COLORADO RIVER RECOVERY PROGRAM
FY 2002 ANNUAL PROJECT REPORT

RECOVERY PROGRAM
PROJECT NUMBER: C-6-RZ

I. Project Title:

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

II. Principal Investigator(s):

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III. Project Summary:

Floodplain wetlands are considered important rearing habitat for razorback suckers. However, the presence of large nonnative fish populations in floodplain habitat may hinder or prevent survival of entrained larval razorback suckers. Nonnative fish are considered a primary factor preventing recruitment of razorback suckers in the Upper Colorado River Basin. An earlier study, conducted by the Utah Division of Wildlife (UDWR), evaluated stocking of larvae and juvenile razorback suckers into floodplain wetlands with existing nonnative fish populations. During this study juvenile razorback sucker growth and survival was excellent, however larval survival was not detected.

Densities of nonnative fish are fairly low in floodplain wetland habitats during the first inundation period following an event that eliminates or "resets" nonnative populations in a site (i.e. draught). Nonnative fish entering floodplain wetland habitats from the river during this initial inundation period reproduce and fish populations increase rapidly. High densities of nonnative fish remain in floodplain sites until the next "reset" event. The best opportunity for larval razorback sucker survival and eventual recruitment in floodplain habitats may occur the first year following a "reset" of the nonnative fish population. Larval razorback suckers that enter floodplain sites the first year after a "reset" will not have to face large existing populations of nonnative fish, which may help survival through their most vulnerable period.

The purpose of this study was to evaluate survival and growth of larval razorback suckers following a "reset" of nonnative fish populations in floodplain habitat. However, because of the draught a natural connection with the river did not occur. To overcome this problem water was pumped into The Stirrup site and larval razorback suckers were stocking into two ¼ acre enclosures at different stocking densities. Each enclosure was stocked with densities of nonnative fish similar to those observed during an initial connection period. Following stocking zooplankton densities and water quality was monitored at the site through the study. Survival estimates for razorback suckers were tabulated in late July at the conclusion of the study.

Survival of larval razorback suckers inside each enclosure was detected and progress is on track given the flow conditions. Further progression regarding larval razorback sucker survival in floodplain habitat will occur when larval fish are stocked into a floodplain site without enclosures during a year flows are adequate for natural inundation. This will more closely mimic a natural scenario than can be achieved with enclosures and artificial maintenance of water in the site. If adequate flows occur next year this study could be completed at the end of next summer.

IV. Study Schedule: 2002 - 2004

V. Relationship to RIPRAP:

GREEN RIVER ACTION PLAN: MAINSTEM
II. Restore habitat
II.A.3. Implement levee removal strategy at high priority sites.
II.A.3.c Evaluation

VI. Accomplishment of FY 2002 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1: Stock larval razorback suckers into two ¼-acre enclosures at The Stirrup.

Larval razorback suckers were stocked into each enclosure at the site. There were 60,373 larval razorback suckers stocked into one enclosure and 457,193 stocked into the other. Each enclosure was also stocked with about 75 fathead minnows, 42 red shiners, 16 black bullheads, 12 green sunfish and 4 carp. A 16' X 16' control pen received 1,000 larval razorback suckers and no nonnative fish (Appendix Table 1).

Task 2: Field data collection

Between initial stocking and termination of the study, zooplankton densities inside each enclosure and outside in open water were sampled weekly to document food availability. Temperature and dissolved oxygen were monitored through 24 periods on several occasions per week. Efforts to visually observe fish were also made during this period. Dissolved oxygen levels remained adequate for fish survival through the study. Zooplankton levels were in decline a few weeks before the end of the study.

The evaluation inside the enclosures was terminated the end of July. Sampling inside and outside the enclosures began on 7/22/02 and ended on 8/13/02. Sampling outside the enclosures occurred to evaluate escapement of larval fish from the enclosures. All fish were captured with fyke nets that were set overnight. Fish were removed from the control pen with a seine on 7/31/02 and 8/01/02. Total length and weight were recorded for a sub-sample of razorback suckers that were captured in each area. Razorback suckers captured inside the enclosures were counted and released outside the enclosures into the main wetland. Population estimates for razorback suckers and nonnative fish captured inside the enclosures were generated using a removal estimator. Nonnative fish that were captured were enumerated and removed from the site.

Population estimate for razorback suckers were estimated at 403 fish (± 137) in the low density enclosure and at 1,622 fish (± 445) in the high density enclosure. Outside the enclosure there were an estimated 1,363 razorback suckers (± 884). In the control pen 118 razorback suckers were caught. Average lengths for these fish were 70 mm in the low density enclosure, 58 mm in the high density, 69 mm in the control and 90 mm outside the enclosures (Appendix Table 1).

Nonnative captures totaled 33,874 fish in the low density enclosure, 26,763 in the high density enclosure and 11,248 outside the pens. Species composition in the low density pen was 18,419 green sunfish, 11,939 fathead minnows, 3,425 black bullheads and 91 red shiners. In the high density enclosure there were 14,909 green sunfish, 7,779 fathead minnows, 4,000 black bullheads and 75 red shiners. Outside the enclosures 6,080 fathead minnows, 3,478 green sunfish, 1,677 black bullheads and 13 red shiners were captured (Appendix Table 1).

Sampling was also conducted in the main wetland in early October to determine average growth of razorback suckers for the summer and to continue survival estimates. Fyke nets were set at the wetland on 30 September – 3 October and again on 7 October. The population estimate for razorback suckers still remaining in the site was 2,461 ± 1024. Average size was 163 mm and 53 grams. There were also 13,355 fathead minnows, 2,568 green sunfish, 2,576 black bullheads and 23 red shiners captured (Appendix Table 2).

Task 3: Data coordination, entry and analysis

Most data entry and coordination between principle investigators has accomplished for this year of the study. Data analysis has been initiated.

Task 4: Report preparation

-Annual RIP Report due December 2002 completed
-Annual RIP Report due December 2003
-Final Report due July 15, 2004

VII. Recommendations:

The reset scenario needs to be tested on a larger scale without enclosures. Larval razorback suckers should be stocked into a "reset" wetland site that inundates and naturally repopulates with nonnative fish. This scenario closely mimics conditions wild larval razorback suckers will encounter as they are entrained in floodplain wetland habitat during high flows. Razorback sucker survival under this scenario may be a key component for establishing self-sustaining populations.

VIII. Project Status: On-track and ongoing

IX. FY 2002 Budget Status

A. Funds Provided: $52,000
B. Funds Expended: $52,000
C. Difference: $0
D. Percent of the FY 2002 work completed, and projected costs to complete: 100%
E. Recovery Program funds spent for publication charges: $0

X. Status of Data Submission (Where applicable): Several razorback suckers were PIT tagged during fall sampling. A copy of Pit tagged fish data will be sent to the database manager.

XI. Signed: Kevin Christopherson 12/9/02
Principal Investigator Date

APPENDIX:

Table 1. Summary of stocking and July fish capture data for larval razorback suckers stocked into the Stirrup during spring 2002.

	Number Stocked			
	Low Density	High Density	Control	Outside Pen
HHigh Density	ControHi	Outside		
Razorback suckers	60,373	457,193	1,000	0
Bonytail chubs	21,250	45,000	5,250	0
Total	81,623	502,193	6,250	0
Fathead minnows	75	81	0	0
Red shiners	42	37	0	0
Black bullheads	16	15	0	0
Green sunfish	12	18	0	0
Carp	4	3	0	0
Total	149	154	0	0
Native fish capture data				
# razorbacks captured	359	1,709	118	268
Population estimate (#)	403	1,622	[a]118	1,363
95 % confidence (#)	+137	+ 445	N.A.	± 884
Average length (mm)	69.5	58	68.7	90.4
Length Range (mm)	43 – 106	36 – 83	34 – 115	70 – 105

Nonnative capture data				
Grams captured	25,059	20,350	N.A.	34,960
Population estimate (g)	28,396	19,954	N.A.	Unavailable
95 % confidence (g)	± 1,374	+ 5,041	N.A.	Unavailable
Number Captured				
Green Sunfish	18,419	14,909	[B]54	3,478
Fathead minnows	11,939	7,779	[B]22	6,080
Black bullheads	3,425	4,000	0	1,677
Red shiners	91	75	4	13
Total	33,874	26,763	80	11,248

Table 2. Summary of October 2002 razorback sucker and nonnative fish data for the Stirrup.

Native fish Data	**October sampling at The Stirrup**
Number of new razorbacks captured	276
Number of recaptures	53
Population estimate	2,461
95 % confidence interval	± 1,024
Average Length (mm)	163
Average Weight (g)	53
Range (mm)	95 – 234

Nonnative Fish Data	**Number Captured**
Fathead minnows	13,355
Black bullheads	2,576
Green sunfish	2,568
Red shiners	23
Total	18,522