

COLORADO RIVER RECOVERY PROGRAM
FY 2009 ANNUAL PROJECT REPORT

RECOVERY PROGRAM
PROJECT NUMBER: C-6 Baeser

I. Project Title: Rearing razorback sucker in Baeser Bend, wetland of the Green River

II. Principal Investigator:

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III. Project Summary:

Baeser Bend is a floodplain wetland used to acclimate young razorback suckers to a natural environment and when the suckers grow enough, they are captured, tagged, and released into the Green River. This study began in 2008 when larval razorback sucker were stocked in the spring and Age-0 razorback sucker were stocked in the fall. First year growth and survival of those cohorts was reported last year. Second year vital rates of the 2008 cohort were tracked through the 2009 field season and are reported here. Similar stocking occurred in 2009. In general larval survival was good in 2008 and nonexistent in 2009, which was attributed to competition and predation of larvae by nonnative minnows in 2009. We tagged and released 1,026 razorback sucker (average size = 302mm; range 200-391mm) from Baeser Bend to the Green River in 2009. We recommend continued acclimation studies at Baeser Bend in 2010 and 2011.

IV. Study Schedule:

2008-Indefinitely

V. Relationship to RIPRAP:

Green River Action Plan: Mainstem

IV.A. Augment or restore populations as needed.

IV.A.1. Develop state stocking plan for the four endangered fishes of the Green River.

IV.A.1.c. Implement plan.

VI. Accomplishment of FY 2009 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

We borrowed a 12 inch (in) pump and tractor from the Ouray National Wildlife Refuge and pumped water into Baeser Bend from December 1– 4, 2008. The water level was 4 feet (ft) after this pumping and the wetland started freezing shortly after. We checked ice

conditions periodically over the winter and ice was 3 ft thick in February with about 8 in of water below the ice. Ice melted completely in late March, and we sampled the wetland to obtain a population estimate March 30 – April 2, 2009.

We set six fyke nets in an arrow pattern (four set touching each other in a straight line and two on the end of the line closest to the shore at 45 degree angles) on March 30. We checked and reset the nets 24 hours later and captured 625 razorbacks. We used hole punches to mark the upper caudal fin of each razorback and then released them randomly back into the wetland. All razorbacks ≥ 150 millimeter (mm) total length (TL) were also PIT tagged. We pulled the nets the morning of April 2 and captured 553 razorbacks of which 28 were recaptures from the previous day. The first day we tagged 172 razorbacks and we recaptured 10 of these. We did not detect a PIT tag in one of the recaptured fish (a hole punch was clearly present). The sample of razorbacks had a distinct break in lengths between the two stocked cohorts (Figure 1), so we made population estimates for both cohorts. This yielded population estimates of 3,195 (95% CI 1,418- 4,972, \bar{X} =186 mm) for the cohort stocked in May 2008, and 9,395 (95% CI 5,120- 13,670, \bar{X} =91 mm) for the cohort stocked in October 2008. We also documented numerous red shiners, sand shiners and fathead minnows in the nets. Exact numbers were not recorded.

On April 13-16 we set six fyke nets and checked them daily to capture razorbacks to stock into the Stirrup wetland. It was later determined that the Recovery Program did not want the fish from Baeser in the Stirrup. All razorbacks ≥ 200 mm were PIT tagged and stocked into the Green River, and all razorbacks 150 - 200 mm were PIT tagged and released back into Baeser Bend to provide survival and growth data. With the combined efforts of the population estimates and capturing fish for the Stirrup, we pit tagged 373 razorbacks. Twenty-four of these were released into the Green River and the remaining 349 were released back into Baeser Bend.

We started the acquisition process for a pump to be used at Baeser Bend in February 2009, but this process took enough time that it was necessary to obtain a pump to keep water levels at acceptable levels. We borrowed a 6 in pump from the Bureau of Reclamation in Grand Junction, Colorado, and pumped water in late April and early May. During our April sampling we observed numerous great blue herons and white pelicans on Baeser Bend and with low water levels, action needed to be taken to decrease avian predation. Significant avian predation on razorbacks may have occurred during the spring when water levels were low. We obtained bird deterring reflectors and deployed them on the west side of Baeser Bend where we observed the most birds. We do not have data to clearly comment on their effectiveness, but recommend their continued use.

On June 1, 2009, 110,000 larval razorbacks (\bar{X} =10 mm) were stocked into Baeser Bend from the Ouray National Fish Hatchery. The hatchery personnel observed that as the larvae were released, they were immediately preyed upon by the numerous cyprinids. During sampling from September to October, this cohort was not detected. The May 2008 larval cohort was collected in large numbers during the fall 2008 sampling when

nonnative cyprinids were much less abundant. We believe that there was no survival of this June 2009 cohort and think the primary reason is predation by cyprinids. We have observed cyprinids enter the wetland through our pumping. We have a filter that does allow cyprinids to pass through the pump alive. In the future, we will attempt to screen the filter with small mesh screening that should preclude any small fish from entering the wetland.

We purchased an 8 in pump and pumped water into Baeser in July, September and October. With this new 8 in pump, we were able to maintain a water level > 3 ft for the remainder of the summer. While pumping in July we observed razorbacks concentrated at the discharge of the pump. The next day we captured 131 razorbacks using dip nets at the discharge pool from the pump. Of those 131 fish, four were recaptured fish from April sampling and only one fish was < 200 mm. We tagged that fish and released it and the four recaptures on the opposite side of the wetland. Of those five fish, two were recaptured at the discharge site the next day. The razorbacks are attracted to this water coming from the river. We are uncertain of the reason for which the fish concentrate at the discharge hose, but speculate that it may be current, different water temperature, or oxygen content of the water. Regardless of the reason, we found that we can use the pump as a method to capture fish. To date, 321 razorbacks have been captured and released into the Green River by attracting them through pumping. We plan to pump one last time in November to raise the water level as high as possible before ice-on.

We tagged and released 1,026 razorbacks from Baeser Bend to the Green River by using the following methods: fyke nets (392), pumping / dipnetting (321), and electrofishing (313). These fish were captured from April until October, and they averaged 302 mm (200-391). During the sampling after April, we only documented eight of the 350 tagged fish that were released into Baeser, and of the eight recaptured fish, we documented seven more than once. With the assumption of all fish having equal probability of recapture, we expected to capture more tagged fish. The reason for the lack of recaptures and/or disproportional ratio of tagged fish to untagged fish in our catch is uncertain, but tag loss or failure to detect tags, handling mortality, or predator selection for larger fish (the PIT tagged fish were the larger cohort; the smaller cohort was too small to tag) are possible explanations.

These recaptures provided growth data. Baeser is a very productive wetland where razorbacks can grow very quickly. Two fish captured 4/16/2009 that measured (mm) 155 and 233 grew to 295 and 335 respectively on 7/28/2009. These fish feed entirely on natural food items.

During our sampling, we noticed significant mortality in fish captured through boat electrofishing. About 20% of razorbacks released to the river were in questionable condition. Upon checking nets and electrofishing during the fall, we documented 5 dead razorbacks that we found in the wetland that we suspect died due to electrofishing. However, given the uncertainty of overwinter survival of these larger razorbacks, we felt that the mortality associated with the continued use of this technique was warranted.

After we had released over 1,000 razorbacks into the river, we decided that the remainder of the razorbacks captured before winter should be tagged and left in Baeser to provide a population estimate and to assess overwinter survival of larger razorbacks.

From October 17-26, we used fyke nets to capture and PIT tag 58 individual razorbacks (four recaps). We estimated the population of razorback sucker in the Baeser wetland entering the winter of 2009-2010 (using the weighted average of four models in program MARK) at 163 (95% CI 65-560). We plan to assess overwinter survival of larger razorbacks and use that information to decide if we should continue to use electrofishing as a removal method.

In spring 2009 we estimated 12,590 razorbacks in Baeser, and after taking out 1,026 that were stocked into the river in the fall, we estimated 163 remaining. This is 92% mortality from spring to fall. We know that some mortality occurred in the sampling of the fish, but the majority probably was due to bird predation. We observed up to 17 piscivorous birds on Baeser in the spring when water levels were around 2 ft. Since then we have obtained a pump that we can use to regulate water levels and have a migratory bird depredation permit that allows us to eliminate problem birds. Problematic birds were not observed in abundance in the summer or fall at Baeser. We expect bird predation to be less of an issue in the future with the ability to eliminate problem birds and to regulate water levels.

On October 30, 2009, the Ouray National Fish Hatchery stocked 14,900 razorback suckers (\bar{X} = 107 mm) into Baeser Bend. We pumped the wetland to 4.5 ft just prior to the stocking to increase survival. These fish are significantly larger than the October 2008 cohort and because of this we expect a higher over-winter survival of this cohort.

VII. Recommendations:

I recommend that we pump Baeser Bend as high as possible as soon as weather permits in late winter or early spring 2010, and keep the water level as high as logistically possible all summer long. I recommend sampling with fyke nets and pumping in the spring to assess overwinter survival of the 2008 and 2009 cohorts. As we capture razorbacks, I recommend PIT tagging all razorbacks >150mm and transferring all of those \geq 200mm into the Green River. At Baeser, it is very difficult to capture razorbacks. My justification of releasing fish 200-300mm into the river is that there is a good chance we will never handle those fish again. In late summer and fall of 2010, I recommend using netting, pumping, and potentially electrofishing (pending overwinter survival rates of larger fish), to capture razorbacks and then tagging and releasing them into the Green River.

We have documented three non-native fish species in Baeser Bend: fathead minnow, sand shiner and red shiner. I am confident that if there were other nonnative fish of concern (i.e. smallmouth bass or northern pike), we would have documented them with the amount of effort we put into sampling during fall 2009. From our experience, larval

razorback will not survive in Baeser Bend with dense populations of adult cyprinids, but they will survive after they have grown past the gape limitation of these predators. I recommend that we continue to stock razorbacks into Baeser Bend in the fall after they are large enough to avoid predation by shiners and fathead minnows and continue this stocking cycle indefinitely as long as no other nonnative fish of concern (i.e. northern pike or smallmouth bass) colonize Baeser Bend.

We have shown that Baeser Bend can produce healthy razorback suckers to be stocked into the river. The next step in assessing the value of Baeser Bend as an acclimation site is to determine if razorbacks reared in Baeser Bend make a contribution to the spawning population in the river. We plan to expand our scope of work to include setting up PIT tag readers on Razorback Bar starting in May 2011 to detect razorbacks from Baeser Bend. This work will also help assess success of hatchery reared razorbacks by detecting them on the spawning bar.

Program Director's Office Note: We suggest that the Biology Committee also consider resetting Baeser Bend in the fall / winter 2010 to increase the likelihood of larval survival in 2011. Vernal-CRFP prefers stocking razorback sucker at a larger size (50-100mm) to avoid predation by nonnative cyprinids.

VIII. Project Status: Ongoing

IX. FY 2009 Budget Status:

- A. Funds Provided: \$71,110
- B. Funds Expended: \$71,110
- C. Difference: 0
- D. Percent of the FY 2009 work completed, and projected costs to complete: 0
- E. Recovery Program funds spent for publication charges: 0

X. Status of Data Submission: Data is recorded and sent to Travis Francis and is available upon request.

XI. Signed: Aaron Webber October 29, 2009
Principal Investigator Date

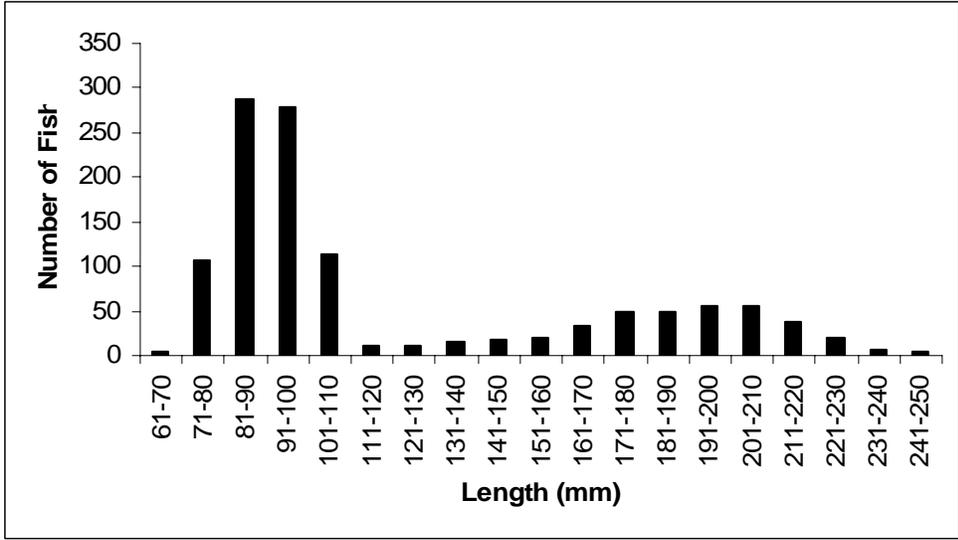


Figure 1. Length frequency of razorbacks captured spring 2009, Baeser Bend.