COLORADO RIVER RECOVERY PROGRAM
FY 2015 ANNUAL PROJECT REPORT

RECOVERY PROGRAM
PROJECT NUMBER: FR-164

I. Project Title: Middle Green River floodplain sampling

II. Bureau of Reclamation Agreement Number: R13PG40020
Project/Grant Period: Start date: 10/01/2013
End date: 09/30/2015
Reporting period end date: 09/30/2015
Is this the final report? Yes _X__ No ____

III. Principal Investigators:
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IV. Abstract:
We sampled floodplain wetlands during high water connection this spring using light traps to identify sites where razorback sucker larvae were being entrained. Sites that were flooded included Escalante Ranch, Stewart Lake, and Johnson Bottom. Razorback sucker larvae were collected from Stewart Lake and Johnson Bottom. USFWS sampled Johnson Bottom intensively during wetland draining this fall to determine whether razorback sucker juveniles had survived through summer. We also sampled Leota 7 in April to determine whether juvenile razorback suckers captured there in 2014 had survived the winter.

V. Study Schedule: 2012-ongoing

VI. Relationship to RIPRAP:
Green River Action Plan: Mainstem
I.A.3.d.1. Conduct real-time larval razorback and Colorado pikeminnow sampling to guide Flaming Gorge operations.
I.D.1.b.(4)(a) Implement LTSP
V.D.1. Implement razorback sucker monitoring plan

VII. Accomplishment of FY 2015 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Spring Wetland Sampling at Leota 7

We sampled Leota 7 using fyke nets April 13-16. Crews deployed ten fyke nets throughout the wetland, and left nets overnight before checking for fish. During this sampling, we captured 31 razorback sucker, one of which was an adult that entered the wetland during spring floods in 2014. The other 30 fish were juvenile wild razorbacks 90-181mm in length. These juveniles were spawned in 2014 and entered the wetland as larvae during peak flows that year. The adult fish was stocked at the Ouray National Wildlife Refuge (NWR) in October 2013. Juvenile fish >100mm were PIT-tagged and released back to the wetland on the first day, and then subsequent captures were released to the Green River at RMI 255. We released 24 fish to the river from this wetland sampling. During high river flows in the Green River, Ouray NWR managed the water canal system for Leota Bottom

to maximize water delivery to Leota 7, in order to increase the chances for razorback sucker survival there.

Larval Trigger and Spring Peak Flow Hydrology

U.S. Fish and Wildlife Service monitors larval razorback sucker (RZB) drift through the use of light traps, starting each spring in May or as water temperatures indicate spawning is imminent. We detected the first RZB larvae on May 8 at Cliff Creek and the Stewart Lake outlet canal, when mean daily flow at Jensen, UT was 8,750 cfs and mean water temperature was 13.1°C. Bureau of Reclamation began increasing Flaming Gorge releases on May 11, to a peak of around 8,000 cfs on May 14. Releases from Flaming Gorge remained at 8,000 cfs until May 21. The Green River at Jensen peaked at 15,800 cfs on May 21. Flows increased from 14 May until the peak, after which floodplain connecting flows began to drop, causing reverse water flow back to the river. Details of spring larval sampling can be found in the annual report for project 22f, but much of the larval identification and final data are still pending laboratory verification, which is currently in process.

Once floodplain wetlands were connected to the river and contained enough water to sample with light traps, we deployed traps to confirm larval RZB had been entrained from the main channel. Light traps were deployed in wetlands at the Escalante Ranch and Johnson Bottom. Utah Division of Wildlife Resources set light traps in Stewart Lake. The wetland at Above Brennan also connected with the Green River on 21 May, but the connection was minimal, and consisted of shallow water moving through thick vegetation and debris. We did not deploy light traps at this location because the connection to the river was brief and did not appear to be capable of entraining larvae into the wetland. Based on fall sampling from 2014, both Escalante Ranch and Above Brennan contained existing populations of nonnative fishes when the river connected to them. These standing populations made it less likely that razorback sucker larvae would have been able to recruit to juvenile size. Much of the floodplain monitoring and sampling effort this year focused on the intensively managed Johnson Bottom site.

Johnson Bottom Wetland Management and Sampling Results

Water Management

In April 2015, U.S. Bureau of Reclamation construction crews performed sediment removal, restored the downstream levee breach, and cleared the water control canals at Johnson Bottom as part of a USFWS Cooperative Recovery Initiative grant. The Vernal CRFP office also constructed a nonnative fish screen consisting of four foot diameter culvert pipe with ½ inch slots. This design was to allow larval RZBs into the wetland while excluding adult and juvenile nonnative fishes. Water from the Green River flows into a canal which leads to a water control gate. This water then passes through the slotted exclusion pipe, and through the water gate culvert to fill the wetland. At higher flows, water can also enter the wetland through a ~70 meter breach downstream.

Once larval RZBs were confirmed in the Green River, we opened the water control gate at Johnson Bottom on May 11, in anticipation of the Flaming Gorge releases. Flows at the Ouray gage (13 miles downstream) at that time were approximately 10,000 cfs. We also were able to collect RZB larvae in the Johnson Bottom canal when we opened the gate. We set light traps in the wetland after opening the gate, and collected RZB from within the wetland beginning May 19. On May 16, the breach began flooding at ~13,000 cfs at the Ouray gage. We installed a net across the breach on May 13, in an attempt to reduce nonnative fish movement into the wetland. The net did develop holes and collapsed during higher flows, but we repaired it daily. We were able to observe adult carp that entered the wetland through the breach. We closed the gate to the wetland on May 22, even though river flows were still over 14,000 cfs. The wetland had filled and flows began to drop, causing back

flow from the wetland to the river. This backflow could not be prevented through the breach, so we closed the water control gate to minimize drainage from that outlet, which can continue after the breach disconnects from the river.

We monitored water quality throughout the summer using miniDOT dissolved oxygen and temperature loggers. Around mid-August, dissolved oxygen levels did approach zero for a few hours each night until photosynthesis increased during the day. There was no evidence of a fish kill during this time, and sampling at the end of summer (see below) yielded many fish of different species and sizes. To alleviate dropping water levels and low dissolved oxygen, we used an eight-inch pump to pump water from the river into the wetland. This pumping lasted for 10 days between August 27 and September 11, and increased the wetland depth by six inches. Finally, we opened the water gate on October 19 to drain the wetland and collect any native fish still present. We installed slotted screens in the drain gate, and ran the water through a fish kettle before it entered the canal back to the river. The kettle design with screens allows water to flow out, while holding fish in the 17x10 meter kettle. Fish can then be sampled using a seine. Results from this sampling are presented below.

Fish Sampling

We sampled fish in Johnson Bottom in mid-July, and then again when we drained the wetland in late October. In July, we set eight fyke nets in the deepest water near the inlet gate and pulled seines in the canal nearest the gate. After two nights of netting, we were able to capture 115 age-0 razorback sucker (Figure 1), one age-1 Colorado pikeminnow, and four adult bonytail. The razorback suckers collected in fyke nets experienced high mortality (53%) due to high numbers of nonnative fishes also present in the nets. The small size of the suckers and high summer temperatures made them susceptible to handling stress and trauma from being smothered in nets with large numbers of other fish. The pikeminnow presumably entered the wetland through the breach in the spring, as did the four bonytail. These fish were stocked in late summer of 2014—two at the Ouray NWR and two at Rainbow Park in Dinosaur National Monument, 65 miles upstream. Other species caught in the nets included young-of-year carp, fathead minnows, red shiners, and green sunfish, in order of abundance (Figure 2).

Because of the handling stress from the first netting, we avoided handling fish during the summer months, and monitored water quality only. At the end of summer, when we began draining the wetland, we sampled fish at the outlet gate fish kettle in order to pass native fish back to the river and prevent nonnative fish from escaping. Fish captured during this time included 38 white sucker (Figure 3), two adult bonytail, one age-0 bluehead sucker, and one age-0 flannelmouth sucker. We captured no RZB during this time, nor were we able to capture three of the bonytail or the pikeminnow found in July. We also sub-sampled the nonnative fish community during draining (Fig. 4). The composition of fish remaining in the wetland in October consisted of 71% fathead minnow, 23% red shiner, 5% green sunfish, and small numbers (<1% each) of white sucker, carp, brook stickleback, and black bullhead. There were few adult carp observed at this time, and it is interesting to note the apparent decrease in carp captured compared to that of the July sampling. We also sampled within the wetland with seines during the draining period, and fish community composition was similar to that of the outlet gate.

The two bonytail captured during draining were both stocked at Ouray NWR in August 2014. One of these fish was captured in a fyke net during the July sampling. These fish were adults that must have entered the wetland when the breach was flooding. These fish were stocked at 230 and 275mm and by mid-October had grown to 315 and 355mm, respectively. The white sucker captured during draining ranged from 82 to 245mm, indicating some of them also likely entered the wetland through

the breach. The presence of a range of sizes of nonnative suckers, as well as the other species present, suggests that water quality issues were not the primary reason for a lack of RZB survival. Water levels in the wetland did reach 0.77 meter and lower before pumping, and we observed pelicans and other birds throughout the summer.

VIII. Additional noteworthy observations:

IX. Recommendations:

- We recommend continuing this work to evaluate the entrainment and survival of RZB, as well as other native species, under the Larval Trigger Study Plan. This work provides information on presence of both larval and juvenile RZB in monitored floodplain habitats.
- Continue to manage Johnson Bottom for larval RZB entrainment and growth. Sample fish through use of seines during summer to track growth and survival.
- Consider pumping river water earlier to maintain greater water depths in the Johnson Bottom wetland during summer.
- Stock bonytail either in the wetland canal during high flows, or directly into the wetland. Bonytail stocked into the canal could access the river, and the canal could serve as a low velocity transition area. Also, hatchery staff report that bonytail approach spawning condition in spring before stocking and often volunteer spawn in hatchery ponds. If fish do spawn in the canal, larvae might be swept into the wetland through the fish exclusion culvert. At least five adult bonytail entered the wetland during high flows, suggesting this might be a preferred habitat.

X. Project Status: on track and ongoing

XI. FY 2015 Budget Status

A. Funds Provided: $68,205
B. Funds Expended: $68,205
C. Difference: -0-
D. Percent of the FY 2015 work completed: 100%
E. Recovery Program funds spent for publication charges: -0-

XII. Status of Data Submission: Data will be submitted to the database manager by December 2015.

XIII. Signed: M. Tildon Jones — 13 November 2015

Principal Investigator — Date

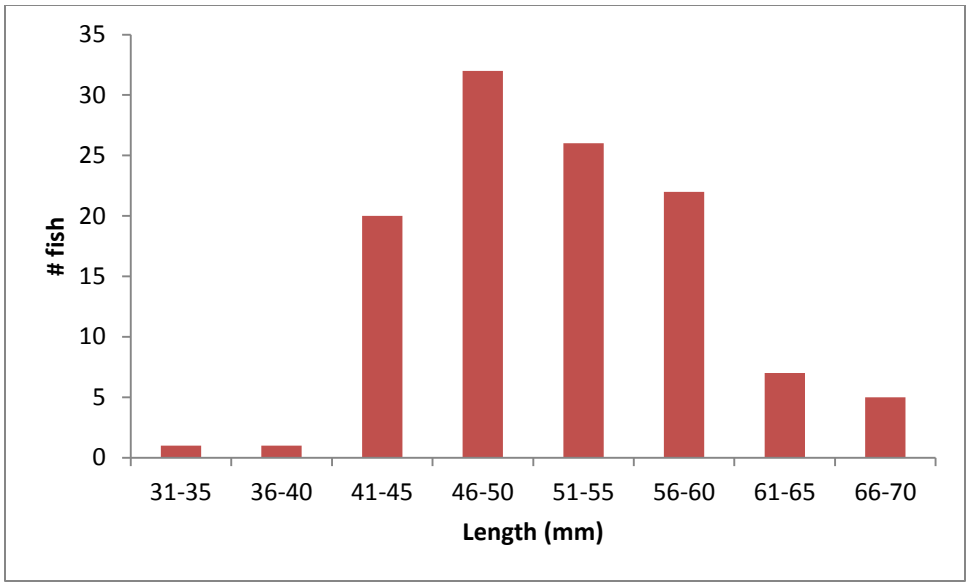

Figure 1. Length-frequency histogram for razorback sucker caught in Johnson Bottom, July 2015.

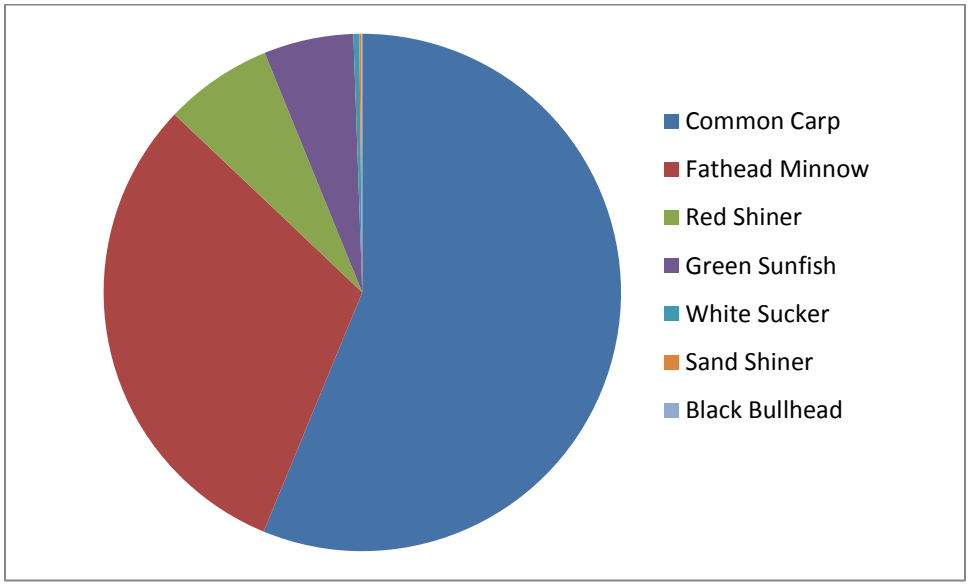

Figure 2. Species composition of other fish captured in Johnson Bottom, July 2015.

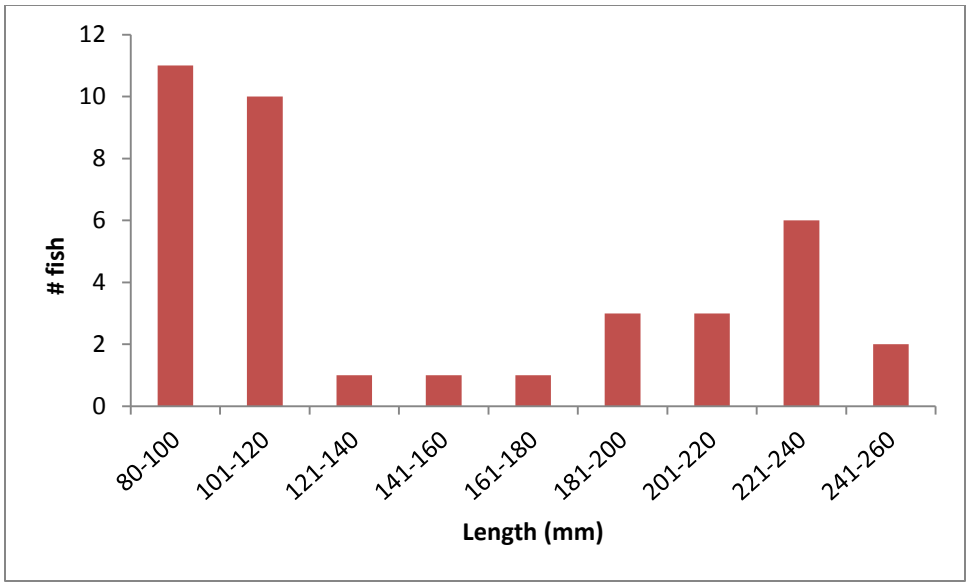

Figure 3. Length-frequency histogram of white sucker captured in Johnson Bottom, October 2015.

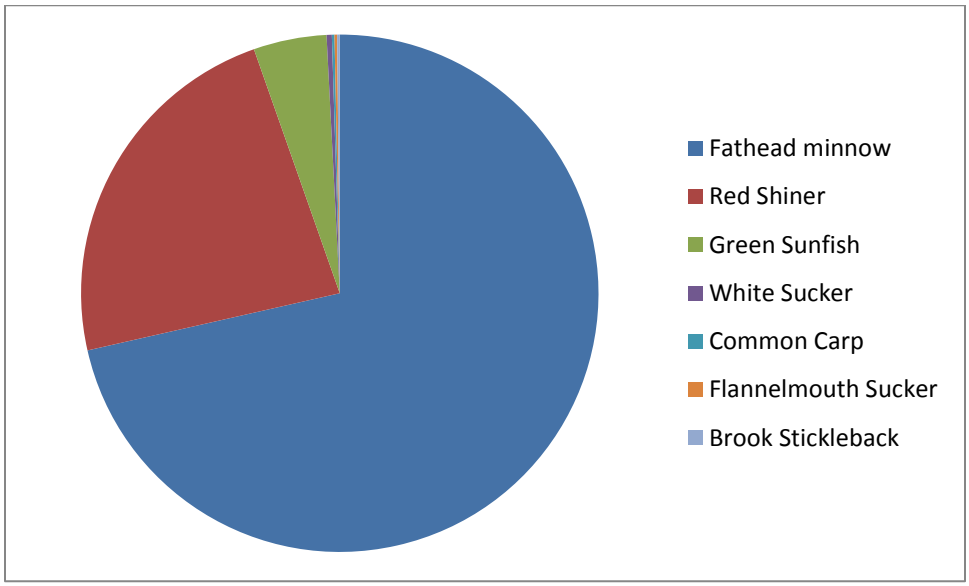

Figure 4. Species composition of fish sub-sampled from the fish kettle at Johnson Bottom, October 2015.