

**COLORADO RIVER RECOVERY PROGRAM  
FY-2002-2003 SCOPE OF WORK**

**Project No.: C-6-rz**

Evaluation of larval razorback suckers stocked into floodplain depressions of the Middle Green River.

Lead Agency: Utah Division of Wildlife Resources

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revised 10/2/01 by Pat Nelson

Category:

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

Expected Funding Source:

- Annual funds
- Capital funds
- Other (explain)

I. Title of Proposal:

Evaluation of survival and growth of razorback suckers stocked into floodplain depressions of the middle Green River.

**Note: Report for original study due 3/02**

II. Relationship to RIPRAP:

- Green River Action Plan: Mainstem
- II.A.2.a Identify and evaluate floodplain sites (Restore habitat)
- II.A.3. Implement levee removal strategy at high-priority sites.
- II.A.3.c. Evaluation.

### III. Study Background/Rationale and Hypotheses:

Based on the assumption that floodplain wetlands provide critical rearing habitat for razorback suckers the Recovery Program initiated an extensive floodplain habitat restoration program (Levee Removal) in 1996. The goal of the Levee Removal Program was to restore natural floodplain wetland habitats and functions that support the recovery of endangered fish (specifically the razorback sucker) (Lentsch et al. 1996). To accomplish this goal, levees at selected wetlands were lowered to increase the frequency of the riverine-floodplain connection to pre-Flaming Gorge Dam levels. As part of the Levee Removal Program a study was designed to monitor native and nonnative fish utilization of floodplain wetlands. However, because there were very few razorback suckers reproducing in the system, answers to several important questions pertaining to razorback sucker utilization of the floodplain were not answered during the initial Levee Removal Study. These questions were: 1) Can larval razorback suckers be entrained in the floodplain by lowering levees to improve the riverine-floodplain connection? 2) Can they be entrained at high enough numbers to ensure some survival from predation by nonnative fish and piscivorous insects? 3) Will razorback suckers survive, voluntarily migrate from the floodplain during high flows and recruit in to the river population? 4) If so, what cues trigger migration from the floodplain? We have successfully answered the later two questions. This proposal shifts the emphasis and efforts toward the larval life stage to evaluate survival and growth in an environment dominated by nonnative fish species.

During the first year of this study 5,955 age I razorback suckers from the Ouray Hatchery were stocked into The Stirrup, Baeser Bend and Above Brennan Levee Removal sites (1,985 fish in each site). The Stirrup site also received 56,907 larval razorback suckers. During the first growing season in the floodplain, age I fish tripled in size (growing from 103 mm TL in April to 323 mm in October). Survival in October of the first year was estimated at 27 % in The Stirrup (95 % confidence interval  $\pm$  20 %), 54 % in Baeser Bend (95 % confidence interval  $\pm$  9%) and 82 % in Above Brennan (95 % confidence interval  $\pm$  81%). In the spring of 2000, after one full year in the depressions, survival was estimated at 49 % in The Stirrup (95 % confidence interval  $\pm$  32 %), 61 % in Baeser Bend (95 % confidence interval  $\pm$  10%) and 72 % in Above Brennan (95 % confidence interval  $\pm$  53%). Survival of fish stocked as larvae in The Stirrup was not detected (UDWR work in progress).

On 12 April, 2000 an additional 2,511 age I razorback suckers were stocked into each of the three sites. No larval fish were received for stocking in 2000. Survival from this group of age I fish was not detected at Above Brennan and The Stirrup during late summer and fall sampling. In The Stirrup, age I fish that were stocked in 1999 appeared to have also died. Fish from the 1999 stocking were still alive in Above Brennan and they appeared quite healthy. Despite observance of a fish kill on 15 August at Baeser Bend, fish from both age groups were still present in the site. Because of deteriorating water quality conditions the decision was made to move the fish from Baeser Bend to the river. A total of 514 fish were relocated to the river late in the summer of 2000 (UDWR work in progress). Razorback suckers in Above Brennan were left in the site and survived through the winter (2000 - 2001).

Voluntary movement from the floodplain to the river of age I fish was not documented through sampling with the use of modified fyke nets in levee breeches in 1999 or 2000. However, river sampling associated with other recovery program sampling efforts has resulted in the collection of several razorbacks that originated from floodplain stocking, indicating voluntary movement of stocked fish from the floodplains.

Below average flows played a key role in the limited migration and high mortality rates that were observed in 2000. Razorback suckers had very little opportunity to leave the floodplain in 2000. The duration of connection was only 15 days at Above Brennan, seven at Baeser Bend and three at The Stirrup. Short duration and low magnitude spring flows also contributed to lower water quality in two of the sites. The Stirrup site received very little fresh water during high flows. Despite adequate water depth in The Stirrup, dissolved oxygen levels became lethal to all fish in the site by early to mid summer (native and non-native). Baeser Bend received just enough water to fill, but because of a short connection duration sufficient water depth was not retained through the summer to maintain water quality. Conversely, at Above Brennan the connection duration was longer, and because of the three upstream breaches, degraded water was flushed from the site. The high mortality rate of fish stocked in April of 2000 occurred prior to connection and may have been the result of stocking stress. Stocking stress is the suspected cause of mortality for these fish because razorback suckers that were already present in Above Brennan (stocked in 1999) did not die. In the spring of 2001 58,240 larval razorbacks were stocked in the Baeser Bend site. Evaluation of larval survival and growth in Baeser Bend will be conducted in late July - mid August. Age I razorback suckers were not available for stocking in 2001. Poor water quality conditions in the spring and low peak flows and subsequent short connection duration would have precluded successful stocking into the floodplain sites prior to connection during early spring of 2001.

To continue building on the successes of the study, we propose shifting emphasis to stocking larval razorback suckers into floodplain depressions to evaluate survival and growth in environments with abundant nonnative fish.

#### IV. Study Goals, Objectives, End Product:

##### Study Goal

Evaluate stocked larval razorback sucker survival and growth in floodplain environments with abundant nonnative fish species.

##### Study Objectives

- 1) Stock Larval Razorback Suckers in Selected Floodplain Depressions.
- 2) Determine growth and survival of larval razorback sucker stocked into seasonal floodplain wetlands.

## End Product

Report on evaluation of survival and growth of larval razorback suckers stocked into floodplain depressions containing abundant nonnative fish species.

### V. Study area:

Floodplain depressions of the middle Green River including: The Stirrup (RM 276.0), Baeser Bend (RM 273.0), Above Brennan (RM 268.5), Johnson Bottom (RM 262.8; sampled by Vernal - CRFP) and Old Charlie Wash (RM 249.6; sampled by Vernal - CRFP).

### VI. Study Methods/Approach:

#### Objective 1. Stock Larval Razorback Suckers in Selected Floodplain Depressions

Larval razorback suckers will be stocked in The Stirrup (20 acres), Baeser Bend (38 acres) and/or Johnson Bottom (11 acres). Baeser Bend is preferred because it is easier to sample. Larval fish will be stocked within one week of hatching in order to match the size and age of larvae that would naturally be transported to the floodplain. In the previous study the recommended stocking rate for larval fish was 1,000 larvae/acre. We recommend some flexibility with the larval stocking rate to help determine the density needed to achieve survival. Regardless, the actual stocking rate for a given year will likely be determined by availability of larval fish.

#### Objective 2. Monitor Stocked fish.

Survival and growth will be determined by sampling with a combination of light traps, seines, fyke nets, electrofishing and trammel nets. It will be the responsibility of UDWR - Vernal crews to sample the Stirrup, Baeser Bend and Above Brennan sites and the responsibility of USFWS - Vernal CRFP to sample Johnson Bottom and Old Charlie Wash floodplain sites. The most effective gear will be used in subsequent sampling efforts and will be consistent with the proposed larval bonytail survival study in the same wetlands. Water quality, survival and relative abundance of stocked fish and sympatric species will be monitored monthly throughout the summer. In September and October, abundance of juvenile razorback sucker will be determined using a mark recapture estimate. This sampling will coincide with the retrieval of juvenile bonytail from the same wetland sites. All endangered fish captured from seasonal wetlands will be PIT tagged and stocked into the Green River.

This study will be coordinated with the evaluation of larval bonytail survival and growth being directed by the USFWS - Vernal CRFP. Study wetlands on the Ouray National Wildlife Refuge will be sampled by USFWS and BLM study sites will be sampled by UDWR. Sampling will be coordinated such that identical sampling regime will be conducted by each participating agency and data will be exchanged for analysis.

## VII. Task Description and Schedule

### Task 1: Stock larval razorback suckers in selected floodplain wetlands

May 2002 (Table 1)  
May 2003

### Task 2: Field Data Collection

May - October 2002 (Table 1)  
May - October 2003

### Task 3: Data coordination, entry and analysis

October - November 2002  
October - November 2003

### Task 4: Report Preparation

Annual RIP Report (12/02 and 12/03)  
Draft report to coordinator July 1, 2004; to peer reviewers and BC Aug 1; back to BC Oct 15.

## VIII FY-2002 Work

1. Deliverables/due dates: Annual Report 15 December 2002
2. Budget:

### Task 1: Stock Fish

Labor- Biologists	3,500
\$1K, technicians	
\$2.5K	
Travel-	1,000
Equipment-	500

### Task 2: Field Data Collection

Labor- 2 biologists	37,000
for 5 weeks =\$15K,	
5 technicians for 12	
weeks =\$22K	
Travel- mileage,	3,500
rent	

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Equipment and maintenance-light traps, nets, electrofishing parts	3,000
Other-	1,500

Task 3: Data Entry and Analysis

Labor- Biologists \$2K, technicians \$2.5K	4,500
Other-	500

Task 4: Report Preparation

Labor- Biologist 2 weeks	2,500
Travel-	500
 Total	 \$58,000

IX. FY-2003 Work

1. Deliverables/due dates: Annual Report 15 December 2003
2. Budget:

Task 1: Stock Fish

Labor-Biologists \$1K, technicians \$2.5K	3,500
Travel-	1,000
Equipment-	500

Task 2: Field Data Collection

Labor-2 biologists for 5 weeks =\$16K, 4 technicians for 12 weeks =\$29K	45,000
Travel-	3,500
Equipment-Same as above	3,000
Other-	1,500

Task 3: Data Entry and Analysis

Labor- Biologists \$2K, technicians \$2.5K	4,500
Other-	500

Task 4: Report Preparation

Labor- Biologist	2,500
Travel-	500
Total	\$66,000

X. FY - 2004 Work:

1. Deliverables/due dates: Draft Report to coordinator July 1, 2004
2. Budget:

Task 4: Report Preparation

Labor- Biologist	7,500
Travel-	500

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Total \$8,000

XI. Budget Summary

FY-2002 \$58,000

FY-2003 \$66,000

FY-2004 \$8,000

Total \$132,000

XII. References

Lentsch, L., T. Crowl, P. Nelson, and T. Modde. 1996. Levee removal strategic plan. Utah Division of Wildlife Resources, Salt Lake City, Utah. 21 pp.

Utah Division Wildlife (UDWR). Investigation of larval and juvenile razorback sucker survival to recruitment in floodplain depressions in the presence of non-native fishes. *Work in progress*. Final Report Due March 2002.

Table 1. Proposed sampling schedule for evaluating survival and growth of larval razorback sucker stocked into floodplain depressions.

	April	May	June	July	August	September
Stock Fish						
Monitor Water Quality						
Monitor fish growth and abundance						
Estimate population size						