

Final

HABITAT RESTORATION PROGRAM

FY 01 WORK PLAN

**RECOVERY PROGRAM
FOR THE
ENDANGERED FISHES
OF THE
UPPER COLORADO RIVER BASIN**

March 26, 2001

HABITAT RESTORATION PROGRAM

FY 01 WORK PLAN

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**COLORADO RIVER RECOVERY PROGRAM
FY-2001 SCOPE OF WORK**

Project No.: CAP-6

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Category:

- Ongoing project
- Ongoing-revised project
- Requested new project
- Unsolicited proposal

Expected Funding Source:

- Annual funds
- Capital funds
- Other

I. Title of Proposal:

Floodplain Habitat Restoration Program - Umbrella Work Plan

II. Relationship to RIPRAP:

The Floodplain Habitat Restoration Program is designed to restore or enhance natural floodplain functions that support recovery of endangered fishes in the upper Colorado River basin. The Program includes the following RIPRAP activities:

-GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

ACTIVITY II. RESTORE HABITAT

II.A.1. Conduct inventory of flooded bottomland habitat for potential restoration.

II.A.2. Screen high-priority sites for potential restoration/acquisition. Conduct programmatic NEPA compliance on floodplain restoration program.

II.B. Support actions to reduce or eliminate contaminant impacts.

-GREEN RIVER ACTION PLAN: MAINSTEM

ACTIVITY II. RESTORE HABITAT

II.A. Restore and manage flooded bottomland habitat.

-COLORADO RIVER ACTION PLAN: MAINSTEM

ACTIVITY II. RESTORE HABITAT

II.A. Restore and manage flooded bottomland habitat.

-COLORADO RIVER ACTION PLAN: GUNNISON RIVER

ACTIVITY II. RESTORE HABITAT

II.A. Restore and manage flooded bottomland habitat.

III. Study Goals, Objectives, End Product:

Naturally functioning, highly productive low-velocity habitats are thought to be an essential component of the life history of some or all of the native fishes of the upper Colorado River basin, but many such habitats have been hydrologically cut off from the main channel of the river and no longer provide benefits to the native fishes. The goal of the Floodplain Habitat Restoration Program is to restore or enhance natural floodplain functions that support recovery of endangered fishes in the Upper Basin. Natural floodplain functions include provision of food, enhanced water temperatures, high quality water, shelter from high velocities, vegetative cover for predator avoidance, nursery rearing habitats, and spawning habitats.

The Floodplain Habitat Restoration Program is based on the premise that an ecosystem approach offers the best opportunity for reestablishing natural attributes and functions of low-velocity habitats and, therefore, achievement of the Program goal. This is because the occurrence, availability to fishes, and bioproduction of low-velocity habitats are spatially and temporally dynamic, and depend upon ecosystem attributes and processes (e.g., flow dynamics, sediment regimes, channel morphology, and food web dynamics). Jack A. Stanford (1994. Instream flows to assist the recovery of endangered fishes of the upper Colorado River basin. U.S.D.I. National Biological Survey Biological Report 24, Washington, D.C. 47 pp.) presented a comprehensive ecosystem approach for identifying the flow needs for the endangered fishes in the Upper Basin that focuses on development of a better understanding of the coupling of physical processes associated with flow, geomorphology, and riverine bioproduction. Stanford's suggested ecosystem approach encompasses floodplain wetlands and other low-velocity habitats and provides a foundation for the Habitat Restoration Program conceptual framework.

Finally, the Floodplain Habitat Restoration Program should be considered in the context of the larger Colorado River Recovery Program. The scope of the framework is limited to those objectives for which the Habitat Restoration Program has leadership responsibility. However, success of the Habitat Restoration Program, and ultimately the Recovery Program, is contingent upon integration of and close coordination between the Habitat Restoration Program and other Recovery Program elements. The framework presumes continued progress in other Recovery Program elements as identified in the RIPRAP, especially development and implementation of instream flow recommendations, stabilization of endangered fish populations, reduction in impacts of nonnative fishes and sportfishing, and continuation of the Interagency Standardized Monitoring Program.

Goal

To restore or enhance natural floodplain functions that support recovery of endangered fishes in the upper Colorado River basin.

Objectives

1. Identify and provide the information needed to successfully implement the Habitat Restoration Program.
2. Reconnect the floodplain to the river in areas where the floodplain has been cut off.
3. Evaluate the response of the river ecosystem (including the response of native and nonnative fish populations) to reconnection of the floodplain to the main channel of the river.
4. Conduct site-specific experimental manipulations at controlled facilities.
5. Implement an adaptive restoration/management approach.

The Program will target sites for restoration that flood frequently under average or less than average spring flow conditions (e.g., within the 10-year floodplain), to maximize benefits to endangered fishes, and to help ensure that Recovery Program resources are applied judiciously.

Accomplishment of the objectives will require clearly articulating a concise list of critical uncertainties and hypotheses to test, developing experimental designs to test the hypotheses, and implementing work plans that are consistent with the experimental design.

End Products:

Functional floodplain habitats of sufficient quantity, quality, and spatial distribution to support the survival, growth, recruitment, and reproduction (i.e., recovery) of the endangered fishes.

IV. Description of past performance on this or similar projects:

In 1991, Ed Wick developed a draft issue paper entitled "River Management and Habitat Restoration Strategy", which recommended restoration of floodplain habitats for use by endangered fishes. One specific recommendation was to reconnect Old Charlie Wash (Wood's Bottom) to the Green River for use by endangered fishes. Old Charlie Wash became a pilot site for testing hypotheses regarding floodplain habitat restoration. To prepare the site, water inlet and outlet control structures, fish screens, and a fish harvest kettle were installed. The site was tested during 1994, 1995, and 1996, to see if water levels and fish predators can be controlled, and if razorback larvae will survive and grow. During 1995 and 1996, spring flows overtopped the levees, allowing access by fishes of all sizes and species. Although nonnative fishes greatly out-numbered native fishes in Old Charlie, 28 young

razorbacks managed to survive in 1995; 45 in 1996. This many razorback larvae surviving to become juveniles in the presence of large numbers of nonnative fishes is considered significant. In addition, Old Charlie was used by 10 adult razorbacks and 14 juvenile pikeminnow during 1995-96.

The Gravel Pit at 29 5/8 Road (Gardner Pond) was connected to the Colorado River (RM 174) in December 1995. Although all fishes had been removed, nonnatives quickly recolonized the site after connection, as expected. Native fish use of the site varied seasonally, with highest use during spring runoff (39% native fishes, including 7 adult pikeminnow); lowest use post-runoff. In March 1998, the site was reconfigured to allow fish access only during spring runoff. During 1998 twenty adult pikeminnow were captured in Gardner and Pickup ponds (Pickup was sampled because the Jarvis site at RM 171 was not connected to the river until late summer 1998). During 1999 seventeen sub-adult and adult Colorado pikeminnow were captured in Gardner Pond. One pikeminnow was captured three different times in Gardner Pond; four different pikeminnow captured in 1998 in Gardner Pond were also recaptured in Gardner Pond in 1999. No pikeminnow were captured in the Jarvis site, possibly because spring flows did not get very high during 1999 and Jarvis requires ~7,000 cfs to begin flooding. Field work will continue through FY 2000; a final report is due in May 2001.

In March 1997, levees were breached at Bonanza Bridge, The Stirrup, and Old Charlie Diked. All sites were used by native and endangered fishes. The Bonanza Bridge site was used the most by adult pikeminnow and razorbacks (and, of course, numerous nonnative fishes). One larval razorback was found in the Bonanza Bridge site and one in Old Charlie Diked.

Preliminary results of studies on fish-food organisms suggest that floodplain habitats are highly productive and provide a tremendous amount of food to the river ecosystem. Water temperatures in the floodplain were found to be warmer than the main channel even after spring runoff had subsided.

During October 1997, levees were breached at Horseshoe Bend, Baeser Bend, and Above Brennan. During March/April 1998, levees were breached at Johnson and Leota, completing the 8-site block design for the Green River levee removal evaluation studies. Preliminary results of data collected during 1996, 1997, and 1998 were synthesized and reported in December 1998. Preliminary results suggested that floodplain habitat restoration may not have a significant or long-term effect on main-channel nonnative fish abundance. Additional data have been collected to verify this hypothesis. Also, it has become clear that there are not enough target species (i.e., razorback suckers) in the system to detect a measurable species response. As a result, propagation and stocking activities have been accelerated, and razorbacks have been stocked into floodplain depressions as well as the main channel.

Razorbacks were stocked into The Stirrup, Baeser Bend, and Above Brennan in 1999. They were ~3-5 inches in length when they were stocked in April. When they were retrieved in September, they were ~14 inches in length. During spring of 2000, post-winter sampling indicated survival over winter (percent survival unknown at this time).

During spring of 1999 and 2000, some of the hatchery produced razorbacks that had been stocked into the river were found on the spawning bar, suggesting that (some) hatchery razorbacks know when and where to go to spawn. One of eleven 1991 year-class hatchery-produced razorbacks that had been stocked into the Baeser Bend in April 1999 had left the floodplain wetland and was found on the spawning bar May 11, 2000.

V. Study area

An inventory of floodplain habitats was conducted for the upper Colorado River basin during FY 93. Irving and Burdick (1995) identified 293 sites consisting of 34,628 acres in 871 river miles of the Green, Colorado, Gunnison, Yampa, and White rivers.

Due to initial emphasis on razorback sucker recovery, the Floodplain Habitat Restoration Program is focusing on areas within the upper Colorado River basin where razorback suckers were historically common to abundant (i.e., Green River (RM 0-398), Colorado River (RM 0-241), and Gunnison River (RM 0-75)). The Yampa and White rivers will be addressed as time and money allow. Following are relative priorities for floodplain habitat restoration (although the Program may capitalize on opportunities as they arise, even if they are not highest priority):

1. Green River

- a. RM 0 to RM 47 (Canyonlands National Park; NPS) **LOW PRIORITY**
 - Razorbacks: numerous larvae have been collected in this area; adult distribution area.
 - Pikeminnow: high density nursery area for young; juvenile high concentration area.
 - Approximately 1,870 acres of primarily floodplain terrace habitat; levees, if any, are natural.
 - Floodplain owned, managed, and protected by the National Park Service; no floodplain development has occurred or is expected to occur.
 - Of high biological importance for habitat restoration. However, floodplain habitat restoration/enhancement options are limited to either lowering the floodplain terrace elevations or restoring the historical frequency and duration of spring flows exceeding 39,000 cfs bankfull.
 - Conclusion: low priority geographic area because floodability- enhancement opportunities are limited; no floodplain development has occurred nor is any future development anticipated.

- b. RM 47 to RM 115 (Labyrinth Canyon; BLM) **LOW PRIORITY**
- Razorback: larvae likely drift through (and may use) this area; adult distribution area.
 - Pikeminnow: high density nursery area for young; juvenile high concentration area; adult concentration area.
 - Approximately 1,697 acres of primarily floodplain terrace habitat; levees, if any, are natural.
 - Floodplain almost entirely owned, managed, and protected by the BLM; no floodplain development has occurred or is expected to occur.
 - Possibly of high biological importance. However, floodplain restoration/enhancement options are limited to either restoring high spring flows or lowering floodplain terrace elevations.
 - Conclusion: low priority geographic area because floodability-enhancement opportunities are limited; no floodplain development has occurred or is expected to occur.
- c. RM 115 to RM 132 (Green River, Utah) **HIGH PRIORITY**
- Razorbacks: larvae drift through this area, and likely would use flooded habitats if they were available; adult distribution area.
 - Pikeminnow: high density nursery area for young; juvenile high concentration area; adult concentration area.
 - Approximately 700 acres of potential floodplain habitat; man-made levees along much of the river.
 - Floodplain mostly privately-owned; Green River Valley (wide alluvial floodplain valley); includes the town of Green River, Utah; in Emery County and Grand County; downstream of Gray Canyon; upstream of Labyrinth Canyon. Some floodplain development has occurred in this area, mostly cropland and pasture;
 - Possibly of high biological importance for habitat restoration.
 - Conclusion: high priority geographic area for floodplain restoration and protection because of restoration (levee-breaching) opportunities; because floodplain development has occurred in the past and is likely to continue; and area is potentially of high biological importance.
- d. RM 132 to RM 238 (Gray/Desolation Canyon to Pariette Draw) **LOW PRIORITY**
- Razorbacks: larvae drift through and adults reside within this section of the Green River.
 - Pikeminnow: includes high density nursery areas for young; adult distribution area.
 - Approximately 1,336 acres of primarily floodplain terrace habitat; levees, if any, are natural.
 - Floodplain almost entirely owned by the BLM and the Tribes; no floodplain development has occurred or is expected to occur.
 - Of high biological importance for habitat restoration. However, floodplain habitat restoration/enhancement opportunities are limited to lowering floodplain terrace elevations or restoring high spring flows.

-Conclusion: low priority geographic area for floodplain restoration and protection because of limited floodability-enhancement opportunities, and no floodplain development has occurred or is expected to occur.

- e. RM 238 to RM 320 (Pariette Draw to Dinosaur National Monument) **HIGHEST PRIORITY**
- Razorbacks: inhabited by adults, young, and larvae.
 - Pikeminnow: includes high density nursery area for young; juvenile concentration area; adult high concentration area.
 - Approximately 11,222 acres of potential floodplain habitat; natural and man-made levees along much of the river.
 - Wide alluvial floodplain valley; 60% Federal, 24% private, 12% Tribal, 4% State; includes the towns of Jensen and Ouray, the Ouray National Wildlife Refuge, Stewart Lake Waterfowl Management Area; the White River confluence at RM 246; the Duchesne River confluence at RM 248; Ashley Creek at RM 299, and razorback spawning areas at RM 307 and 311.5. The floodplain within this section is also the most developed along the Green River; mostly cropland and pasture.
 - Of high biological importance for habitat restoration.
 - Conclusion: highest priority geographic area for floodplain restoration and protection because of numerous restoration opportunities; because maintenance of floodplain developments is expected to continue; and because of high biological importance.
- f. RM 320 to RM 410 (Dinosaur to Flaming Gorge) **LOW PRIORITY**
- Razorbacks: includes spawning and adult areas.
 - Pikeminnow: includes high concentration and distribution areas for adults, and nursery areas for young.
 - Approximately 1,720 acres of potential floodplain habitat; some man-made levees.
 - Floodplain owned primarily by the NPS, BLM, FWS, USFS, and State of Utah; includes Brown's Park National Wildlife Refuge, and the Yampa confluence at RM 345; some floodplain development has occurred (e.g., levees at Brown's Park).
 - At present, the temperature of waters released from Flaming Gorge Reservoir creates a thermal barrier in the Green River above the confluence with the Yampa, which limits use by endangered fishes. As a result, this section of river is not being considered a priority geographic area for floodplain restoration and protection at this time. Studies are being conducted to explore opportunities for thermal enhancement of waters released from Flaming Gorge. If the studies conclude that water temperatures can be managed to make the river habitable, then this area will be targeted for floodplain restoration and protection.
 - Of low biological importance for floodplain habitat restoration at this time.
 - Conclusion: low priority geographic area for floodplain protection at this time because of low water temperatures above the Yampa.

3. Colorado River

- a. RM -16 to RM 0 (Cataract Canyon) **LOW PRIORITY**

- Razorbacks: larvae have been captured at the inflow to Lake Powell (Sheep Canyon), so they no doubt drift through Cataract Canyon.
 - Pikeminnow: area contains adults and young.
 - Negligible amounts of potential floodplain habitat.
 - Floodplain owned, managed, and protected by the National Park Service; no floodplain development has occurred or is expected to occur; levees, if any, are natural.
 - Of low biological importance for habitat restoration; opportunities limited.
 - Conclusion: low priority geographic area for floodplain restoration and protection because floodability-enhancement opportunities limited, and no floodplain development has occurred or is expected to occur.
- b. RM 0 to RM 32 (Canyonlands) **LOW PRIORITY**
- Pikeminnow: Larval nursery area; adult distribution area.
 - 127 acres of primarily floodplain terrace habitat.
 - Floodplain owned, managed, and protected by the National Park Service; no floodplain development has occurred or is expected to occur; levees, if any, are natural.
 - Of low biological importance for habitat restoration; opportunities limited.
 - Conclusion: low priority geographic area for floodplain restoration and protection because floodability-enhancement opportunities are limited, and no floodplain development has occurred or is expected to occur.
- c. RM 32 to RM 127 (Canyonlands to Westwater) **MEDIUM PRIORITY**
- Pikeminnow: adult and juvenile concentration area; larval pikeminnow high-density nursery area.
 - Razorbacks: historical adult distribution area.
 - 1,356 acres of potential floodplain habitat.
 - A mix of BLM, NPS, and private lands; includes Moab (RM 62-64), Arches National Park (RM 64-75), and the Dolores River (RM 96); some floodplain development has occurred.
 - Of high biological importance for habitat restoration; some opportunities may be available on private lands.
 - Conclusion: medium priority geographic area for floodplain restoration and protection because of limited floodplain development and little additional development anticipated in the near future.
- d. RM 127 to RM 240 (Westwater to Rifle) **HIGH PRIORITY**
- Razorbacks: historical concentration area (razorbacks are believed to have been historically abundant in this area).
 - Pikeminnow: adult high concentration area; larval nursery area.
 - 3,588 acres of potential floodplain habitat.
 - Mostly privately-owned.

- The floodplain within this area is the most developed on the upper Colorado River; development and maintenance is expected to continue; most levees are man-made.
- Of high biological importance for habitat restoration.
- Conclusion: high priority geographic area for floodplain restoration and protection because of numerous opportunities for habitat restoration; because floodplain development and maintenance of floodplain structures is expected to continue; and because of high biological importance.

4. Gunnison River

a. RM 0 to 50 (Colorado River confluence to Escalante State Wildlife Area)

MEDIUM PRIORITY

- Razorbacks: believed to have been historically common in this area; and locally abundant.
- Pikeminnow: adults have been captured in this section, and numbers should increase as they continue to use the Redlands fish ladder.
- 532 acres of potential floodplain habitat; some floodplain development.
- Mostly privately owned.
- Of medium biological importance for habitat restoration.
- Conclusion: medium priority geographic area for floodplain restoration and protection because of limited floodplain development, localized opportunities for restoration, and relatively moderate biological importance.

b. RM 50 to RM 75 (Escalante State Wildlife Area to the North Fork of the Gunnison River) **HIGH PRIORITY**

- Razorbacks: believed to have been historically abundant in this area, and are being reintroduced.
- Pikeminnow: reside in this section of river; numbers should increase because of Redlands fish ladder.
- 774 acres of potential floodplain habitat.
- Mostly privately owned.
- The floodplain within this area is the most developed on the Gunnison River; development is expected to continue; most levees are man-made.
- Of high biological importance for habitat restoration.
- Conclusion: high priority geographic area for floodplain restoration and protection because of numerous restoration opportunities; because floodplain development and maintenance of structures is expected to continue; and because of high biological importance.

5. Yampa River RM 0 to RM 140 **LOW PRIORITY**

- Razorbacks: spawn at RM 1; adults have been captured to RM 53.3.
- Pikeminnow: adult population in this area.
- Floodplain owned/protected by NPS to RM 47; BLM and private lands to Craig.
- Some floodplain development.
- Of moderate biological importance for habitat restoration.

-Conclusion: low priority geographic area for floodplain restoration and protection because of limited floodability-enhancement opportunities, and because no floodplain development is anticipated within most of the Yampa razorback range.

6. White River RM 0 to RM 156 **LOW PRIORITY**

-Pikeminnow: adult distribution (high concentration area to RM 21); juvenile concentration area to RM 59.

-Mix of Tribal, BLM, and private lands.

-Some floodplain development.

-Of low biological importance for habitat restoration.

-Conclusion: low priority geographic area for floodplain restoration and protection because of no known historical use of this area by razorbacks.

VI. Study Methods/Approach and Description of Work

Following summarizes activities and approaches related to the five Program objectives:

Objective 1. Identify and provide the information needed to successfully implement the Floodplain Habitat Restoration Program.

The Habitat Restoration Program consists of a number of major components (e.g., contaminants, hydrology, biology, geomorphology, engineering, land acquisition, NEPA compliance, I&E, etc.). Before floodplain areas can be restored, several kinds of information are required. First, landowner willingness to cooperate needs to be established (i.e., the landowner is willing to allow data collection on the property, and would be ultimately willing to allow the property to be flooded). Then, the area is screened for contaminants. Federal mandates require that contaminants surveys be conducted on properties the government wishes to acquire; the federal government cannot acquire an interest in a property that fails the contaminants survey, unless the contaminants problems are remediated. Also, the Program does not wish to restore habitats that cannot sustain endangered fishes because of contaminants problems.

Sites being considered for restoration will undergo floodability assessments (area of inundation as a function of flow, with and without levees), to determine how much habitat we will be getting for our acquisition and construction dollars, and as a pre-construction baseline (see Hydrology/Geomorphology SOW, attached). Relative floodability of priority geographic areas will be determined via surveying, HEC-2 modeling, and collection and analyses of aerial photos. The Program will target the most floodable lands as highest priorities.

Environmental compliance (NEPA, permits, etc.) will be required prior to acquisition and construction, and will necessitate compiling specific kinds of information. Appraisals and legal reviews will be obtained where properties are

privately-owned. Specific data (e.g., specifications of structures, materials, topography, etc.) will be obtained to assist with design, engineering, and construction (e.g., levee breaching, removal, or set back) at each site. Post-construction evaluation data will be collected as feedback for making Program refinements.

Contaminants screening and environmental compliance are activities conducted in support of floodplain habitat restoration. Separate SOW's will not be developed for these support activities.

An independent Technical Advisory Group was established in 1994 to review the scientific aspects of the Program and offer suggestions. The Group consisted of four nationally recognized experts (Drs. Peter Bayley, Larry Hesse, Wendell Minckley, and Ned Andrews) who collectively have a diversity of knowledge and experience with large river ecosystems. The Group has reviewed the key Program documents (e.g., the Habitat Restoration Program conceptual framework, the Levee Removal Strategy, the Basin-Wide Monitoring/Evaluation Plan). Input provided by the Group has helped shape the Umbrella SOW and guide the Habitat Restoration Program.

A Work Group was also established during 1994 to provide a forum for agencies and interested parties to provide input into the Program. The Work Group currently consists of 20 members (Appendix A), each of which has a unique perspective to bring to the table. The Work Group reviews all draft documents and products of the Floodplain Habitat Restoration Program, and offers input and suggestions. The Work Group has also helped shape and guide the Program.

Final drafts of products are reviewed by the Biology Committee, who then makes recommendations to the Management Committee on each of the Program products. Products become final upon approval of the Management Committee.

Objective 2. Reconnect the floodplain to the river in areas where the floodplain has been cut off.

Within priority geographic areas, the floodability of the floodplain will be enhanced, where possible, via levee-breaching and excavation. During March of 1997, levees were breached at Bonanza Bridge, The Stirrup, and Old Charlie Diked along the Green River. Though not part of the Floodplain Habitat Restoration Program, the levees at Stewart Lake were breached in May 1997 to flush selenium from the UDWR refuge.

Following are sites where levees were breached during FY 98.

<u>SITE</u>	<u>RIVER MILE</u>	<u>OWNER</u>
Horseshoe Bend	GR285	BLM

Baeser Bend	GR273	BLM
Above Brennan	GR268	BLM
Johnson	GR261	FWS
Leota	GR258	FWS
GP at 29 5/8 Road (reconfig)	CR174	CDP
Jarvis Site	CR171	CGJ

Site Reconfiguration. For all sites through 1999, levees had been breached between the mid-point and downstream ends, 1) to minimize risk of rerouting the river through the site, resulting in a secondary channels; 2) to reduce flood risk to adjacent landowners; and 3) to minimize the rate of sediment deposition and O&M costs. All sites have been used by adult native and endangered fishes, but they have not proven adequate for entraining drifting razorback larvae. During April 2000, levees were breached on the upstream end of the Bonanza Bridge site and the Above Brennan site. Evaluation of results will determine if this configuration will be conducive to entrainment of drifting larvae without compromising the integrity of the habitat.

Prior to any site reconfiguration, approval of the Recovery Program will be needed, permission and input from BLM and FWS as landowners, as well as NEPA, permits, Section 7, cultural resource clearance, etc.

Levee Breaching at “Safe Sites”. Sites that flood and drain seasonally during runoff (e.g., terraces and shallow depressions) are considered “safe sites” because they do not allow overwintering and subsequent build-up of nonnative fishes. Such sites contribute food to the river ecosystem and seasonal habitats used by razorback suckers and Colorado pikeminnow. Following are candidate sites for floodability enhancement:

<u>Candidate Site</u>	<u>Estimated Cost</u>	<u>Acreage</u>
SR-296	\$36K	323
VR-288	\$25K	78

Additional sites are expected to become available in the near future as easements are acquired and floodability enhancements are proposed.

Land Acquisition. The Land Acquisition Coordinator has been contacting owners of private lands along the Green, Colorado, and Gunnison rivers. Easements on 438 acres (8 properties) have been acquired as of May 2000. Offers are currently out on an additional ~250 acres (12 properties), and another 15 properties are in various stages of the acquisition process. Easements acquired by the Recovery Program are transferred to the U.S. Fish and Wildlife Service for management as part of the Colorado River Wildlife Management Area established in July 1999.

Objective 3. Evaluate the response of the river ecosystem (including the response of native and nonnative fish populations) to reconnection of the floodplain to the main channel of the river.

There are three scales of evaluation in the Floodplain Habitat Restoration Program:

-Site-specific evaluation, to answer questions such as “What fishes are using the floodplain habitats? What fishes are reproducing in the habitats? What are the effects of levee removal on the immediate area?” Site-specific evaluations have been or are currently being conducted at Bonanza Bridge, Horseshoe Bend, The Stirrup, Baeser Bend, Above Brennan, Johnson Bottom, Leota Bottom, Old Charlie Diked, and Old Charlie Wash along the Green River; and the Gravel Pit at 29 5/8 Road, Pickup Pond, the Jarvis Site, Adobe Creek, and Walter Walker along the Colorado River.

-Segment-specific evaluation, to answer questions such as “What happens to fish species composition, distribution, and relative abundance in the river adjacent to a functioning series of floodplain habitats? What are the effects of levee removal on the river segment?” Segment evaluation, currently being conducted under the Green River Levee Removal Evaluation Studies, will end with a final synthesis report due July 2000.

-Basin-wide evaluation to monitor/evaluate effects of restoration activities on endangered, native, and nonnative species status and trends, and effects on ecosystem macro-parameters. Evaluation at this scale is being conducted under the 1) Basin-wide razorback monitoring program, 2) ISMP, and 3) Habitat monitoring program (currently under development).

In each case, "success" will be defined primarily as the positive response of razorback suckers and other endangered fishes to habitat restoration activities.

Objective 4. Conduct site-specific experimental manipulations.

Old Charlie Wash

Old Charlie Wash is a floodplain depression that was restored for testing hypotheses on floodplain habitat and razorback restoration. It has inlet and outlet water control structures, fish screens to allow access of small fishes but prevent access by larger fishes, and a collection kettle for more-efficient harvesting of fishes.

At the July 1, 1998 meeting, the Biology Committee recommended that, during years when Jensen flows exceed 14,000 cfs (which includes FY 98), Old Charlie Wash be managed to provide larval/YOY razorback rearing habitat. During years when flows are between 11,000 cfs and 14,000 cfs, Old Charlie will be used to

remove nonnative fishes from the Green River. During dry years, Old Charlie will be managed to enhance wetland health (see attached proposal).

Leota Bottom

Levees were breached in two locations at Leota (L-7 and L-7a) during March/April 1998. An outlet structure with fish-harvest kettle and screens was completed in 1999. An O&M plan is under development. The site will likely be operated in a manner similar to Old Charlie Wash. Additional earthwork will be necessary to make L-7/7a completely drainable so that all fish can be harvested.

Johnson Bottom

As with Leota, the levee was breached at Johnson (J-4) during March/April 1998. An outlet structure with fish-harvest kettle and screens was completed in 1999. An O&M plan is under development. The site will likely be operated in a manner similar to Old Charlie Wash. Additional earthwork will be necessary to make Johnson completely drainable so that all fish can be harvested.

Gravel Pits (29 5/8 Road Gardner Pond and Jarvis Site)

There are ~340+ gravel pits in the Grand Valley area of the Colorado River and the Delta area of the Gunnison River. The Gravel Pit at 29 5/8 Road (Gardner Pond) was connected to the Colorado River in December 1995, to determine if gravel pits can act as a surrogate floodplain habitats to assist in recovery of the endangered fishes. The site has been used by a number of pikeminnow, and numerous nonnatives (Burdick et al. 1997).

In March 1998, the site was filled and graded to allow seasonal use by fishes but prevent year-round use and build-up of nonnatives. The Jarvis site, another old gravel pit, was also configured (in September 1998) for seasonal use. During 1999, seventeen sub-adult and adult Colorado pikeminnow were captured--all from Gardner Pond. One pikeminnow was captured three different times in Gardner Pond; four different pikeminnow captured in 1998 in Gardner Pond were also recaptured in Gardner Pond in 1999. No Colorado pikeminnow or other endangered fishes were captured in Jarvis Pond, possibly because spring flows were low. Both sites are being monitored during FY 00, to evaluate use by endangered and native fishes, and to evaluate nonnative fish removal techniques. A final report is due 5/01.

Walter Walker

Walter Walker is a large floodplain depression along the Colorado River (RM 164) that has been used extensively by Colorado pikeminnow and razorback suckers. Levels of selenium measured in water samples from Walter Walker ranged <1 to 170 ppb (level of concern is 2 to 5 ppb); levels in dry weight whole-body fish

samples ranged 74 to 137 ppm (level of concern is 8 ppm). Walter Walker, combined with Adobe Creek and Horsethief, have been used to determine if razorback suckers are adversely affected by high levels of selenium in floodplain sites (Hamilton et al. In prep) and, if so, if "freshening flows" can be used to reduce selenium levels. From December 1996 through FY 98, selenium remediation was tested at Walter Walker, to determine if selenium concentrations can be reduced to "acceptable" levels via flushing. Final reports are expected in 2000.

Objective 5. Implement an adaptive restoration/management approach.

Results of activities continue to be evaluated and used as feedback for making Program refinements.

VII. FY 01 Work Schedule

- Land acquisition activities - Ongoing
- Contaminants screening - Ongoing
- Floodability assessments - Ongoing
- Environmental compliance 10/00-1/01
- Evaluation 4/01-9/01

Site-specific experiments:

- Old Charlie Wash, Leota, Johnson operations 5/01-10/01
- Gravel Pits evaluation/nonnative fish removal final report 5/01
- Walter Walker final reports 2001

VIII. FY 01 Deliverables

1. Contaminants
 - a. Site screening reports (~10 sites)
 - b. Walter Walker Final Reports
2. Floodability - Site reports (~10 sites)
3. Land Acquisition
 - a. Easement agreements for ~500 acres of Green River floodplain
 - b. Easement agreements for ~100 acres along Gunnison and Colorado rivers.
4. Levee Removal
 - a. Site reconfiguration evaluation (Bonanza Bridge and Above Brennan)
 - b. Evaluation reports for The Stirrup, Baeser Bend, and Above Brennan
5. Site-specific experiments - Annual Reports due 12/3/01
 - Old Charlie Wash, Leota, Johnson

IX. FY 01 Budget

Capital Funds

		<u>Overhead*</u>
Contaminants (site screening)	\$ 90.0K	\$ 9.0K
Pre-acquisition assessments		
Post-restoration assessments		
Hydrology/Geomorphology (\$100K FY 00 carryover)	\$ 0.0K	
Pre-acquisition assessments		
Design options for restoration		
Post-restoration monitoring/evaluation		
Land Acquisition Activities	\$ 950.3K	\$ 26.3K
Levee Removal		
-Construction (Johnson, ESWA)	\$ 102.5K	
-Evaluation (Bonanza Bridge/Above Brennan)	\$ 28.0K	
Total =	\$1,170.8K	\$ 35.3K

Annual Funds

-Gravel Pits (GP@29&5/8 Rd, Jarvis)	\$ 11.0K	\$ 1.1K
-Razorback Survival in Depressions	\$ 40.4K	
Total =	\$ 51.4K	\$ 1.1K

O&M Funds

-Controlled Facilities (Old Charlie, Leota L-7/7a, Johnson)	\$ 83.7K	\$ 6.7K
Annual draining and fish harvest (\$66.7K)		
Annual O&M & excavation of drainage canal (\$17K)		
-Easement and Weed Management	\$ 50.0K	\$ 5.0K
Total =	\$ 133.7K	\$ 11.7K

Grand Total = \$1,355.9K \$ 48.1K

*Assumes 10% overhead

X. FY 02 Description of Work

Contingent upon evaluation results, levee removal will continue along the Green, Gunnison, and Colorado rivers (sites will be screened for contaminants; will undergo floodability assessments; and will require environmental compliance). Levees will be breached/removed and evaluated.

The Land Acquisition Coordinator will continue to develop easement agreements along the Green, Colorado, and Gunnison rivers. Sites where agreements can be developed will be screened for contaminants; undergo floodability assessments; and will require environmental compliance. Levees will be breached, removed, or set back where necessary, and results evaluated.

Site-specific experiments will continue. Additional facilities are not planned, but could be developed if high-priority needs are identified.

Deliverables

1. Contaminants site screening reports (~10 sites)
2. Floodability site reports (~10 sites)
3. Land Acquisition
 - a. Easement agreements for another ~500 acres of Green River floodplain
 - b. Easement agreements for another ~100 acres of Gunnison and Colorado River floodplain
4. Levee Removal
 - a. Evaluation reports
5. Site-specific experiments - Annual Reports due 12/3/01
 - a. Old Charlie Wash, Leota, Johnson

XI. Budget Summary

FY 2001

\$ 1.206M in capital funds (includes overhead)
\$ 51.4K annual funds (plus overhead)
\$145.4K O&M funds (includes overhead)

Budget earmarked for FY 02 = \$1.391M capital funds

APPENDIX A

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