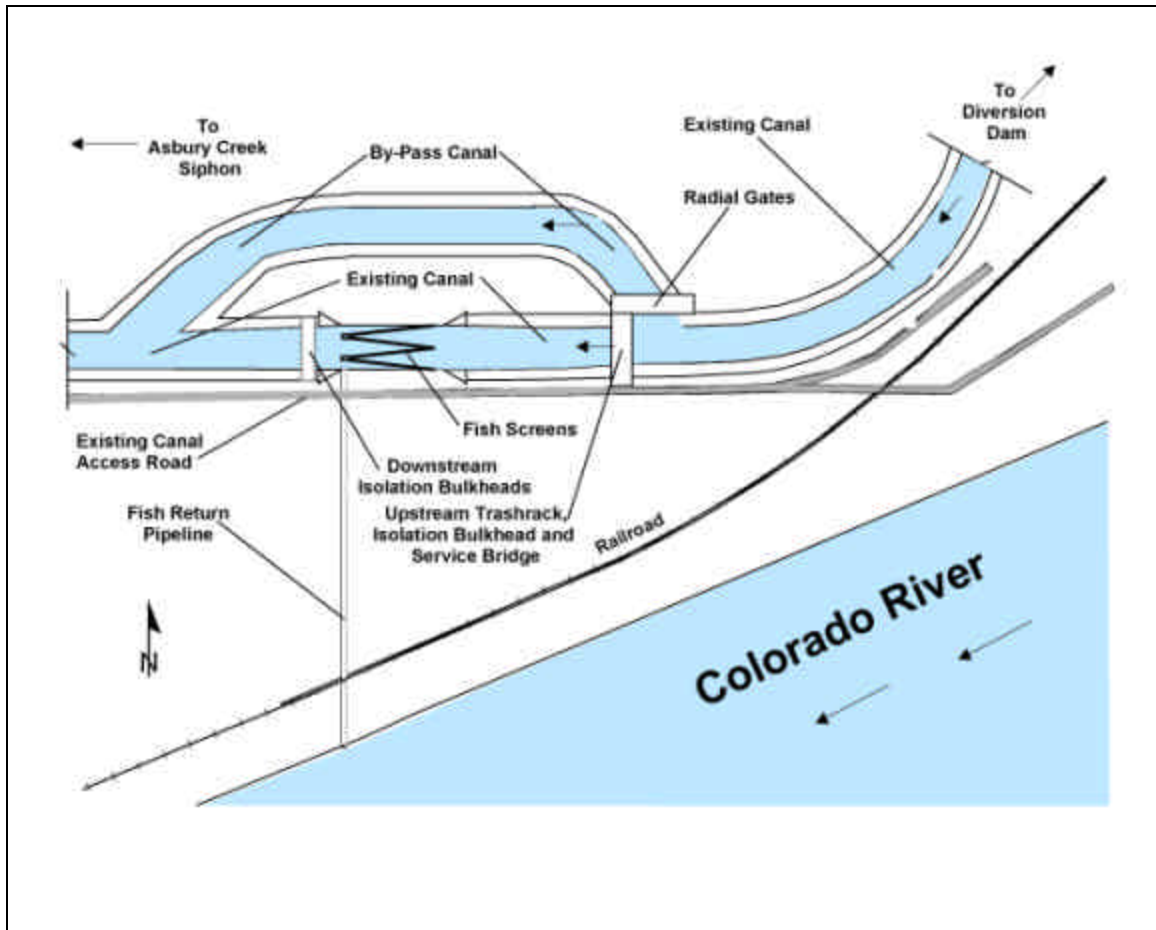


Figure 8-Government Highline Canal Fish Screen Conceptual Drawing

Fish Screen Preferred Alternative

Selecting a fish screen site for the GHC was problematic in that all locations would not provide year-round screening capabilities because of seasonal icing and trash problems. Table 1 shows the advantages and disadvantages for each location. The Above Cameo Alternative has been selected as the preferred alternative, primarily because of existing right-of-way (fish return pipeline location within “Withdrawn Project Lands”), ease of railroad crossing, adequate elevations drop from the screen to the river, sufficient area to construct a canal bypass channel, and additional GHC capacity to carry bypass flows. The fish screen would be operated from April through November.

The Below Cameo Alternative was not selected because of railroad encroachment and difficulty in designing for the increased elevation differences between the canal and river for the fish return bypass pipe. Increased water temperatures from the Cameo Generating Station were expected to result in only two additional weeks of screening, while requiring the fish to navigate about 4.2 miles of canal and two siphons.

The Head Works Alternative was considered not viable because of the difficulty of protecting the screen from large debris, including floating and submersed trees, which are

common at higher river flows. It would be difficult to design a structure that would protect the fish screen from being damaged that would not interfere with the ability to divert water into the canal. Maintenance of the screen would also require construction of temporary cofferdams in the river to isolate the screen each time screen dewatering was needed.

Construction

The fish passage and fish screen would be completed under Reclamation construction contracts. The Grand Valley Water Users Association would continue to participate in the design process to ensure the fish facilities would not conflict with the operation and maintenance of the Dam and GHC. Temporary construction easements or permits would also be acquired from all affected landowners 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.

Construction access to the left riverbank would be from Interstate 70. The contractor would be required to provide traffic control along the interstate. Access to the right riverbank and the GHC would be accomplished from the existing canal road from the Cameo Generating Station to the Dam. Fish Passage construction staging and material storage would be on the left riverbank above the Dam. Construction access is limited near the Dam because of its proximity to railroad tracks on the right and Interstate 70 on the left. Construction would be completed during lower water and a cofferdam or sheet pilings would be used to direct the Colorado River around the work area so that river flows would not be affected.

The bypass channel would be constructed in conjunction with construction of the fish screen and fish passage when the GHC is dewatered. Material excavated to create the bypass channel (approximately 50,000 cubic yards) would be used to widen the existing canal road adjacent to the screen site. The remaining waste would be disposed of on Reclamation lands adjacent to the fish screen site. Once construction of the fish screen was completed, the waste site would be revegetated with a grass mixture. Portions of the fish screen return pipeline could be constructed during the summer 2004 without affecting canal flows. The majority of the fish passage and fish screen features would be constructed in the winter months (November 2003 through February 2004), and winter canal flows (800 cfs) would not be available to the Grand Valley Power Plant for one winter season.

Fish Screen Alternative	Advantages	Disadvantages
<p>Head Gate</p>	<ul style="list-style-type: none"> -Prevents fish from entering the canal. -Less trash in canal. -Does not require a fish return pipeline flow. -May require refurbishing or replacing old canal head gates. -Does not require a bypass channel. 	<ul style="list-style-type: none"> -Small and large floating and subsurface trash and debris in the river could damage or plug the screens and reduce screening area. -Screens would be removed during the winter months due to icing. -Screens would be removed during periods of high algae blooms. -Difficulty in O&M of screens, would require construction of a cofferdam in the river each time maintenance was needed and would interfere with canal diversion during maintenance activities. -Would require modification to historic structure (Head Works).
<p>Above Cameo</p>	<ul style="list-style-type: none"> -Small trash and debris would be returned to the river via the bypass pipe. -Shorter fish travel distance in the canal than the Below Cameo Alt. and would be before canal siphons. -Trash rack would remove large trash, making canal operations easier. -Additional flows needed to operate the fish return pipeline would be carried within existing canal capacity without reducing irrigation and hydropower flows. -Fish screen and fish return pipeline could be built completely within existing Reclamation Withdrawn Lands. -Fish screen bypass channel addresses icing and maintenance concerns for canal operations. -Fish would be returned to the river a considerable distance away from the dam, thus reducing the likelihood of fish re-ascending the passage and entering the canal (Merry-go-round syndrome). 	<ul style="list-style-type: none"> -Requires additional flows to operate the fish return pipeline -When ice is present, fish would not be screened from the canal. -Would affect about 10% of an existing peach orchard on Reclamation Withdrawn Lands (removal of mature peach trees). Require a fish return pipeline Right-of-Way and temporary construction easement from the adjacent private landowner to minimize impacts to the existing orchard on Reclamation lands.
<p>Below Cameo</p>	<ul style="list-style-type: none"> -Warmer water returned to the canal by the Cameo Generating Station may prevent icing on the screen and allow for a longer screening season. -Fish would be returned to the river a considerable distance away from the dam, thus reducing the likelihood of fish re-ascending the passage and entering the canal (Merry-go-round syndrome). 	<ul style="list-style-type: none"> -Requires additional flows to operate the fish return pipeline during periods of peak irrigation demand, which may reduce the amount of flow available for irrigation and hydropower. -Trash not removed as early as the Above Cameo Alt. -Fish would travel through about 4.5 miles of canal before being screened and returned to the river. -Fish would travel through two siphons and two tunnels before being screened and returned to the River (increased potential for incidental take). -Potential need to screen the Cameo Generating Station intake pumps.

Table 1- Summary of Fish Screen Alternatives

Before construction, Reclamation and the contractor would obtain any necessary approvals required by the Clean Water Act. Approximately 0.5 acres of wetlands would be impacted by the construction of the fish passage and would require wetlands mitigation. The Clean Water Act Section 404 permits would be obtained prior to construction of the fish passage and the fish screen fish return pipeline. The contractor or Reclamation would request water quality certification under Section 401. If discharging water from dewatering the cofferdam area were needed, the contractor would obtain a Section 402 permit. In river construction would be scheduled during low water conditions in the fall and winter.

Reclamation estimates costs for the Concrete Fish Passage to be approximately \$2,400,000 depending on materials used and construction methods. The estimated cost to construct a fish screen in the GHC is about \$6,600,000. Both costs include all pre-construction activities, permitting, and construction. Funding for the construction is provided through the Recovery Program.

Operation, Maintenance, and Replacement Measures

The Service would operate the fish passage structure from April through October each year. The Service would monitor native and endangered fish use of the passage. The fish screen would be operated year-round if weather conditions permit. The Grand Valley Water Users Association would likely operate the fish screen and maintain both the fish passage and screen. Existing easements would be used to provide access for operations and maintenance of the fish passage and screen.

Construction would not begin on the project until operation, maintenance, and replacement funding mechanisms and operation and maintenance arrangements were agreed upon and the operating agreement was signed. Permission would also be obtained from all affected landowners for perpetual access and use of the site for operation and maintenance. Long-term operation and maintenance cost for the fish passage is estimated at \$25,000 per year including the fish trap. Long-term operation and maintenance cost for the fish screen is estimated at \$34,000 per year.

The Recovery Program would fund all operation and maintenance activities for the fish passage, fish trap, and fish screen, with no costs to local water users.

Water Supply for Fish Passage and Screening

A maximum of 130 cfs of Colorado River flow would be needed to operate the fish passage structure regardless of which alternative was constructed. The rock passage requires 130 cfs to maintain the depth design of 2 feet. The concrete passage could operate at lower flows (no attraction flow). Because water is immediately returned to the river and normally at least 640 cfs passes over the dam in this reach, no measures are needed to augment existing water supplies for the fish passage in most years. However, the Service has storage available to augment flows from upstream reservoirs, i.e. Ruedi,

Wolford Mountain and Williams Fork Reservoirs. Approximately 1,620 cfs is diverted into the GHC for a prolonged period during the irrigation season.

Due to the physical limitations of the dam, river flow is necessary to maintain sufficient upstream water surface elevation in the river. When the river drops significantly, it is not possible to divert a full supply into the canal. Additional flow required for either a fish screen or fish passage would aggravate this problem. Therefore when flows in the river are not sufficient to divert 1,670 cfs (historic diversions and fish return pipeline), the Grand Valley Water Users Association in discussion with Reclamation and the Service may elect to close the passage. Flow in this reach is frequently augmented with storage releases. Since canal entrainment could potentially be more detrimental to fish survival than temporary inability to pass the dam, fish screening would be a higher priority than fish passage.

The 50 cfs necessary to operate the fish screen and fish return pipeline would be diverted in addition the normal 1,620 cfs diversion and would normally be available. Except during periods of extreme drought, the 50 cfs would be returned directly to the river.

Alternative Eliminated From Analysis

Reclamation considered the following alternatives for fish passage, but eliminated them from detailed analysis for the reasons discussed:

1. Construct an out-of-channel fish passage around the dam.

This type of fish passage was constructed in 1996 at the Redlands Diversion Dam on the Gunnison River, and has been successful in allowing native and endangered fish to migrate upstream. Reclamation has determined that a fish passage design of this type is not feasible at the Grand Valley Project Diversion Dam, due to the close proximity of Interstate 70 on the left riverbank, and the GHC and railroad on the right riverbank.

2. Construct a boatable fish passage structure.

This alternative was eliminated from further analysis because the passage will be selective and designing a boatable passage would conflict with the ability to limit nonnative fish movement upstream. The Dam is currently impassable to all watercraft and this alternative would increase safety issues with the Dam operations and boaters who miss the passage could be swept over the Dam through one of the other bays.

3. Dam removal and construction of a pumping plant.

This alternative was eliminated from further analysis because of the cost of constructing and operating a pumping plant (energy consumption) was prohibitive.

Environmental Commitments

The proposed action includes measures as needed to:

- Mitigate or negate adverse impacts to the historic qualities of the Grand Valley Project Diversion Dam and any other significant site.
- Ensure ease of fish movement and selectively reduce upstream passage of nonnative fish
- Avoid potential impacts with threatened and endangered species
- Provide appropriate mitigation for wetland impacts
- Provide for appropriate mitigation to protect water quality including the use of best management practices
- Provide agreement to cease fish passage and/or fish screen operations when river flows are insufficient or river conditions such as ice, trash or algae prevent operations
- Protect existing water rights and suppliers

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

To comply with requirements of the Endangered Species Act and Section 106 of the National Historic Preservation Act, Reclamation is consulting with the Service and the Colorado State Historic Preservation Office (CSHPO) on the proposed action. A Memorandum of Understanding between Reclamation and CSHPO is being developed to address and mitigate impacts to historic structures.

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 proposed action.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter discusses resources that may be affected by actions taken to provide fish passage at the Grand Valley Project Diversion Dam and a fish screen in the GHC. During preparation of this draft environmental assessment, information on issues and concerns was received from affected water users, resource agencies, private interests, recreational interest groups and citizens, and other interested parties (see Chapter 4, Consultation and Coordination, for further details).

For each resource, the potentially affected area and/or interests are identified, existing conditions described, and impacts predicted under the No Action, Rock Fish Passage, and Concrete Fish Passage alternatives. Head Works, Above Cameo, and Below Cameo fish screen alternatives are also discussed. This chapter is concluded with a summary comparison of the alternatives and a list of mitigation measures.

General

The project is located in Mesa County, Colorado along the Colorado River. Mesa County has a population of about 110,000. Grand Junction, the largest city in the area, was founded in 1881. Construction of the first irrigation project began in 1882 with the Pacific Slope Ditch to supply Grand Junction with water. The Dam, on the Colorado River upstream from its confluence with Plateau Creek, was completed in 1917. The Government Highline Canal, also completed in 1917, is 55 miles long. Water is supplied to four irrigation districts (Grand Valley Water Users Association and the Palisade, Orchard Mesa, and Mesa County Irrigation Districts) serving over 90 miles of canals in the Grand Valley. Water is also used to generate hydroelectric power at the Grand Valley Power Plant and is used by Xcel Energy (formerly Public Service Company of Colorado) for cooling at the Cameo Generating Station.

Although agriculture remains important in the Grand Valley today, light manufacturing and service industries also influence the local economy. Tourism is also a significant source of economic activity for the area. The project area is a major transportation corridor, with the Union Pacific's railroad tracks on the right bank of the Colorado River and Interstate 70 on its left bank.

The upstream extent of the area affected by the fish passage, and other endangered fish recovery activities for the Upper Colorado River, is the town of Rifle in Garfield County, Colorado. 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

Water Rights and Use

Issue: The proposed action must not interfere with the operation of the Dam and GHC.

Existing Condition: The Dam and the GHC are operated year-round to provide water for irrigation and hydroelectric power generation. The water users served by the Dam and GHC are:

- 1) Grand Valley Water Users Association
- 2) Orchard Mesa Irrigation District
- 3) Palisade Irrigation District
- 4) Mesa County Irrigation District
- 5) Xcel Energy (formerly Public Service Company of Colorado)

During the irrigation season, from April through October, up to 1,620 cfs is diverted to provide water supplies for these entities (1,310 cfs for irrigation and 310 cfs for hydropower). Water rights allow for a total diversion of 1,710 cfs from the Colorado River, however the physical capacity of the GHC can only carry 1,620 cfs. From November through March, about 800 cfs is diverted for hydroelectric power generation at the Grand Valley Power Plant. Xcel Energy also has a non-consumptive use of up to 70 cfs for cooling at the Cameo Generating Station. Diversions are normally shut off for about two weeks each year during March and November for inspection and maintenance.

Impacts:

No Action: The No Action Alternative would have no direct affect on these water rights and uses. However taking no action would result in failure to make sufficient progress in Recovery Program efforts to restore endangered fish populations. This could trigger future Service consultations under the Endangered Species Act, which could create confrontations between endangered fish recovery and water users.

Proposed Action: Providing fish passage at the Dam and fish screening in the GHC would have no long-term effect on water user's ability to fully use their water rights.

Construction activities associated with the canal bypass channel would affect the ability to divert water for hydroelectric power production at the Grand Valley Power Plant and water used by Xcel Energy during portions of the construction period. During the construction of the canal bypass channel (Winter 2003/2004), it would not be possible to deliver water to the Grand Valley Power Plant or provide up to 70 cfs from the GHC to the Cameo Generation Station. Impacts to the Cameo Generating Station are expected to be minimal because Xcel Energy has constructed alternate methods of cooling that they would be able to use when water cannot be provided by the GHC (Public Service

Company of Colorado, 2000). Winter power production (November 2003 through February 2004) at the Grand Valley Power Plant would be lost while the fish passage structure and portions of the fish screen are constructed.

Flows up to 130 cfs would be needed to operate either the concrete or rock fish passage and provide attraction flows at the base of the Dam. This water would continue flowing downstream in the river. At least 640 cfs typically passes over the Dam after the 1,620 cfs has been diverted.

The Above and Below Cameo fish screen alternatives would require a fish return flow in the range of 50 to 70 cfs to return fish to the river and keep the screens clean and free of debris. The fish screen would be equipped with automated cleaners, an air burst system, and lastly radial gates in the canal bypass channel that would be activated when flow through the screens becomes reduced. The Head Works fish screen would not require a fish return flow, however the screen would restrict some flow into the canal, create head loss problems and it may not be possible to operate the screens when river flows drop significantly.

The initial GHC capacity is 1,675 cfs, but the canal capacity about 3 miles downstream of the Dam near the Jerry Creek siphon is restricted to 1,620 cfs. The additional flow needed for the fish return pipeline would be diverted without reducing the irrigation or hydropower water deliveries (1,620 cfs) for the Above Cameo Alternative. For the Below Cameo fish screen alternative, during the peak of the irrigation season when irrigation demands equal 1,310 cfs, it may be necessary to reduce the amount of flow available for hydropower production at the Grand Valley Power Plant to operate the fish screen.

When the river drops significantly, it may not possible to divert a full water supply (1,620 cfs) into the GHC, therefore the Grand Valley Water Users Association in discussions with Reclamation and the Service may elect to cease operation of the fish passage when river flows are not sufficient to divert 1,670 cfs. Installing flashboards on the dam's rollers to increase the water surface elevation may extend the operation of the fish passage at lower flows.

Additional operation and maintenance work would be required for the fish passage and fish screen; however, the costs and responsibility for these activities would lie with the Recovery Program. It is anticipated that the Grand Valley Water Users Association would perform this work under an agreement.

Water Quality

Issue: Fish passage and fish screen construction could cause temporary water quality changes downstream. This could affect the ability of the domestic water providers to meet drinking water standards and protect public safety.

Existing Conditions: The Clifton Water District provides domestic water to about 30,000 residents of the Grand Valley. Using the Colorado River as a water source, they produce potable water that exceeds drinking water standards (Clifton Water District, 1997). The Ute Water Conservancy District provides domestic 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 pumping plant on the Colorado River is normally used only as an emergency backup water supply. Ute Water and Clifton Water diversions are approximately 5 and 13 miles downstream from the Grand Valley Project Diversion Dam, respectively.

Impacts:

No Action: No temporary changes in water quality would occur if no fish passage or fish screen were constructed.

Proposed Action: Fish passage and fish screen construction activities would cause a temporary increase in erosion and sediments, but impacts are expected to be minor. Construction of the fish passage would require removal of sediment deposited in the Colorado River channel upstream of the Dam. Cofferdams or sheet pilings would be used to dewater construction sites for the fish passage and fish screen. The Headworks fish screen alternative would require the construction of a temporary cofferdam in the river to dewater the fish screen each time maintenance activities were needed, thus increasing the amount of sediment in the river, when compared to the Above Cameo and Below Cameo fish screen alternatives. The Above and Below Cameo alternatives would have a bypass channel capable of dewatering and isolating the fish screen for maintenance activities.

Timing of construction would be coordinated with the Clifton and Ute Water Districts to reduce water quality problems and Clean Water Act regulations would be followed.

Recreation Resources

River Boating and Public Safety

Issue: The Dam is not navigable by boats, and no established portage exists.

Existing Conditions: The Colorado River provides recreation opportunities for a growing population with an increasing interest in whitewater rafting. The Grand Valley Project Diversion Dam is an extremely dangerous barrier to river navigation. Boaters have reportedly portaged around the left side of the dam, next to Interstate 70, but no established take-out or put-in sites are near the Dam. Limited access and the additional navigation barriers of the GVIC and Price-Stubbs Diversion Dams have made recreational boating impractical along this 8 to 10 mile stretch of the Colorado River.

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 that there

were about 300 to 400 float trips annually. Within the Grand Valley, BLM estimates that about 2,000 users annually recreate on the river between Palisade and Loma, Colorado. For comparison purposes, the BLM estimates that approximately 9,000 recreational boaters annually use Ruby Canyon, just downstream from Loma (Bureau of Land Management, 1999).

Impacts:

No Action: If no action is taken, the Dam will remain a dangerous barrier to river navigation.

Proposed Action: The proposed action to construct a fish passage and fish screen would have no effect on existing conditions for river navigation. The Dam would continue as a barrier to river navigation and portage around the Dam would continue to be prohibited. Public safety, liability, interference with the operation of the Grand Valley Project, and security issues would need to be addressed before Reclamation could consider authorizing portage at the Dam. In addition, the Grand Valley Water Users Association would need to concur with any portage option. It should be noted that funding for the fish passage and screen would be provided by the Recovery Program for endangered fish, and does not include funds specifically for recreation enhancement.

Land and Facility Resources

During construction, an increase in noise and traffic would occur. Reclamation and its contractors would work with adjoining landowners to address concerns regarding disturbances during construction of the fish screen and bypass canal. Any complaints would be resolved on a case-by-case basis.

Protect Existing Structures

Issue: The fish passage and screening project could affect existing structures in the project area. Wetting (saturating) the foundation of the railroad and Interstate 70 could weaken the foundation. If actions taken at the project site raise or lower the existing water table, there could be impacts to those structures.

Existing Conditions: The railroad bed was originally constructed in 1885 by the Grand River Toll Road Company and became known as the Roan Creek Toll Road. The toll road remained in operation from 1885 to 1889 when the Denver Rio Grande purchased the roadbed for its proposed standard gauge railroad. In 1886, the Rio Grande and Pacific Railroad and the Colorado Midland entered into a joint agreement to build one line and founded the Rio Grande Junction Railway. In 1890, the Rifle-Grand Junction line was originally laid down as narrow gauge on standard ties in preparation for conversion of the Denver and Rio Grande from 3-foot gauge to standard gauge (Wilson, 1981). In 1913, while plans were being made to construct the dam, the Rio Grande and Reclamation agreed to raise the tracks 5 feet at the dam site to avoid problems during high water (Simonds, 1994).

Today the Union Pacific Railroad operates and maintains the railway. Primary commodities handled by Union Pacific include grain, automobiles and trucks, consumer and manufactured goods and coal. Union Pacific operates more than 30 trains a day in Colorado. Amtrak also provides passenger service over the Union Pacific line and has a station in Grand Junction, connecting Denver, Salt Lake City, California and Chicago (Union Pacific, 2000).

Construction of a road from Grand Junction to DeBeque on the left riverbank known as Taylor State Road (which later became Interstate 70) began in 1899. Senator Edward Taylor successfully argued and got \$40,000 to unite the east and west slopes of Colorado. In 1916, Taylor State Road became the first paved transcontinental highway. The road originally turned south and followed Plateau Creek. In 1931, the first highway (Highway 4) was constructed adjacent to the Grand Valley Project Diversion Dam to establish paved passage through DeBeque Canyon to the town of DeBeque. In 1989, the highway was expanded to four lanes and became the present day Interstate 70 (Colorado Dept. of Transportation, 2000a).

In 1998, Interstate 70 at the Grand Mesa/Collbran Interchange (about 0.5 miles south of the dam) had an annual average daily traffic volume of 13,291 (Colorado Dept. of Transportation, 2000b). Truck use was 13.70 percent.

The Grand Valley Project Diversion Dam can maintain the water level at approximately the same elevation during both high and low river flows. The six roller gates and the sluiceway roller gate may be raised and lowered in any combination necessary to maintain the proper water level regardless of flow in the river.

Reclamation designed the Dam to pass flows up to 75,000 cfs (U.S. Department of Interior, 1981). Since 1935, the U.S. Geological Survey has maintained a gage on the Colorado River near Cameo, approximately 2 miles upstream of the dam. The highest flow recorded was 39,300 cfs on May 26, 1984. A flooding frequency analysis conducted by Reclamation's Technical Service Center estimates the 500-year flood flow at the dam to be 49,000 cfs (Norval, 1998).

Impacts:

No Action: If no action is taken, no changes in existing water levels would occur, and there would be no impact to the railroad or Interstate 70.

Proposed Action: Constructing a fish passage through the left roller bay would result in this bay no longer being operational. The remaining five bays and the sluiceway would not be affected. Reclamation's Technical Service Center conducted a hydraulic analysis to estimate the changes in the upstream reservoir during the 2- to 500-year flood peaks due to removing one of the six bays from operations (USBR, 2000). For the 2-year event (19,000 cfs), the change in water surface elevation was 0.48 feet, and for the 500-year event (49,000 cfs) the change was negligible (0.03 feet). The report concluded no appreciable increase in the upstream reservoir water surface elevation due to one of the

six bays being closed off, if the sluiceway is operating in combination with the other bays. Because the change in water surface is negligible, the Union Pacific Railroad and Interstate 70 would not be impacted by the loss of one bay. Additional traffic during construction may affect travel on Interstate 70 and is discussed in greater detail in the next section.

Access

Issue: Before any modification to the Dam or GHC could be made, Reclamation would coordinate with the Grand Valley Water Users Association and the Colorado Department of Transportation to safely access the construction site and/or use their land.

Existing Conditions: Both the Dam and the GHC are owned by Reclamation, and are operated and maintained by the Grand Valley Water Users Association. Access to the GHC and the right side of the Dam would be via the Interstate 70 Cameo Interchange. A single lane dirt road parallels the GHC upstream from Cameo and leads to the right side of the Dam and crosses two siphons. A footbridge crosses the Dam, but cannot be used for vehicle access. A small bridge crosses the GHC near the canal's administrative sluiceway, which is used to access the right side of the GHC and canal head works. Access to the left side of the Dam is via a pullout accessible from westbound Interstate 70. The median between the east- and west-bound lanes of Interstate 70 has an opening to allow access to the dam for operations and maintenance. The closest exit for westbound traffic is the Cameo exit about 0.5 miles downstream of the Dam, and for eastbound traffic, the DeBeque exit is about 15 miles upstream.

Access to the GHC below Cameo is similar to access to the GHC above Cameo with a dirt road paralleling the left side of the GHC.

A portion of a mature peach orchard, which was on project-withdrawn lands adjacent to the Above Cameo Fish Screen location, would be impacted. It was discovered that the adjoining landowner was farming a peach orchard on Reclamation withdrawn lands. After review by Reclamation and the adjoining landowner, it was determined that approximately 6 acres of the orchard and 1 acre of additional land were Federal lands withdrawn for the construction, operation and maintenance of the Grand Valley Project. Reclamation and the adjoining landowner entered into a life-estate exchange dated March 12, 2003 that allows for the construction of the fish screen and the landowner to continue farming the property. About 10 percent or less of the orchard (50 trees) would be affected by construction of the fish screen return pipeline and widening the canal road. The property owner authorized a temporary Right-of-Way for pipeline construction, a permanent Right-of-way for the pipeline, and a life-estate easement to Reclamation for 1-acre for construction staging activities associated with the fish screen, GHC and the Grand Valley Diversion Dam. Reclamation also donated a grant of easement along the existing canal road to the landowner.

Impacts:

No Action: If no action were taken, there would be no access impacts associated with construction or operations.

Proposed Action: Access to the GHC would be needed to construct a fish screen. Reclamation has existing rights-of-ways through private lands along the GHC and would use the existing canal road to access the fish screen construction site. Some form of traffic control may be necessary because the canal road is narrow and has several blind spots. Heavy equipment would need to cross the railroad tracks twice, once at the Cameo Generating Station, and once at the construction site. In addition an existing bridge at the Asbury Creek Siphon would need to be improved or replaced to allow heavy equipment crossing. Reclamation would coordinate construction activities with the Union Pacific Railroad and adjoining private landowners and obtain necessary permits prior to beginning construction.

To construct the fish passage, heavy equipment would need to access the left bank of the river, both upstream and downstream of the Dam. The Dam and portions of Interstate 70 are within “Project Withdrawn Lands” under title to the U.S. Government for the Grand Valley Project. The Colorado Department of Transportation has been contacted and would work with Reclamation to ensure that appropriate traffic control measures are used to protect both the construction crews and the public traveling on Interstate 70. Because of the large volume of traffic on Interstate 70, some form of traffic control would be needed. Flagging, reduced speeds, and temporary closures of the right lane of westbound Interstate 70 may be used.

With easements from the adjoining landowner, about 10 percent (50 trees) of the peach orchard would be removed for the fish return pipeline and canal road widening. Under the License Agreement between Reclamation and the adjoining landowner, Reclamation would compensate at fair market value for any additional lost trees (greater than 50 trees). All vegetation would be cleared and grubbed, burned or hauled off-site, and a trench excavated for placement of the fish bypass pipeline. Waste from excavated material for the canal bypass channel (approximately 50,000 cubic yards) would be deposited in an area adjacent to the canal on Reclamation lands. A small amount of material may also be placed on the adjoining Hays’ property (about 1-acre in size) for leveling and improving the construction staging area. Once construction is completed, both areas would be reseeded with an appropriate grass mixture. The areas would also be shaped and contoured to reduce erosion.

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 geographic features – which include prime and unique farmlands, wild and scenic rivers, refuges, floodplains or wetlands.

Affected reaches of the Colorado River are not under study or recommended for designation as a wild and 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.

Prime or Unique Farmland

Providing for fish passage would have no affect on prime and unique farmland. Providing fish screening at the Above Cameo site would affect a portion of property considered as prime or unique farmland by the Natural Resource Conservation Service (NRCS 2002). The affected property consists of a mature peach orchard in trespass on Reclamation property. Reclamation has developed a fish return pipeline alignment that would minimize impacts to the farmland. Approximately 10 percent (50 trees) of an existing peach orchard on Reclamation Withdrawn land would be affected by the construction of the fish return pipeline and widening of the existing canal road. Under the executed license agreement with the adjacent property owner dated March 12, 2003, Reclamation would compensate at fair market value for additional losses (greater than 50 trees). The agreement authorizes the removal of 50 mature peach trees and crops, and allows Herbert and Thelma Hays to continue to farm Reclamation's property under a life-estate easement from Reclamation. Reclamation received a temporary construction easement for 2.4 acres of the Hays non-orchard property for use during fish return pipeline construction, and a life-estate of 1.2 acres of non-orchard property for construction staging.

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 or zone of influence upstream of the Dam is about 50 acres, and the stream bank is protected from erosion by riprap along both the Interstate and railroad beds. Deposition and transportation of sediment in the river depends on variations in seasonal and annual river flows.

Vegetation along both sides of the river is dominated by common reed (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*) and scattered salt cedar (*Tamarisk ramosissima*). The left riverbank widens immediately upstream from the Dam and is heavily vegetated with reed canary grass. A few sandbar willow (*Salix exigua*) and salt cedar are also present. During low flow conditions, a large gravel bar extends out into the river below the Dam. On the right bank, beginning about 400 feet downstream from the Dam, a riparian vegetated area up to 300 feet-wide lies between the GHC and the river, with some backwater areas that are inundated during high water. The area extends downstream for about 2,000 feet, and gradually narrows to about 50 feet wide.

Vegetation at the three fish screen alternatives (Head Works, Above Cameo, and Below Cameo) is similar. The GHC's banks are devoid of vegetation. Potential fish return

pipeline routes would pass through narrow bands of riparian vegetation dominated by salt cedar and Russian olive (*Eleaagnus angustifolia*). Fremont's cottonwood (*Populus fremontii*) and sandbar willow are also present.

Impacts:

No Action: If no action were taken, there would be no affect on river floodplain and wetlands.

Proposed Action: Construction of the fish passage would cause temporary disturbances to about 4.0 acres of river floodplain during construction, including hauling and storing materials. For the Rock Fish Passage, about 2.5 acres of wetlands created by sediment deposition behind the Dam would be excavated or filled to construct the fish passage. Silt approximately 10 feet deep has been deposited by the river along the left bank of the river creating wetlands dominated by reed canary grass. This stand of wetland grasses extends upstream several thousand feet. The concrete fish passage is more compact than the rock fish passage and would permanently disturb about 0.5 acre of wetlands. The removed silt would be spread and contoured upstream of the Dam along a dewatered portion of the left river channel, hauled to another site, or other method which meets the Clean Water Act. Reclamation would apply for Section 404 permits under the Clean Water Act to discharge fill material into water of the United States and develop appropriate wetlands mitigation in consultation with the Army Corps of Engineers and the Service.

Construction of the fish return pipeline is predicted to impact less than 0.5 acres of riparian habitat where the fish return pipeline would connect to the river. No jurisdictional wetlands would be affected by the construction of the proposed fish screen, however about 0.1 acres of linear wetland vegetation along the irrigation ditch servicing the peach orchard on Reclamation land would be affected by the canal road widening. The ditch would be relocated and possibly replaced with gated pipe to service the orchard. Replacement habitat for the loss of 0.1 acre of wetland vegetation would be included in wetland mitigation for the fish passage. Precautions would be taken to avoid mature cottonwood trees and minimize disturbance. Some grasses and forbs would be lost through soil compaction, but re-vegetation efforts should rapidly mitigate this loss.

Wetland delineations, as defined in the 1987 Army Corps of Engineers Wetlands Delineation Manual, were conducted upstream and downstream of the Dam in the area proposed for fish passage. Field surveys identified about 4.5 acres of jurisdictional wetlands upstream of the Dam along the left riverbank. This wetland extends from the river's edge to the elevated bed of Interstate 70 for approximately 0.25 miles upstream of the Dam. Wetlands mitigation for projected impacts to 0.5 acres of jurisdictional wetlands would be developed in consultation with the Army Corps of Engineers and the Service. Potential wetland mitigation sites include DeBeque Wildlife Area and Grand Junction Wildlife Area. Both properties are along the Colorado River and are owned by Reclamation.

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 Dam upstream to Rifle, Colorado and downstream to the Price-Stubb Diversion Dam. The Service was consulted by memorandum dated June 15, 2000 requesting a list of Federally threatened and endangered species that may occur in the project area. The Service responded on July 17, 2000 with a list of five endangered and one threatened species. Federally listed species include the bald eagle (*Haliaeetus leucocephalus*), southwestern willow flycatcher (*Empidonax trailii estimus*), Colorado pikeminnow, razorback sucker, humpback chub (*Gila chypa*), and bonytail (*Gila elegans*). These species were evaluated in a biological assessment (U.S. Bureau of Reclamation, 2000).

The bald eagle, a regular winter visitor to the Colorado River corridor, occasionally perches and roosts in large cottonwood trees along the river. The migratory southwestern willow flycatcher is known to use patches of willow, salt cedar and small cottonwood trees in Mesa County from about May 1 to August 15. The riparian habitat along the river in the project area consists of primarily salt cedar and sandbar willow, with few scattered mature cottonwoods. The single story patches within the project area lack the diversity and are typically too small to be considered suitable habitat for breeding and nesting. Migrant flycatchers may use the project area but construction activities would be completed outside the nesting season.

The Service also identified issues concerning project impacts on wetlands, riparian areas and aquatic resources. These issues were addressed previously in this chapter. Reclamation's biological assessment concluded that the proposed project would have no effect on bald eagles and southwestern willow flycatchers. Endangered fishes are discussed in the next section.

The biological assessment was sent to the Service on August 9, 2000 requesting written concurrence. The Service issued a Biological Opinion dated February 8, 2001 (U.S. Fish and Wildlife Service, 2001; Attachment B) that concurred with the determination of no effect for the bald eagle and southwestern willow flycatcher. Potential for incidental take of the endangered fish was also discussed. Contracts would require work to stop if activities are thought to be affecting any listed species and the Service would be notified.

Other local wildlife may temporarily avoid the project area during construction, but construction of the fish passage and fish screen is not expected to have long-term impacts.

Effects on Endangered Colorado River Fishes

Issue: Providing passage at the Dam is needed to allow endangered and native fish access to upstream habitat, and providing a fish screen is needed to prevent fish from becoming entrained in the GHC. Passage actions are meant to complement other

Recovery Program efforts such as stocking of endangered fish, controlling competition or predation by nonnative fish, and restoring habitats.

Existing Conditions: The Dam prevents access by migratory fish to suitable upstream habitat. Two of the four endangered Colorado River fish species, the humpback and bonytail, are not known to occur in the reach of the Colorado River involved in the proposed project area. During the spring of 2000, the Recovery Program stocked sixty-five 14- to 18-inch Colorado pikeminnow and 10,998 4- to 11-inch razorback suckers near Parachute, Colorado (Burdick, 2000). The Colorado Division of Wildlife in cooperation with the Recovery Program also stocked 7,000 4-inch and 25 10-inch bonytail from Palisade to Grand Junction, Colorado in April 2001.

The affected reach of the Colorado River is within designated critical habitat for the Colorado pikeminnow and razorback sucker. These fish are known to occupy habitat downstream from the Price-Stubb Dam, but the Colorado pikeminnow is absent in the 50 miles of historic range from the Price-Stubb Dam upstream to Rifle, Colorado, and 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 razorbacks were collected from isolated ponds adjacent to the Colorado River near DeBeque. No young razorbacks have been collected in recent surveys of the Colorado River. Because little or no recruitment has been documented throughout the basin, propagation and stocking of razorback suckers is considered the highest priority among the four endangered fishes. The Recovery Program has approved a 5-year plan to stock additional numbers (130,000) of 6- to 12-inch razorbacks both upstream and downstream of the Dam. About 1,200 Colorado pikeminnow are also scheduled for stocking in the Colorado River from DeBeque Canyon to Rifle. In addition to stocking razorback sucker, Colorado pikeminnow, and possibly bonytail, the Recovery Program is developing and implementing plans to acquire and restore floodplain habitat and reduce competition and predation by nonnative fish.

Other native fish species found in the Colorado River include the 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 Price-Stubb Dam are absent upstream (Wydoski, 1994). Nonnative fish species include channel catfish, northern pike, red shiner, largemouth bass, bluegill, and black crappie. Black bullhead, smallmouth 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, green sunfish, smallmouth and largemouth bass, and northern pike are predators of the endangered fishes. Off channel ponds have been identified as a source of many of the nonnative fish 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). 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.

Impacts:

No Action: If no passage or fish screen were provided, a self-sustaining population of endangered fish would be less likely to develop via natural upstream recolonization. Stocked fish could enter the GHC, resulting in probable death or injury. 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 endangered fish cannot access upstream habitat, related Recovery Program efforts to acquire and restore floodplain habitats, stock Colorado pikeminnow and razorback sucker, and removal of nonnative fishes would be less effective.

Proposed Action: Both the rock and concrete fish passage alternatives would allow endangered and native fish to migrate upstream of the Dam. A fish passage constructed in 1996 at the Redlands Diversion Dam on the Gunnison River has provided upstream passage for about 36,400 fish, 93 percent of which were native fish. Of those fish, 47 were the endangered Colorado pikeminnow (U.S. Fish and Wildlife Service, 1999a). In 2001, 5 razorback suckers also used the Redlands fish passage (Burdick, 2002). Installation of a fish trap to allow selective passage would prevent upstream access by nonnative fish. Providing a fish screen in the GHC would prevent fish from entering the irrigation canals and Grand Valley Power Plant. Winter ice conditions may prevent operation of the screen from December through March. During the winter, fish stay in the deeper pools of the river, and it is less likely that fish would enter the GHC.

Reclamation concluded in its biological assessment that the proposed action 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 habitats would be affected in a beneficial manner. The fish passage would assure access to critical habitat used by the Colorado pikeminnow and razorback sucker to improve chances of recovery. Selective passage would also help maintain the current level competition and predation by nonnative fish. The fish screen would benefit the Colorado pikeminnow and razorback sucker by reducing the potential for canal entrainment.

Instream construction activities would be avoided from May to June to minimize impacts to endangered fish spawning and larval development. Incidental take may occur as a result of constructing and operating the fish passage and screen.

The Service in its Biological Opinion (U.S. Fish and Wildlife Service, 2001), concurred with the determination of ‘no effect’ for humpback chub, and “may affect, not likely to adversely affect” for Colorado pikeminnow, razorback sucker, and bonytail. The Service determined that while the proposed fish passage and screen will be beneficial overall to

these species, these fish species might be incidentally taken at the proposed facilities. The Service provided the following examples of how incidental take might occur:

- 1) Take may occur during project construction.
- 2) Take may occur when the screen is removed or there is not enough flow to operate the fish screen.
- 3) Larval fish will not be excluded from the canal, therefore, when spawning occurs upstream of the project site, larval fish may drift downstream, enter the canal, and be removed from the river or become impinged on the fish screen.
- 4) Endangered fish may be incidentally taken at the fish passage in the fish trap.
- 5) Endangered fish may become trapped on the intake grate of the inlet to the fish ladder.
- 6) After being released from the trap, endangered fish in an exhausted condition may fall back down over the dam.

In its Biological Opinion, the Service referred to the “Final Programmatic Biological Opinion for Bureau of Reclamation’s Operations and Depletions, Other Depletions, and Funding and Implementation of Recovery Program Actions in the Upper Colorado River above the Confluence with the Gunnison River” (PBO)(U.S. Fish and Wildlife Service, 1999b). The Service addressed incidental for the Grand Valley Project fish passage and screening as defined in the PBO as incidental take of Colorado pikeminnow, and razorback sucker when adults are taken in irrigation canals and municipal intakes is one percent of the latest adult population estimates above Westwater Canyon. The Service also requested that the entities that use the Dam and GHC to divert water sign a recovery agreement as described in the PBO to receive coverage for incidental take. The Grand Valley Water Users Association, Orchard Mesa, Palisade, and Mesa County Irrigation Districts, and Xcel Energy would sign recovery agreements. All entities have signed recovery agreements.

Effects to endangered fish under all fish passage and fish screen alternatives, with exception to the no action, are predicted to be beneficial, however authorized incidental take as described above may occur.

Cultural Resources

The area of potential effect for an investigation of cultural resource impacts is the Dam site and the GHC from the Dam to Tunnel No. 3. Prior to settlement and development of irrigation facilities, the area was part of the 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 1890, railroad tracks were extended along the Colorado River, past the future site of the Grand Valley Project Diversion Dam. The Dam and GHC system were completed in 1917 to supply water to the higher elevation lands of the Grand Valley.

Reclamation's review of reports and historic preservation actions for various undertakings in the area produced documentation of irrigation features of historic importance, including the Grand Valley Project Diversion Dam, Roan Creek Toll Road, and the Union Pacific Railroad. As a standard cultural resource protection measure, the fish passage and fish screen construction contracts would require work to be stopped if cultural resources are encountered. Work could not resume until measures needed to avoid or minimize adverse impacts to significant resources, are agreed to by the Colorado State Historic Preservation Officer (SHPO).

Protect Historic Dam and Canal

Issue: The Grand Valley Project Diversion Dam is listed on the National Historic Register of Historic Places, and the Government Highline Canal is eligible for listing. Federal agencies are responsible for ensuring that their actions do not adversely affect the historic qualities of these structures.

Existing Conditions: In 1985, the Colorado Historical Society determined that the Grand Valley Project Diversion Dam and Government Highline Canal were eligible for inclusion on the National Register of Historic Places (Colorado Historical Society, 1985). The Dam was nominated to the National Register in June 1991, and was listed on October 8, 1991 (5ME301). The GHC remains eligible for listing. Constructed between 1913 and 1917, the Dam is a concrete structure 14 feet in height, spanning a distance of 546 feet across the Colorado River. It was built in order to divert river flows into the 55-mile-long Government Highline Canal. The Dam incorporates a set of seven roller gates to control the river flow. It is the largest of only four such dams constructed in the United States. Additional details on the Dam and GHC were discussed previously in Chapter 2.

Reclamation defined the area of potential effect that includes all alternatives under consideration. Reclamation initiated compliance with 36 CFR 800.0, which is the process of identification and evaluation of historic properties within the area of potential effect; however, this process is not yet complete. Based on what has been identified so far, Reclamation has identified that there are historic properties present within the affected environment/area of potential effects. These include the dam and the government highline canal, but in addition there are cultural resources present that are being evaluated for eligibility to the National Register of Historic Places.

Impacts:

No Action: If no action were taken, no adverse effects to the historic qualities of the Dam or GHC would occur.

Proposed Action: Reclamation has determined, in consultation with the Colorado State Historic Preservation Officer, that the selection of the preferred alternative will result in an adverse effect on the historic design of the Grand Valley

Project Diversion Dam, but that there will be no effect to any other cultural resources within the project area.

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 Caucasian (Grand Junction Chamber of Commerce, 1997). Other ethnicities of persons in the area include Hispanic (8 percent); and Native Americans, Asians, and African Americans (all less than 1 percent).

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

Social and Economic Factors

Construction of the fish passage and fish screen 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 it is not expected to place a strain on public services such as schools or transportation.

Hydropower

Issue: The United States, Grand Valley Water Users Association, Orchard Mesa Irrigation District and Xcel Energy all benefit from revenues created from the sale of electricity generated at the Grand Valley Power Plant. Construction and operation of the fish passage and fish screen could affect the ability to divert water for the hydropower plant.

Existing Conditions: In 1931, Reclamation and Xcel Energy entered into a contract whereby Reclamation would design and build a hydroelectric power plant using funds provided by Xcel Energy. Construction of the plant began in March 1932, and was completed in March 1933. The plant was formally transferred to Xcel Energy on April 1, 1933, and immediately began producing electricity. The plant has two generators, producing 1,500 kilowatts each. The Dam and the upper portion of the GHC are used to

supply water to the plant year-round. Water rights for the plant are owned by the United States.

Approximately 4.6 miles below the Dam (just above Tunnel No. 3), between 770 and 800 cfs is diverted from the GHC for the plant and the Orchard Mesa Irrigation District. The water passes through the Colorado River siphon under the Colorado River and into the Orchard Mesa Power Canal. During the irrigation season, the plant uses about 310 cfs. 272 cfs is used for hydraulic pumps to lift irrigation water to the Orchard Mesa, and 188 cfs is delivered for irrigation. From November through March, the entire 800 cfs is used for Grand Valley Power Plant. Xcel Energy operates and maintains the plant. Revenues are divided between the Grand Valley Water Users Association, the Orchard Mesa Irrigation District, and Xcel Energy, with the association and districts' shares being used for the Grand Valley Project maintenance and improvements. Annual revenue for Grand Valley Water Users Association and Orchard Mesa Irrigation District vary from \$200,000 to \$250,000 per year.

The period between October and December generates the highest quarterly revenues between \$64,000 and \$72,600.

In addition, Xcel Energy has a non-consumptive use of approximately 70 cfs, which it diverts for cooling at the Cameo Generating Station. The Cameo Generation Station produces significant revenues.

Impacts:

No Action: The No Action Alternative would have no direct effect on hydropower production. However, taking no action could result in failure to make sufficient progress in Recovery Program efforts to restore endangered fish populations. This alternative could require additional consultation with the Service under the Endangered Species Act, which in turn could put water users at risk of assuming responsibility for compliance.

Proposed Action: Under all alternatives, construction and operation of the fish passage would have no long-term effect on hydropower production. To the extent possible, construction of the fish passage and screen would be coordinated to coincide with maintenance of the Grand Valley Power Plant to minimize impacts to hydropower production. Diversion for power production at the Grand Valley Power Plant would not be available during construction of the fish passage and fish screen (November 2003 through February 2004). Excel Energy has the ability to continue operations at the Cameo Generating Station without diversions from the Dam for extended periods; therefore no long-term effects are anticipated. Operation of the fish screen under the Below Cameo Alternative would reduce the amount of water available for hydropower production at the Grand Valley Power Plant for short periods of time during the summer when irrigation demands equal 1,310 cfs.

When this occurs, it may be necessary to take 50 cfs to operate the fish return pipeline from the 310 cfs normally used by the Grand Valley Power Plant.

Long-term effects to hydropower production under the Below Cameo Alternative are predicted to be infrequent and short in duration. The effects on hydropower are at least partially compensated by the Recovery Program's practice of delivering reservoir water to the Colorado River and allowing that water to be diverted to and through the power plant. The Above Cameo and Head Works Alternatives would have no long-term effect on hydropower production.

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 served as a reasonable and prudent alternative to water developments causing jeopardy to the endangered fish. Its existence has allowed the Service to issue favorable biological opinions on some 684 water projects in Colorado, Utah and Wyoming with potential to deplete more than 1.7 million 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 recover 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 uses, and a population of fish and wildlife. In 1996 an estimated 32,561 acres produced a crop value of \$14,585,985 (U.S. Bureau of Reclamation 1997b). Recovery of the endangered fish involves significant expense and controversy. Many believe the Recovery Program is the best method to avoid conflicts between endangered fish recovery and water development. Congress has demonstrated its support for the efforts through enactment of Public Law 106-392, dated October 30, 2000, which authorizes Reclamation to continue participating and funding activities in the Recovery Program. The Recovery Program would fully fund costs for construction and operation of the fish passage and fish screen. Others believe these funds could be better spent on schools, roads, or other public needs.

Impacts:

No Action: If no action is taken, fish passage would not be restored and fish entrainment in the GHC would continue to occur. It is unlikely that additional funds would be available for schools, roads or other public needs unless authorized by Congress. If efforts are not made toward meeting objectives of the endangered fish

Recovery Program, existing and future water development projects could be put at risk by conditions imposed under the Endangered Species Act. Since its inception, the Recovery Program has served as the reasonable and prudent alternative to mitigate for the adverse effects of some 683 water development projects in the Upper Colorado Basin.

Proposed Action: Reclamation estimates costs for concrete fish passage to be approximately \$2,400,000. The estimated cost to construct a fish screen in the GHC is \$6,600,000. These costs include all pre-construction activities, permitting, and construction.

Annual operation and maintenance costs are estimated to be \$25,000 per year for the fish passage and \$34,000 per year for the fish screen. Total construction costs are estimated to be about \$9,000,000 for both the fish passage and fish screen. Total annual operation and maintenance costs are estimated to be about \$59,000.

Summary and Mitigation Measures

In summary, the primary effect of the proposed action would be to allow endangered fish to migrate into upstream habitat and assist in the recovery of Colorado pikeminnow and razorback sucker. Migrating fish would also be protected from harm caused by entering the GHC. The proposed action 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 2 on the next page compares impacts for each issue discussed in this chapter.

Mitigation Measures

- 1) Reclamation has initiated consultation with the Colorado State Historic Preservation Officer (CSHPO) and other interested parties, to develop and evaluate alternatives that would avoid, minimize, or mitigate adverse effects on historic properties within the area of potential effects. This commitment will be formalized in a memorandum of agreement with the CSHPO.
- 2) To avoid unanticipated changes in water quality, the Clifton Water District and Ute Water Conservancy District would be advised of the construction schedule for the fish passage and fish screen.
- 3) Contacts with all affected landowners would be made before commencing any construction activities.
- 4) Reclamation and/or construction contractors would obtain Clean Water Act approvals before beginning work. Wetlands mitigation would follow approval by the Army Corps of Engineers and Service and would be concurrent.
- 5) 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.
- 6) All costs for providing fish passage and screening would be funded by the endangered fish Recovery Program.

- 7) Reclamation and the contractor would coordinate with the Colorado Department of Transportation to develop appropriate traffic control measures to protect the public traveling along Interstate 70 and provide safe access to the construction site.
- 8) Final project designs would be reviewed by the Grand Valley Water Users Association to ensure project designs are compatible with the operation and maintenance of the Dam and GHC.
- 9) Reclamation would minimize impacts to the peach orchard and the adjacent property owners, Herbert and Thelma Hays. Commitments in the License Agreement dated March 12, 2003 are also be environmental commitments.
- 10) Reclamation and its contractors would follow “best management practices” including dust abatement, erosion control, and revegetation of disturbed areas with the appropriate grass mixtures.
- 11) Reclamation would provide information and final designs to Mesa County for construction activities within the 100-year floodplain.

		Fish Passage Alternatives		Fish Screen Alternatives		
Affected Environment	No Action	Rock Fish Passage Alternative	Concrete Fish Passage Alternative	Head Works Fish Screen Alternative	Above Cameo Fish Screen Alternative	Below Cameo Fish Screen Alternative
Water Resources (Pg. 22)						
Water Rights and Uses (Pg. 22)	Potential Adverse Effect	No Effect	No Effect	No Effect	No Effect	May Effect
Water Quality (Pg. 23)	No Effect	Short-term Effect	Short-term Effect	Short-term Effect	Short-term Effect	Short-term Effect
Recreation Resources (Pg. 24)						
River Boating (Pg. 24)	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Land and Facility Resources (Pg. 25)						
Protect Existing Structures (Pg. 25)	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Access (Pg. 27)	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Unique Geographical Features (Pg. 28)						
Prime or Unique Farmland (Pg. 29)	Potential Adverse Effect	No Effect	No Effect	No Effect	Short-Term Effect	No Effect
Floodplain and Wetlands Protection (Pg. 28)	No Effect	Loss of 2.5 acres of Wetlands	Loss of 0.5 acres of Wetlands	Loss of < 0.5 acres of Wetlands	No Effect	No Effect
Fish and Wildlife Resources (Pg. 29)						
Effects on Endangered Colorado River Fishes (Pg. 30)	Adverse Effect	Beneficial Effect	Beneficial Effect	Beneficial Effect	Beneficial Effect	Beneficial Effect
Cultural Resources (Pg. 33)						
Historic and Cultural Properties (Pg. 33)	No Effect	May Effect	May Effect	May Effect	No Effect	No Effect
Indian Trust Assets (Pg. 35)						
	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Environmental Justice (Pg. 35)						
	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Social and Economic Factors (Pg. 35)						
	Potential Effect	Short-term Effect	Short-term Effect	Short-term Effect	Short-term Effect	Short-term & Potential Long-term Effect

Table 2 – Comparison of Fish Passage and Fish Screen Alternatives

CHAPTER 4 – CONSULTATION AND COORDINATION

Plan Formation and Public Scoping Activities

Plans for providing fish passage at the Grand Valley Project 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 has formally and informally discussed with water users the need to provide fish passage, and more recently, fish screening.

In October 1999, a scoping bulletin was mailed to 124 agencies, individuals and organizations who could potentially be affected by the proposed project or who could be expected to have relevant information on the project. The bulletin announced Reclamation's intention to prepare a draft environmental assessment, described the proposed fish passage, and requested that recipients respond with their comments and concerns about the project.

Reclamation announced the project in an October 25, 1999 news release that resulted in an article on the subject appearing in the local newspaper (Daily Sentinel, 11/1/99). A local television station aired a news story about the project on October 28, 1999.

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

- State Historic Preservation Officer
- Grand Valley Water Users Association
- Orchard Mesa Irrigation District
- Palisade Irrigation District
- Mesa County Irrigation District
- Ute Water Conservancy District
- Clifton Water District
- U.S. Fish and Wildlife Service
- Union Pacific Railroad
- Colorado Department of Transportation
- Colorado Department of Natural Resources
- Colorado Water Conservation Board
- Xcel Energy
- Colorado Division of Wildlife
- Bureau of Land Management
- Gary Lacy, Recreation Engineering & Planning; Pete Atkinson, Whitewater West
- Jerry Nolan
- Herbert and Thelma Hays
- Colorado River Front Commission

Comments on Draft EA

The following comments were received on the Draft Environmental Assessment distributed for public review and comment on March 11, 2002. Only comments related to the draft environmental assessment and the proposed action of constructing fish passage at the Grand Valley Project Diversion Dam and fish screen in the Government Highline Canal are addressed in this section. Comments and responses are provided below. Comment letters are maintained in the project files.

Xcel Energy-March 19, 2002

Xcel Energy provided the following comments on the draft EA:

Comment 1. The Draft EA incorrectly states the amount of water that the Cameo Station diverts and returns to the Government Highline Canal. The actual rate of flow of water diverted and returned to the Government Highline Canal by the Cameo Station is approximately 74 cfs. In addition, please note the correct spelling of Xcel Energy.

Response 1. The 30 cfs used in the draft EA was changed to 74 cfs. Also Excel Energy was changed to Xcel Energy.

Comment 2. The Draft EA states that construction activities may affect the ability to divert water during portions of the construction period. We understand the construction period will be between November 8, 2002, and March 25, 2003. The Draft EA correctly states that Xcel Energy has constructed alternate methods of cooling that can be used during canal outages and that impacts due to canal outages are expected to be minimal. Use of the canal as authorized by Contract No. 02-WC-40-8010 is the preferred method for providing cooling water to the Cameo Station. Our primary concern about canal outages is the amount of energy that can be produced at the Grand Valley Power Plant would be reduced. We request the Bureau of Reclamation to manage the screen installation in such a manner that water could continue to be available to the Cameo Station and the Grand Valley Power Plant to the maximum extent practicable during construction. Specifically, we support the Orchard Mesa Irrigation District and the Grand Valley Water Users Association and urge the Bureau of Reclamation to install a permanent horseshoe bypass around the screen installation area. This bypass would ensure more flow to the Grand Valley Power Plant and more hydropower production during screening installation.

Response 2. Dewatering of a portion of the Government Highline Canal during the construction of the fish screen and fish passage is necessary. Reclamation will work with contractors to minimize the dewatering period. A bypass channel around the fish screen has been added to reduce the canal downtime during construction and maintenance. The bypass will also assist with fish screen icing and may allow for additional screening operations.

Comment 3. In addition, a permanent bypass would reduce impacts associated with a wild horse herd in the area. A natural beach on the Government Highline Canal south of Tunnel #2 allows the horses to walk into the canal for water. Any change in bank scouring due to the screen project would put the horses in increased danger of falling in the canal while attempting to reach water. We understand that Orchard Mesa Irrigation District personnel have found several dead horses in the power canal.

Response 3. Reclamation evaluated Above Cameo Fish Screen Alternative (south of Tunnel #2) where horses water at the canal. Difficulty in designing the bypass pipe, crossing the railroad, water to operate the fish return pipeline, and permanent access were factors in choosing the Above Cameo Fish Screen alternative over the Below Cameo Fish Screen Alternative. After additional review, it was thought that the heated water returned to the canal from the Cameo Plant would provide only about 2 weeks of additional screening operation. This would occur during a period when fish movement is minimal. Moving the fish screen closer to the diversion dam would eliminate approximately 3 miles of canal and two canal siphons which the fish would have to navigate before being returned to the river. As mentioned in Response 2, Reclamation has added a permanent canal bypass channel around the fish screen design.

Comment 4. The Draft EA states that flows available for the Grand Valley Power Plant would be reduced by 10 to 70 cfs during high irrigation demand, because these flows would be required to operate the fish screen. We urge the Bureau of Reclamation to consider design alternatives that would minimize the amount of water required for the fish screen operations, and thus minimize the losses to hydropower.

Response 4. As stated in Response 3, Reclamation has selected the Above Cameo Fish Screen Alternative as its preferred alternatives after additional review. The initial reach of the canal above the Asbury Creek Siphon is capable of carrying the additional 50 to 70 cfs of water needed to operate the fish return pipeline. This alternative minimizes the amount of water required to operate the fish screen fish return pipeline.

Colorado River Energy Distributors Association-April 9, 2002

The Colorado River Energy Distributors provided the following comments on the draft EA:

Comment 1. As you recall, we will develop a distinct likelihood of “take” by the diverter and this will result in a requirement to screen (since a reality) as mitigation. Screening is not feasible for young larval fish migrating downstream but could be useful for juveniles. The screen now being proposed is intended to keep out juveniles and not larvae. These screens become a huge maintenance cost and depending on the arrangement, may impact the RIP budget. We thought USBR/FWS should recognize this up front when preparing the EA and Section 7 BO by somehow allowing the possibility of “take” and this may still be the thing to do (perhaps a Conservation Agreement with Assurances).

Response 1. When fish passage was restored at the Grand Valley Irrigation Company (GVIC) Diversion Dam, the U.S. Fish and Wildlife Service, through its biological opinion, identified screening canals as a reasonable and prudent measure to reduce incidental take. In addition, the Service identified screening canals as a reasonable and prudent measure to reduce take in the “15 Mile Reach” Programmatic Biological Opinion as discussed in the EA. The Recovery Program was required (non-discretionary action) to design, construct, and maintain fish preclusion devices to prevent or reduce adult and sub-adult fish (>300 mm total length) from entering major irrigation diversion systems (Grand Valley Irrigation Company Canal and Government Highline Canal).

Recovery agreements as outlined in the “15 Mile PBO” have also been used to provide incidental take and Section 7 coverage for parties involved.

Eric R. Jacobson-April 6, 2002

Mr. Jacobson provided numerous comments regarding his proposed FERC-4515 project at the Price-Stubb Diversion Dam. Reclamation has responded to these comments previously. Only comments related to the draft EA and the construction of a fish passage at the Grand Valley Project Diversion Dam and fish screen in the Government Highline Canal are addressed in this document. Mr. Jacobson’s comments are as follows:

Comment 1. A 95% passage requirement should be added to the final draft of the GVP-EA especially for the USBR Palisade power plant and the turbine driven OMID pumping plant; USFWS has already made a determination that 95% turbine passage is “reasonable and prudent.” A vague/open ended “incidental take” statement is unenforceable and unacceptable.

Response 1. Requirements for new and existing facilities are not the same. The FERC 4515 was a proposed new facility.

Comment 2. Dam removal must be examined; elimination of long and un-necessary diversions/depletions should be considered in the final draft of the GVP-EA. Elimination of dewatered river reaches has been determined to be “reasonable and prudent” by Interior.

Response 2. Dam removal was considered in the EA and eliminated from further analysis because the cost of constructing and operating a pumping plant (energy consumption) was prohibitive. Criteria used to develop alternatives for fish passage at the Grand Valley Project Diversion Dam are stated on pages 2 & 3 of the draft and final EA.

Comment 3. GVP shut down during target fish stocking periods must be added to the final draft to the GVP-EA. USFWS has previously determined that such a shut down is “reasonable and prudent”.

Response 3. As stated in Comment 1, FERC 4515 is a proposed new facility while the GVP is an historic existing facility. A fish screen constructed in the Government Highline Canal that will return fish to the river just downstream of the diversion makes it unnecessary to shut down diversions during stocking. The Service in its Biological Opinions requires the screening of adult and sub-adult fish (>300 mm in total length).

Comment 4. 365 day per year operation of the passage structure should be addressed in the final draft of the GVP-EA. USFWS has previously determined that 365 day per year operation is “reasonable and prudent”.

Response 4. Again the comparison is between a proposed new and an existing facility. Water rights serviced by the GVP include Palisade Irrigation District (1889, 1918), Mesa County Irrigation District (1898, 1903), Orchard Mesa Irrigation District (1907), Grand Valley Water Users Association (1908), United States (1914). The EA states that the fish passage will be designed to operate at river flows sufficient to divert 1,670 cfs, which would not conflict with existing water diversion rights. If the river falls below this level, Grand Valley Water Users Association (the dam operator) in discussion with Reclamation and the Service may elect to close the passage.

Comment 5. The final draft of the GVP-EA must establish once and for all optimum rise/chamber size/operating parameters/schedule for concrete ladders pertaining to the target fish and utilize the optimum size for the Final EA. This sizing should be deemed “reasonable and prudent” and be applicable to both GVP and FERC-4515.

Response 5. The fish passage design that was used follow the National Marine Fisheries Service design criteria and consultation with the Service.

Comment 6. The final draft of the GVP-EA must examine canal dewatering mortality on all fish species, promulgate a plan for ameliorating this man-made reduction in the fishery, and examine efforts/consider solutions to the silt sluicing operation.

Response 6. The proposed fish screen in the Government Highline Canal is the reasonable and prudent measure identified by the U.S. Fish and Wildlife Service to reduce incidental take. The fish screen is designed to meet and will exceed the Service’s requirement to screen adult and sub-adult fish (>300 mm). The screen size proposed for use in the Government Highline Canal is 2.4 mm. Dam sluicing operations are outside the scope of the environmental assessment.

Comment 7. Any passage alternatives, which are more costly than the least cost alternative must be funded by project beneficiaries (as per Interior’s own statements). Installation of the requisite fish trap will be made more difficult with the rock fish passage; stress/mortality studies need to be conducted to ascertain the effect of differences in passage design on target fish, including the effects of passage dewatering for daily fish trap clearing operations.

Response 7. Reclamation has selected the least cost alternative for fish passage.

Comment 8. Recreational boat passage is reasonable and prudent and should be required at GVP.

Response 8. The draft EA stated: “Public safety, liability, interference with operations of the Grand Valley Project, and security issues would need to be addressed before Reclamation could consider authorizing portage at the Dam.”

Comment 9. Disparities in requisite project feature funding shows favoritism, is unfair, and violates the fundamental right of equal protection.

Response 9. The commenter may be confused about requirements for proposed new facilities verses existing facilities.

Comment 10. USFWS has already determined that it is “reasonable and prudent” for the needs of target T and E fish to take precedence over the needs/sensitivities/economic viability of diversion dam operators. This determination should not have “case exceptions” for Federal projects.

Response 10. Reclamation consulted with the USFWS on the proposed project. A copy of the Service’s Biological Opinion is attached in the Appendices.

Comment 11. Introduction of a negative species mix in critical T and E fish habitat is contrary to the goals and objectives of the recovery plan and is patently not “reasonable and prudent.” The requisite fish trap should be at the Price-Stubb.

Response 11. The Biological Committee of the Recovery Implementation Program identified that selective passage was needed at either the GVP Diversion Dam or Price-Stubb Diversion Dam. It may not be feasible to provide selective passage at the Price-Stubb Diversion Dam.

Comment 12. Passage operations should have first call on water in times of shortages; USFWS has previously determined that such a first call is “reasonable and prudent.”

Response 12. The State of Colorado administers calls on the river. Water rights are administered by priority dates.

Comment 13. GVP should use best available technology for target fish protection; best available technology is mandated by NEPA. Interior is perhaps not capable of policing itself in regards to this issue and may need the outside purview of a non-Interior regulatory agency.

Response 13. The best available technology is being used and applied to the development of fish passage and fish screen designs at the GVP Diversion Dam.

Mesa County Department of Planning and Development-April 9, 2002

Comment 1. Mesa County requires a floodplain permit for any construction activity that takes place in the Colorado River floodplain. The *Mesa County Land Development Code 2000*, section 7.13 through 7.13.11 contains specific criteria necessary to obtain this permit. Further, it is necessary to obtain this permit prior to initiating any construction activity.

Response 1. Reclamation will submit all necessary needed information to Mesa County.

Comment 2. The County may require an administrative site plan review for temporary use activities in the construction staging area. Sections 3.5 and 3.5.11 of the *Mesa County Land Development Code 2000* provide the information necessary to obtain this clearance.

Response 2. As stated in Response 1, Reclamation will submit all necessary needed information to Mesa County.

Comment 3. The County requests that you include a weed management plan (including follow-up control measures) as an element of the reclamation plan for the staging area and the wetlands mitigation area.

Response 3. Noxious weed control is addressed in the construction specifications and Reclamation has Integrated Pest Management for each of its properties that meet Federal requirements.

Comment 4. As a general heads-up, Mesa County requires an access permit for any access to and from county roads. Additional county permits that may be required include: grading, building, surface disturbance permits for work within County rights-of-way.

Response 4. Reclamation and/or the construction contractor will obtain any required permits prior to constructing the fish passage and fish screen.

Orchard Mesa Irrigation District – April 11, 2002

Comment 1. It is mentioned several times that water is diverted year round to operate the Grand Valley Power Plant. OMID, GVWUA, Xcel Energy and the Bureau of Reclamation share in revenues from the power generation and cooling water. It is mentioned that water diversions from the river may not be possible during construction of the passage and screen. The operation of the power plant in the winter months produces the most net revenue to all parties involved. There is no mention to compensate the parties involved with the power plant for the loss of revenue if water is not diverted during construction of the passage and screen. The loss of revenue to OMID alone will be between 8 and 10 percent of the district's annual O&M budget not to speak of the loss of revenue to GVWUA and Xcel Energy.

Response 1. It has been the position of the Upper Colorado River Recovery Implementation Program for Endangered Fish, that the Recovery Implementation Program will not authorize payment for power interference. If this position is unacceptable, the District should request reimbursement from the Recovery Program.

Comment 2. It states in the draft EA and the Colorado River Biological Opinion that actions of the Fish Recovery will not be injurious to water users. OMID considers the loss of revenue from power generation as injury. On page 20 of the draft EA it mentions that when the irrigation demands equal 1310 cfs that power water will be decreased to insure operation of the fish screen. It further states that this action should be infrequent due to the Grand Valley Water Management Plan. OMID does not see that the reduction in power water to operate the fish screen as being infrequent. Irrigation water demands reach the 1310 cfs level annually. With less water available to operate the power plant this will decrease power revenues in the summer months.

Response 2. As discussed previously, Reclamation has re-evaluated the fish screen location and has selected the Above Cameo Alternative as the Preferred Alternative. The Government Highline Canal above the Asbury Creek Siphon is capable of carrying the additional water needed to operate the fish return pipeline without affecting the 1,620 cfs used by the canal parties.

Colorado Department of Natural Resources – April 12, 2002

The Colorado Department of Natural Resources provided the following comments on the draft EA.

Comment 1: The Department agrees with the Rock Fish Passage as the preferred alternative, for all the reasons stated on page 11 of the Environmental Assessment. In particular, this alternative has the biological benefit of allowing the fish to re-enter the river at a point high enough upstream from the dam to accomplish their passage while reducing the likelihood of fish falling back over the dam.

Response 1: Discussion of selection of the preferred alternative is discussed in the EA. The concrete fish passage was moved to extend further upstream to address concerns with and reduce the incidence of “fish fall-back” over the dam.

Comment 2: The Department must raise serious questions about the preferred alternative of the “Below Cameo” fish screen as preferable in all cases. We suggest the Bureau reconsider the Head Works fish screen as the preferable alternative because of the necessity of bypass flows into the Government Highline Canal to operate the fish screen and because of the threat of entraining endangered fish over the course of 4.5 miles of the Canal before returning the fish to the river.

The Environmental Assessment states that 50 to 70 cfs in fish return pipeline would be necessary to operate fish screens in the Canal. There is some question about the

availability of these flows during high irrigation demand, and the Assessment assumes that flows available to hydropower in the Cameo Generating Station would be reduced in order to assure the proper operation of the fish screen. We must raise the issue of the availability of bypass flows apart from the hydropower flows, especially in low-flow drought conditions.

Response 2: As discussed in the draft EA, Reclamation examined placing the fish screen at the Canal Head Works. This alternative was not chosen because of the difficulty of protecting the screen from large debris in the river and winter icing. Submerged logs and trees are commonly seen in the river, which would cause severe damage to the screen and affect dam operations. The Headworks alternative would also require the construction of a temporary cofferdam in the river each time fish screen maintenance activities were needed making this alternative impractical. Initially, the Below Cameo location was selected because the expected benefits of a lengthened screening season. After additional review, it was determined that the screening season would likely only be increased by two to three weeks. Therefore, Reclamation selected the Above Cameo location, which allows the fish to be returned to the river quickly (within the 1st mile of the canal) and because the initial reach of the canal is capable of carrying the needed additional bypass flows to operate the fish screen without affecting downstream canal deliveries.

Colorado Water Conservation Board – April 12, 2002

The Colorado Water Conservation Board provided the following comments on the draft EA.

Comment 1. Page 2, 2nd Para: Revise as follows, “ Access to upstream habitat of these migratory endangered fish has historically been blocked by three irrigation diversion dams on the Colorado River mainstem above the Gunnison River confluence (see Frontispiece Map).

Response 1. This change was incorporated into the final EA.

Comment 2. Page 2, 3rd Para: Please indicate when a decision on the Price-Stubb fish passage will likely be reached.

Response 2. A supplement draft EA for the Price-Stubb fish passage was released for public comment in August 2002. Reclamation plans to finalize NEPA compliance for the Price-Stubb fish passage in the spring/summer of 2003 and begin construction in winter 2004/2005.

Comment 3. Page 3, Need: Revise as follows, “Action is needed to restore access to critical habitat upstream of the Grand Valley diversions for the Colorado River endangered fish and to make sufficient progress towards establishment of self-sustaining populations of these endangered Colorado River fishes.”

Response 3. This change was incorporated into the final EA.

Comment 4. Page 3. Purpose: Revise as follows, “ The purpose of the Grand Valley fish passage project and fish screen are to further the goals of the Upper Colorado River Recovery Implementation Program.”

Response 4. This change was incorporated in the final EA.

Comment 5. Page 11, Preferred Alternative: Need to briefly identify the biological benefits that justify the increased cost.

Response 5. Additional detail was added to this section, and the preferred alternative was changed in the Final EA.

Comment 6. Page 14, Table 1: Please identify the source for the additional 10-70 cfs needed to operate the fish screen. Will this operation have any impacts, good or bad, on the Orchard Mesa Check Settlement or operations of the historic user pool in Green Mountain Reservoir? We do not believe there are any water right issues created by this operation, but such should at least be addressed. Again, we do not believe that there are any canal capacity issues created by this operation, but that too should be addressed. Also, please identify whether or not the fish screens will need to be operated year round or whether partial year operation is acceptable.

Response 6. In the Final EA, the Above Cameo Fish Screen Alternative was selected. This alternative would require 50 cfs, which would be diverted in addition to the historic 1,620 cfs diversion. The 50 cfs diversion would be returned to the river via the fish return pipeline. None of the fish screen alternatives is predicted to affect the Orchard Mesa Check Settlement or operations of the historic user pool in Green Mountain Reservoir. If necessary, releases of water from Ruedi Reservoir and/or Wolford Mountain Reservoir can be used to operate the bypass pipeline during periods of time when the river is under administration.

During consultation with the U.S. Fish and Wildlife Service, Reclamation identified that the fish screen would be removed for maintenance and during times of heavy icing in the canal. Fish screen operations were identified in the biological assessment as April to November each year. Fish screen operations would be dependant on water temperature and canal icing.

Comment 7. Page 14, Construction: There are no conceptual drawings for the construction of the fish screen, only locations. We would like to know what the screen and return to river look like. Are there any right-of-way issues with the railroad given that this is one of the primary routes? Are there any return design considerations between the canal and river that should be identified (e.g. slope, amount of fall or distance)?

Response 7. Additional detail was added to both the Design and Construction Sections regarding the fish screen in the final EA. A conceptual drawing of the fish screen was also added to the final EA.

Comment 8. Page 15, O, M & R: What is the estimated annual costs, who will pay, are these costs covered by the O, M & R contract between the CWCB and the GVVUA? Alternatively, refer reader to page 35 for this discussion.

Response 8. Additional detail was added to the O, M & R Section and reference to the Cost/Benefit Section.

Comment 9. Page 16, Water Supply: Please discuss the water supply for the fish screen operation in a little more detail. It needs to be clear that this supply is different for the in canal location and also separate from the supply used for the fish passage (which rides on water that is passed through to GVIC). People need to be clear on who may and may not be impacted.

Response 9. Additional detail was added to the Water Supply Section. See also response to Comment 6.

Comment 10. Page 19, Water Resources: Please discuss briefly the Orchard Mesa Check Settlement and Green Mountain operations and note whether or not the operation of the fish passage and screen will have an impact.

Response 10. The Orchard Mesa Check Settlement and Green Mountain Historic User Pool are not affected by the proposed action; therefore they are not discussed in the EA.

Comment 11. Page 36, Table 2: Please refer the reader to a page when an effect is identified.

Response 11. Table 2 was modified to incorporate the comment.

Comment 12. Is it appropriate to add the Colorado River Recovery Program and participants to the consultation and coordination list? If so, Colorado Department of Natural Resources and the Colorado Water Conservation Board should be added.

Response 12. These agencies, as well as others, were added in the final EA.

Bob Cron – April 12, 2002

The following comments were provided by Mr. Bob Cron.

Comment 1. I am struck by the Page 5 statement that “The dam has historically posed a significant threat to all forms of water recreation...” And yet, apparently, the Bureau feels no need to mitigate the hazard, which they created. What better time to consider meeting the challenge of designing a fish passage which would also be usable by rafts and kayaks or at least a portage next to Highway 70. The work could be completed at the same time as the fish passage with great savings in expenditures and with just one intrusion on the site. The Bureau should budget to eliminate the existing safety hazard at

the dam and take advantage of this opportunity to meet their obligations in one project by supplementing the Recovery Program with Bureau funds.

Response 1. The Endangered Species Recovery Program was established to recover the endangered fish in the Upper Colorado River Basin. The Program has sought and obtained special legislation to achieve that goal. Funds were appropriated from Congress for that explicit purpose; therefore boat passage is outside the scope of this proposed action. Furthermore, Reclamation does not have alternative funding to provide boat passage which would be very expensive at this site. Using these funds to resolve recreational issues is not appropriate. If recreational interests, such as the Colorado Riverfront Commission, want to pursue boat portage at the Grand Valley Project Diversion Dam, the proper venue would be to meet with Bureau of Reclamation operation staff and the Grand Valley Water User's Association.

Comment 2. I also recommend revising the boatable fish passage structure section on page 17 to include analysis of a portage. In addition, the last sentence of this section which says, "this alternative would increase safety issues with the Dam operations and potential boaters who miss the passage would be swept over the Dam through one of the other bays" should receive additional thought. I contend that the current situation is the greater safety risk since there is no alternative now if one misses pulling out. You are swept over period.

Response 2. Discussed in Response 1.

Comment 3. Chapter Four, page 37. I am surprised to see that the Colorado Riverfront Commission was not one of the organizations on your contact list. The Commission is appointed by Mesa County and the municipalities in the Grand Valley to advocate and coordinate a Colorado River greenway through the length of Mesa County. That mission includes the site of your project.

Response 4. The Colorado Riverfront Commission, along with 150 other agencies, organizations, and individuals were contacted during public scoping to participate in this project. The Colorado Riverfront Commission was included in the mailing list in Appendix A and has been added to Organization Contact List in the final EA.

Colorado Division of Wildlife – April 12, 2002

The following comments were provided by the Colorado Division of Wildlife on the draft EA.

Comment 1. Based on available literature, it would appear that the most important seasons and life history attributes to be impacted by the passage device would include May-June spawning movements by adult Colorado pikeminnow and upstream dispersal movements by late-juvenile/early adult Colorado pikeminnow in July and August. Since razorback sucker have used the Redlands fish passage structure, it is logical to expect similar and expanded use of this structure. It is important to ensure that the operational

period for this passage structure corresponds to maximum opportunity for the endangered fish species to move upstream in accordance with life history behavior and needs.

Response 1. The proposed fish passage operation as identified in the Final EA is April through October. The U.S. Fish and Wildlife Service will operate the passage and adjust operations as needed to maximize opportunity for fish use of the passage.

Comment 2. For the proposed fish screen, it is not clear what the mesh screen size is expected to be and the smallest size fish expected to benefit from prevention of entrainment into the canal. Considering that spawning by wild Colorado pikeminnow and razorback sucker is likely to occur above this canal intake, it is important to specify if the screening goal is to reduce entrainment by larval and young-of-the-year life stages or not. We do support the proposal that screening is necessary to prevent entrainment since current Recovery Program efforts to establish pikeminnow and razorback sucker populations above this diversion dam will likely increase the risk of entrainment and mortality in the canal. Similar to the studies conducted to determine optimal operation of the passage structure, research will be required to determine the optimal operation period for reducing entrainment into the canal. Icing problems may not be a factor if movement of native fish into the canal is negligible in the fall-winter seasons.

Response 2. The proposed fish screen will use 3/32" wedge wire to preclude fish from entering the canal. The final programmatic biological opinion for Bureau of Reclamation's Operations and Depletions, Other Depletions, and Funding and Implementation of Recovery Actions in the Upper Colorado River above the Confluence with the Gunnison River, and the biological opinion issued for the fish passage and screen the Service stated the following:

“The Recovery Program will design, construct, and maintain fish preclusion devices to prevent or reduce adult and sub adult (≥ 300 mm total length) from entering the existing major canal diversion systems (Grand Valley Irrigation Canal and Grand Valley Project Diversion Dam [Government Highline Canal]).”

The 3/32" wedge wire screen computes to a 2.4 mm mesh screen capable of screening all but eggs and small larval fish. The Recovery Program is also required to develop a plan to monitor the amount of incidental take at the fish passage and fish screen. The Grand Valley Project Diversion Dam Fish Passage biological opinion is in the appendices of both the draft and final EA.

Comment 3. We have also concluded that there will be some minor loss of wetlands and riparian vegetation in the construction area, but propose this can be mitigated by replanting native trees, shrubs, grasses, etc.

Response 3. As identified in the Final EA, Reclamation expects impacts to 0.5 acres of wetlands as a result of the fish passage and fish screen. Reclamation is consulting with the Army Corps of Engineers and the Service and would submit a dredge/fill permit

application under Section 404 of the Clean Water. Proposed mitigation for wetland losses is located at the DeBeque Wildlife Area.

Comment 4. We want to emphasize that preventing unrestricted fish passage is an absolute requirement in any alternative selected in order to keep channel catfish from expanding their distribution upstream.

Response 4. Proposed fish passage at the Grand Valley Project Diversion Dam will have restricted passage to prevent upstream movement by non-native fish.

Comment 5. The EA needs to be updated to state that approximately 7,000 four-inch bonytail and 25 ten-inch bonytail were stocked into the Colorado River from Palisade to Grand Junction in April 2001. Stocking was done by the Colorado Division of Wildlife in cooperation with the Recovery Program.

Response 5. The April stocking was added to the final EA.

Herbert and Thelma Hays Comments

The following comments were provided by Mr. Jack Hays on July 2, 2002.

Comment 1. The Hays residence water is provided by a water well located about 50' south of the house. The main source of water to the well is most likely from the canal. The source of water to the well cannot be confirmed. However, to construct the screen the water flow in the canal apparently will be shut off completely for an unknown period of time. The possibility of loss of access to water from the well should be considered. Therefore the BOR should be required to include a plan to provide water to the Hays residence in the event the water well ceases to function due to screen construction.

Response 1. During construction of the fish passage and fish screen the GHC will be dewatered for about a 4-month period from November 2003 through February 2004. Additional work will be completed during the normal spring and fall canal maintenance, which typically last from 2 to 4 weeks twice a year. Reclamation is under no obligation to provide access to water caused by canal seepage. However, if the water well becomes a problem, Reclamation will work with the Hays to haul water if water was not available while the canal was out of service.

Comment 2. Construction of the screen at this location would have a direct and detrimental affect on existing producing farmland (peach orchard). A plan to compensate for possible financial loss, and restore the affected area should be drafted and presented for approval.

Response 2. This issue was addressed the License Agreement between Herbert and Thelma Hays and Reclamation signed on March 12, 2003.

Comment 3. A headgate necessary to irrigate private property is located at or near the location of the screen. A plan to install a new headgate (if needed) should be drafted and presented for approval. Furthermore, in the event a new headgate is required, it must be installed in a timely manner to be available at the start of the growing season.

Response 3. Once final design of the fish screen is completed, Reclamation would work with the Grand Valley Water Users Association to ensure that irrigation water deliveries are not interrupted. This will involve the permanent relocation of an existing headgate on Reclamation Withdrawn Land.

Comment 4. Regarding the debris caught by the screen. It is noted in the environmental statement that most of the floating debris will simply be directed to the outflow pipe and return to the river. Based on what we know about the design of the screen the possibility of this actually occurring with any success is extremely unlikely. In fact there will be a large volume of material that will not return to the river via the outflow pipe. Such as material to large or material that floats on the surface held against the screen by the water flow. All material not exiting via the outflow pipe must be removed manually with large equipment. After the material is removed it presents another problem because it must be loaded and transported to a disposal site. Based on the above-mentioned facts. A plan to for removal, transportation and disposal of all material that does not exit via the outflow pipe should be drafted and presented for approval. The plan should consider the resulting increase in heavy traffic and dust as well as an increase in road and bridge maintenance.

Response 4. An automated trash rack located upstream of the fish screen is included in the fish design to remove large material prior to reaching the screen. Automated screen brushes and an air burst system are also incorporated in the screen design to assist in removing debris caught by the screen. The Grand Valley Water Users Association, who currently operates and maintains the GHC under contract with Reclamation, would perform operation and maintenance activities associated with the fish passage and fish screen. It is anticipated that most of the material removed by the automated trash rack and fish screen would be wood, leaves and other organic material. This material would likely be piled, dried and burned on-site. The automated trash racks are upstream of the fish screen on Reclamation property.

In addition, GVWUA has committed to upgrade the existing bridge that crosses Asbury Creek next to the Hays residence.

Comment 5. The possibility of the outflow pipe becoming plugged entirely or partially should be considered. Because the current design directs all material into the pipeline plugging or flow restriction can certainly occur. A plan to clean out the flow pipe should be drafted and submitted for approval. The plan should include method, cost estimate and impact on private property.

Response 5. See Response 4. In addition, a bypass channel that could carry the entire 1,620 cfs flow around the fish screen site was incorporated into the fish screen design.

Estimated cost of annual operation and maintenance costs and contracts are discussed in the Alternatives Chapter of the Final EA.

Comment 6. It is our contention that locating the screen at the dam has not been given thorough consideration. If the screen were designed to operate at the point where the water enters the canal many problems that are present with the downstream screen are eliminated. The following advantages have not been considered...”the screen can be designed to back flush for cleaning”...”ice will cause problems no matter where the screen is located”...”more fish will be saved by placing the screen at the point of entry”...if the outflow pipe were ever to plug up entirely or if flow is partially restricted the cost of cleaning out the pipe will without question be very costly”.

Response 7. All screen sites were evaluated in the EA. The headworks site was determined to not be feasible because of ice and debris in the river, loss of head as water enters the canal (would affect the ability to divert the 1,620 cfs into the canal), the need for a temporary cofferdam each time fish screen maintenance activities are performed, and the adverse affect to the historic properties of the Diversion Dam.

Consultation with Other Agencies

Reclamation staff continues to informally coordinate and consult with the Service to comply with the Fish and Wildlife Coordination Act and Endangered Species Act; the Army Corps of Engineers and Colorado Water Quality Control Division to comply with requirements of the Clean Water Act; and the Colorado State Historic Preservation Officer and Federal Advisory Committee to comply with the National Historic Preservation Act. Agency review results for this draft environmental assessment were incorporated in the final environmental assessment.

Distribution List

Appendix A contains the mailing list for this draft environmental assessment. The list includes all individuals, agencies and organizations to which Reclamation sent the scoping bulletin in October 1999. In addition, others who have specifically requested a copy of the draft environmental assessment are included on the list.

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APPENDIX A

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Grand Junction, CO

Mesa County Commissioners
Grand Junction, CO

Mr. Bob Cron
Colorado Riverfront Commission
Riverfront Legacy Project
Grand Junction, CO

Mr. John Heideman
Colorado Riverfront Commission
Grand Junction, CO

Town of Parachute
Parachute, CO

Mr. John Shields
Wyoming State Engineers Office
Cheyenne, WY
Mr. Marty Ott
Utah Dept. of Natural Resources
Salt Lake City, UT

Mr Tom Pitts
Water Consult
Loveland, CO

Mr. Robert Muth, Director
Colorado River Recovery Program
US Fish and Wildlife Service
Denver, CO

Mr. Bruce McCloskey
Colorado Division of Wildlife
Denver, CO

Mr. Dave Mazour
Tri-State Generation and Transmission
Association Inc
Denver, CO

Mr. Reed Harris
Utah Department of Natural Resources
Salt Lake City, UT

Mr. Robert Wigington
The Nature Conservancy
Boulder, CO

Ms. Susan Baker
U.S. Fish and Wildlife Service
Denver, CO

Mr. Pete Winn
Earth Science Expeditions
Grand Junction, CO

Western Association to Enjoy Rivers
(W.A.T.E.R.)
Grand Junction, CO

Mr. Dennis Adams
Rocky Mountain Canoe Club
Grand Junction, CO

Mr. Jerry Nolan
W.A.T.E.R.
Grand Junction CO

Mr. John Toolen
Colorado Division of Wildlife
Grand Junction, CO

Mr. Tom Latousek
American Rivers
Southwest Regional Office
Phoenix, AZ

Mr Hal Simpson, Colorado State Engineer
Office of the State Engineer
Denver, CO

Mr. Mark Peterson
Colorado River Boat Association
Grand Junction, CO

Mr. Gregg Rippey
Colorado State Representative
Glenwood Springs, CO

Mr. Andrew Fahlund
Associate Director of Hydropower Programs
American Rivers
Washington, DC

Mr. Ron Teck
Colorado State Senator
Denver, CO

Mr. Gary Lacy
Recreation Engineering & Planning
Boulder, CO

Mr. Randy Seaholm
Colorado Water Conservation Board
Denver, CO

Mr. Matt Sicchio
American Rivers
Washington, DC

Ms. Sally Schuff
Colorado Department of Agriculture
Denver, CO

American Whitewater
Silver Spring, MD

Mr. Matt Smith Colorado State
Representative
Grand Junction, CO

Mr. and Mrs. Bob and Jill Stecker
Colorado Association of Paddle Racers
Boulder, CO

Mr. Rod Kuharich, Director
Colorado Water Conservation Board
Denver, CO

Mr. Pete Atkinson
Whitewater West
Grand Junction, CO

Mr. Richard Perske, Program Engineer
Colorado Department of Transportation
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Mr. Owen Leonard, Regional Transportation
Director
Colorado Department of Transportation
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Mr. Larry Abbott
Colorado Department of Transportation
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Ms. Jane Norton, Executive Director
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Mr. Ron Velarde
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Mr. Kurt Mill, West Region Manager
Colorado State Parks
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Mr. Alan Martellaro, Division Engineer
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Mr. Greg Walcher,
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Colorado Dept. of Natural Resources
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Mr. Thomas Blickensderfer
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Ms. Gayle Berry
Colorado State Representative
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Ms. Georgianna Contiguglia
Colorado State Historic
Preservation Office
Denver, CO

**U.S. FISH AND WILDLIFE SERVICE
BIOLOGICAL OPINION**



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
764 Horizon Drive, Building B
Grand Junction, Colorado 81506-3946

IN REPLY REFER TO:

ES/GJ-6-CO-99-F-033-CP016
MS 65412 GJ

February 8, 2001

Memorandum

To: Technical Services Division Manager, Bureau of Reclamation, Western Colorado Area Office, Grand Junction, Colorado

From: Acting Colorado Field Supervisor, Fish and Wildlife Service, Ecological Services, Grand Junction, Colorado
Allen R. Pfister

Subject: Biological Opinion for the Proposed Grand Valley Endangered Fish Passage Facilities

This responds to your August 9, 2000, request for consultation under section 7 of the Endangered Species Act of 1973, as amended. Your request is for the proposed fish passage facility and fish screen at the Grand Valley Project's Dam and Canal (Government Highline) located on the Colorado River just above the confluence with Plateau Creek, Mesa County, Colorado. You requested concurrence with your biological assessment that the proposed project would have no affect on Uinta Basin hookless cactus (*Sclerocactus glaucus*), bald eagle (*Haliaeetus leucocephalus*), southwestern willow flycatcher (*Empidonax traillii extimus*), or humpback chub (*Gila cypha*). The Fish and Wildlife Service has reviewed the assessment for these species and concurs with your determinations. Your biological assessment also determined that the proposed project may affect, but is not likely to adversely affect Colorado pikeminnow¹ (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), and bonytail (*Gila elegans*). While the Service concurs that the proposed fish passage facility and canal screening will be beneficial overall to these species, these fish species may be incidentally taken at the proposed facilities, therefore, the Service must conclude that the proposed project may affect these fish species. The following are examples of how these fish could be incidentally taken either through harass or harm, at the proposed facilities:

1. Take may occur during project construction.

¹formerly squawfish

2. Take may occur when the screen is removed when flows in the river drop below 2,700 cfs and there is not enough flow available to operate the screen (100 cfs is necessary to operate the screen).
3. Larval fishes will not be excluded from the canal by the screen, therefore, when spawning occurs upstream of the project site, larval fish may drift downstream, enter the canal, and be removed from the river or become impinged on the screen.
4. Endangered fishes may be incidentally taken at the fish ladder in the fish trap.
5. Endangered fishes may become trapped on the intake grate of the inlet of the fish ladder.
6. After being released from the fish trap, endangered fishes in exhausted condition may fall back down over the dam.

A Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin was initiated on January 22, 1988. The Recovery Program was intended to be the reasonable and prudent alternative to avoid jeopardy to the endangered fishes by depletions from the Upper Colorado River Basin. In order to further define and clarify the process in the Recovery Program, a section 7 agreement was implemented on October 15, 1993, by the Recovery Program participants. Incorporated into this agreement is a Recovery Implementation Program Recovery Action Plan which identifies actions currently believed to be required to recover the endangered fishes in the most expeditious manner. Fish passage at the Grand Valley Project is one recovery action identified in the Recovery Action Plan.

On December 20, 1999, the Service issued the final programmatic biological opinion for Bureau of Reclamation's Operations and Depletions, Other Depletions, and Funding and Implementation of Recovery Program Actions in the Upper Colorado River above the Confluence with the Gunnison River (this document is available for viewing at the following internet address: <http://www.r6.fws.gov/crip/biological.htm>). The Service has determined that projects that fit under the umbrella of the Colorado River PBO would avoid the likelihood of jeopardy and/or adverse modification of critical habitat for depletion impacts. The proposed fish passage facility is part of the Recovery Action Plan that was evaluated in the programmatic biological opinion and is considered a necessary action to avoid jeopardy and adverse modification of critical habitat. The programmatic biological opinion contained an incidental take statement that identified the following reasonable and prudent measure to minimize the take of endangered fishes at the Grand Valley Project's Government Highline Canal.

The Recovery Program will design, construct, and maintain fish preclusion devices to prevent or reduce adult and subadult fish (≥ 300 mm total length) from entering the existing major irrigation diversion systems (Grand Valley Irrigation Company Canal and Grand Valley Project Diversion Dam [Government Highline Canal]).

The Service understands that the Recovery Program's current design uses a screen of 3/32" wedge wire to preclude fish from entering the canal. This would prevent fishes much smaller than 300 mm from entering the canal.

The terms and conditions to carry out the reasonable and prudent measure identified in the PBO are as follows:

1. The Recovery Program will develop an appropriate design for fish preclusion devices that are compatible with the operation of the subject facilities.
2. Fish preclusion devices to prevent or reduce adult and subadult fish (>300 mm total length) from entering the canals within the time frame outlined in the Recovery Action Plan will be constructed by the Recovery Program.
3. If another existing water delivery system between Rifle and the 15-Mile Reach is found to result in take that may cause the incidental take limit to be exceeded, then the Recovery Program will design and construct fish preclusion devices to prevent or reduce adult and subadult fish (>300 mm total length) from entering that facility.
4. A plan to monitor the amount of take will be developed by September 30, 2001, by the Recovery Program and added to the Recovery Action Plan.

Reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take at the Grand Valley Project. Incidental take statements exempt those actions covered by the incidental take statement from the Act's section 9 prohibitions if the reasonable and prudent measures and the implementing terms and conditions of incidental take statements are complied with.

The PBO states that the anticipated incidental take of Colorado pikeminnow and razorback suckers when adults are taken in irrigation canals and municipal intakes is 1 percent of the latest adult population estimate above Westwater Canyon. Stocking plans call for stocking 796,200 (6-12") razorback sucker and 7,200 (6-12") Colorado pikeminnow upstream of the Grand Valley Project Dam (Nesler 1998). In the spring of 2000, 65 (14-18") Colorado pikeminnow (5 wild fish and 60 hatchery fish) were stocked above the project site and to date 17,913 (4-11") razorback sucker have been stocked. If, during the course of the action, this minimized level of incidental take (to include all forms of take (harass, harm, etc)) is exceeded, such incidental take represents new information requiring reinitiation of consultation to review of the reasonable and prudent measures provided. The Service will consider the causes of the taking and review the need for possible modification of the reasonable and prudent measures.

Bonytail are scheduled to be stocked between Palisade and Loma, so when the fish passage is completed at the Price-Stubbs Dam and the Grand Valley Project Dam, they may occur in the project area and may be incidentally taken at the proposed facilities.

Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited.

taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement. In order to fall under the umbrella of the incidental take statement of the PBO and be exempt from the prohibitions of taking endangered species, as described above, the entities that use the Grand Valley Project's Dam and Government Highline Canal to divert water will be required to sign a Recovery Agreement, as described in the PBO. The following entities divert water at the Grand Valley Project facilities:

Grand Valley Water Users Association
Orchard Mesa Irrigation District
Palisade Irrigation District
Mesa County Irrigation District
Public Service Company of Colorado

The water depletions associated with the Grand Valley Project are interdependent on the proposed action because they rely on the recovery actions outlined in the PBO to avoid jeopardy and adverse modification of critical habitat to the endangered fishes. The PBO addresses all historic depletions, therefore, it includes the water depletions associated with the Grand Valley Project (approximately 62,508 acre-feet/year) and after the above mentioned water user entities sign Recovery Agreements, all requirements for the subject water depletions to fit under the umbrella of the PBO will be met.

When the attached Recovery Agreements are signed and returned to the Service, the Service will provide Reclamation and the subject water user entities with documentation that the fish passage and fish screen project may rely on the incidental take statement in the Colorado River PBO to be exempted from the prohibitions of section 9 (take) of the Act. Furthermore, when representatives for the water user entities sign the Recovery Agreements, the Service agrees that the water depletions associated with the Grand Valley Project will avoid jeopardy and adverse modification of critical habitat for the endangered Colorado River fishes under the terms of the Colorado River PBO. To help facilitate the implementation of the fish screen project, I request that the signed Recovery Agreement be returned within 60 days.

Attachments: 5 Recovery Agreements

cc: FWS/ES, Lakewood

PGelatr:GVPass/PBO.wpd:020801