

**COLORADO RIVER RECOVERY PROGRAM
FY 2006 PROPOSED SCOPE OF WORK for:**
(Habitat evaluation surveys)

Project No.: C-6 HYD

Lead Agency: U.S. Fish and Wildlife Service
Submitted by: Pat Nelson (Lead)
Address: U.S. Fish and Wildlife Service
P.O. Box 25486, DFC
Denver, CO 80225
Phone: 303-969-7322 Ext 226
FAX: 303-969-7327
E-Mail: Pat_Nelson@FWS.GOV
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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:

Physical evaluation of floodplain habitats restored/enhanced to benefit endangered fishes of the upper Colorado River basin.

II. Relationship to RIPRAP:

COLORADO RIVER ACTION PLAN: MAINSTEM
ACTIVITY II. RESTORE HABITAT

- II.A. Restore and manage flooded bottomland habitat.
- II.A.6. Develop and implement Colorado River Sub-basin Floodplain Management Plan.

COLORADO RIVER ACTION PLAN: GUNNISON RIVER
ACTIVITY II. RESTORE HABITAT

- II.A. Restore and manage flooded bottomland habitat.
- II.A.3. Develop and implement Colorado River Sub-basin Floodplain Management Plan.

III. Study Background/Rationale:

The Habitat Restoration element of the Upper Colorado River Endangered Fish Recovery Program seeks to enhance floodability of riparian habitats to assist in recovery of the razorback sucker. Razorback sucker spawn on the ascending limb of the hydrograph during spring runoff. After several days the eggs hatch, and larvae emerge from the spawning substrate and begin drifting down river. Studies have suggested that larvae will not survive unless they are able to drift into suitable floodplain nursery habitats. As a result of water development and flow management, spring flows rarely get high enough for larvae to gain access to suitable floodplain habitats, so levees have been breached at several floodplain wetland depressions along the Colorado and Gunnison rivers in Colorado to allow access by drifting razorback sucker larvae.

For most of the floodplain sites, levees were breached so that the sites would connect to the river nearly every year. Levee-breach configurations may be affected by factors such as erosion, sediment deposition, vegetation encroachment and, as a result, the ability of the breaches to entrain drifting razorback sucker larvae. A need exists to determine the existing quality of levee-breach configurations in terms of ability to entrain larvae, and to recommend corrective actions and improvements as necessary.

Other considerations addressed by this work are to ensure that restored habitats will not adversely affect adjacent landowners, and that any need for long-term O&M will be minimal.

IV. Study Goals, Objectives, End Product:

Goal:

To restore floodplain nursery habitats to assist in recovery of the endangered fishes, and to ensure that the habitats function as designed and constructed, and to take remedial measures as necessary.

Objectives:

1. To determine, as a function of main-stem flows, how well selected floodplain nursery habitats connect with the river and are likely to entrain drifting larvae (Audubon, Unaweep, Walter Walker);
2. To characterize post-runoff habitat and levee-breach morphology at selected sites (Audubon, Unaweep, Walter Walker) and compare to as-built morphology (Audubon, Unaweep);
3. To identify potential problems and make recommendations (Audubon, Unaweep, Walter Walker);
4. To estimate when the downstream levee will breach at GJ Pipe.

End Products:

Final report to include results of site surveys and flow measurements, and an annual report.

V. Study Sites

| <u>Property</u> | <u>Acres</u> | <u>River-RM</u> | <u>Purpose</u> | <u>Connection Flow</u> |
|-----------------|--------------|-----------------|----------------|------------------------|
| Audubon | 10.40 | Colo-168.0 | Larvae | 16.7kcfs (1.25-year) |
| UnawEEP | 55.00 | Gunn-13.0 | Larvae | 4.2kcfs (1.11-year) |
| Walter Walker | 450.00 | Colo-164.5 | Larvae | 13.6kcfs (1.11-year) |
| GJ Pipe | 13.70 | Colo-165.5 | Larvae | 37.8kcfs (5-year) |

VI. Study Methods/Approach

Objective 1. To determine how well selected floodplain nursery habitats connect with the river as a function of mainstem flows, cross-sectional profiles will be surveyed within the levee breaches. Flow volumes entering the floodplain habitats will be measured for mainstem flows ranging from initial site connection flows to spring peak flows (at least three flow measurements per site), and an empirical relationship will be developed for targeted sites.

Objective 2. To characterize post-runoff habitat and levee-breach morphology, surveying will be conducted to identify areas of erosion and sediment deposition. Results will be compared to as-built morphology (Audubon, UnawEEP) and pre-runoff morphology. Modified topo maps will identify areas of erosion and deposition (Audubon, UnawEEP).

Objective 3. Estimate approximately when downstream levee at the GJ Pipe site will be breached by the river.

Analyses of these data will yield modified as-built topographic maps (Audubon, UnawEEP), levee-breach cross-sectional profiles (Audubon, UnawEEP, Walter Walker), levee-breach stage-discharge relationships (Audubon, UnawEEP), and GJ Pipe levee dimensions.

VII. Task Description and Schedule

Task 1. Pre-runoff surveys

- All sites: Establish monuments
- Audubon and UnawEEP: Survey cross sections through both the upstream and downstream levee breaches
- Walter Walker: Survey the lowered levee
- GJ Pipe: Measure dimensions (especially widths) of the downstream levee

Task 2. Runoff surveys

- All sites: Note any potential problems or risks to adjacent landowners during runoff.
- Audubon and UnawEEP: Determine flows at which sites connect with the main channel of the river. Measure flows through the upstream levee breaches on the ascending, peak, and descending limbs of the hydrograph. Develop a flow rating curve for the breaches, and determine the relationship between main channel flows and inflows through the levee breaches.
- Walter Walker: Determine flows at which site connects with the main channel of the river. Measure water surface elevations to determine depths of flow over the lowered levee, and relate to main channel flows.
- GJ Pipe: Visit site and note any scour that may be occurring on the downstream levee.

Task 3. Post-runoff surveys

- All sites: Perform visual observation of the sites with regard to aggradation and degradation, and survey shots to locate areas where notable scour or deposition has occurred. Note any potential problems.
- Audubon and UnawEEP: Survey cross sections through both the upstream and downstream levee breaches. Compare survey information to as-built data, modify as-built topo maps.
- Walter Walker: Survey the lowered levee. Compare to pre-runoff survey.
- GJ Pipe: Measure dimensions (especially width) of the downstream levee. Compare to pre-runoff survey.

Task 4. Analyze results and write summary report with conclusions and recommendations.

VIII. FY 06 Work

-Deliverables: Summary report with recommendations.

-Budget

| | |
|--|--------------|
| Surveyor (GS-11 @ 48.50/hour x 80 hours) | 3,880 |
| Hydro-Tech (GS-9 @ 35.00/hour x 80 hours) | 2,800 |
| Biologist (GS-11 @ 42.50/hour x 120 hours) | 5,100 |
| Engineer GS-12 @ 62.50/hour x 40 hours) | 2,500 |
| <u>Misc. Supplies</u> | <u>720</u> |
| Subtotal | 15,000 |
| <u>Contingency @ 25%</u> | <u>5,000</u> |
| Total | 20,000 |

IX. Budget Summary

FY 2006: \$20,000

X. References

FLO Engineering. 1999. Floodability assessments of private land sites along the Green River, Gunnison River and Colorado River. Draft 1998 floodplain habitat restoration status report, Volume IA. FLO Engineering, Breckenridge, CO. Six sections + app.