

- I. Project Title: Middle Green River floodplain sampling
- II. Bureau of Reclamation Agreement Number: R15PG00083
Project/Grant Period: Start date: 10/01/2014
End date: 09/30/2019
Reporting period end date: 09/30/2016
Is this the final report? Yes 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, Bonanza Bridge, Stirrup, Above Brennan, Johnson Bottom, Wyasket Lake, and Old Charley. Preliminary results indicate razorback sucker larvae were collected from Stewart Lake (see FR-165 report), Bonanza Bridge, Stirrup, Above Brennan, and Johnson Bottom. We also collected adult and young-of-year bonytail from Johnson Bottom, indicating successful spawning in the wetland.
- 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 2016 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

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 28 at Cliff Creek, when mean daily flow at Jensen, UT was 11,100 cfs and mean water temperature was 13.6°C. Bureau of Reclamation began increasing Flaming Gorge releases on May 31, to a peak of around 8,600 cfs¹ on June 9. Releases from Flaming Gorge remained at 8,600 cfs until June 29. The Green River at Jensen peaked at 20,500 cfs on June

¹ Flow measured by Bureau of Reclamation through the dam outlet and bypass. This value differs from the USGS gage at Greendale, UT.

12, after two smaller peaks of 15-16,000 cfs in mid-May. These smaller pulses likely began filling some wetlands before the detection of RZB larvae. Flows increased from June 1 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, we deployed light traps to confirm larval RZB had been entrained from the main channel. Light traps were deployed in wetlands at Escalante Ranch, Stirrup, Above Brennan, Leota Bottom, and Johnson Bottom. Utah Division of Wildlife Resources set light traps in Stewart Lake. We observed flooding at Wyasket Lake and Old Charley wetland, but were not able to sample those sites because of access issues. Based on previous sampling, Escalante Ranch and Leota Bottom contained existing populations of nonnative fishes when the river connected to them, and we were unable to detect RZB larvae in those sites. Larvae were collected, however, from Stirrup, Above Brennan, and Johnson Bottom between June 8-10. We also seined the Bonanza Bridge wetland on June 15 and collected RZB larvae from that site.

Johnson Bottom Wetland Management and Sampling Results

Water Management

Due to high forecasted flows, we did not attempt to block fish access from the river through the large, downstream breach, nor did we manage water through the much smaller control structure. As a result, Johnson Bottom was connected to the Green River from approximately May 9 (avg daily flow measured at Ouray, UT = 10,700 cfs) through June 29 (avg daily flow measured at Ouray, UT = 12,100 cfs). Fish sampling during the summer (see below) did not show evidence of RZB presence, and we did not supplement water during this time. Water levels remained high despite this, and were still three feet by October.

Fish Sampling

Ouray National Fish Hatchery also stocked bonytail into the wetland breach on May 13, after the breach had flooded and connected the wetland to the river. The decision to stock in this location was based on access, since the breach is also the road leading to the water control gate and inlet canal. Stocking here was also intended to give fish the ability to access wetland or river habitats, and to serve as a low velocity acclimation site before they moved into the river. The hatchery released 1,041 bonytail ranging in length from 160-285mm (mean TL=226mm). Forty-two bonytail were recaptured in the wetland during the rest of the season.

We sampled the wetland July 19-21 using baited hoop nets and seines. We also electrofished in the wetland on July 20. The hoop netting resulted in a catch of 574 (97%) common carp (CP), 16 (3%) green sunfish (GS), and one black bullhead (TL=184mm). The carp were all young-of-year, but the green sunfish were 100+mm, and included one ripe female expressing eggs (TL=110mm). Seining produced different results in different parts of the wetland, but consisted of carp, green sunfish, fathead minnow, black crappie, and stickleback, in order of decreasing abundance. In the seine hauls, carp and green sunfish consisted of young-of-year fish. Electrofishing produced one black bullhead (TL=182mm) and one bonytail (TL=284). The bonytail was a fish stocked into the wetland in May 2016.

We resumed fish sampling once we opened the water control structure to drain the wetland on

October 6. This sampling involved pulling seines in the fish kettle, which is isolated between two water control gates. The downstream gate (during wetland draining) is screened with 6mm x 75mm slots to hold fish in the kettle. We also electrofished within the wetland on October 6. During electrofishing, we captured two adult bonytail. Later, from October 27 through November 2, we captured 46 bonytail from the fish kettle, consisting of 41 adults and 5 young-of-year. For all 48 bonytail caught in autumn, stocking records indicate 39 of the 43 adults were stocked in May 2016. Two fish did not have tags, but were similar in size to other fish stocked in this group. Two additional fish had tags that were not from the 2016 stocking, and one could be traced back to a stocking event in September 2015 at the Ouray NFH boat ramp across the river. The other was a 370mm adult for which we currently do not have stocking information. The five young-of-year bonytail have been confirmed by CSU-LFL (Bestgen, pers. comm.) based on morphological characteristics, and represent wild spawning within the wetland by stocked adults.

The majority of fish captured at Johnson Bottom in autumn were nonnative species consisting of carp, black bullhead, fathead minnow, green sunfish, black crappie, white sucker, red shiner, brook stickleback, channel catfish, and Iowa darter. Most of these fish were young-of-year (YOY), but there were adults and larger juveniles captured for the following species: black bullhead, white sucker, black crappie, green sunfish, and one adult channel catfish. Fish composition during the first part of draining consisted primarily of YOY black bullhead and fathead minnow, with incidental black crappie, green sunfish, and carp. As the draining progressed, and the wetland depth decreased, the fish community shifted more towards YOY carp and fathead minnow, with more adult black bullhead and red shiner.

The presence of several nonnative predator species, particularly adults, could explain a lack of razorback sucker survival in the wetland. This is consistent with the lack of larval RZB captures this year in other wetlands that harbored a pre-existing nonnative fish community (i.e. Escalante and Leota), a pattern which has been observed in other years as well.

Sampling Results for Other Wetlands

Leota Bottom

We sampled Leota Bottom, units 7/7a (now connected as one), August 3-5 and Oct. 11-12. During August sampling, we used a combination of fyke and baited hoop nets. October sampling only consisted of fyke nets. Although this site had wild razorback sucker juveniles in fall 2014 and spring 2015, no native fish were caught during sampling. In August, the fish community consisted of common carp, black bullhead, fathead minnow, green sunfish, white sucker, and channel catfish. Nonnative fish composition in October was 35% black bullhead, 35% fathead minnow, 20% carp, 8% green sunfish, and 2% black crappie.

Above Brennan

We first sampled this site August 1-3 using baited hoop nets, fyke nets, and seines. During this time, we captured one adult RZB and one adult bonytail. The RZB was stocked in September 2015 at Ouray National Wildlife Refuge. The bonytail was stocked at Rainbow Park in Dinosaur National Monument (59 miles upstream) in August 2015. Both were translocated to the Green River. The remainder of fish caught were nonnative species: black bullhead, red shiner, green sunfish, white sucker, fathead minnow, common carp, and crappie.

We sampled Above Brennan again Oct. 13-14 using only fyke nets. This produced five adult RZB. One RZB was originally tagged in 1999 as a 485mm adult, and had not been encountered since. The

other RZBs were stocked between 2013 and 2015. All fish were released in the Green River. Besides these native fish, the rest of the sampling collected 75% black bullhead, 10% crappie, 7.5% fathead minnow, 1.5% green sunfish, 1.5% common carp, 0.5% white sucker, 0.5% Iowa darter, and 0.5% red shiner.

Stirrup

We first sampled Stirrup August 1-3 using seines, fyke nets, and baited hoop nets. The summer sampling yielded only nonnative fish, including predominantly YOY carp, green sunfish, fathead minnow, black bullhead, and red shiner. We sampled using only large mesh fyke nets from October 13-14, which produced 70% black bullhead, 20% carp, 5% green sunfish, 4% fathead minnow, and an equal proportion of red shiner and white sucker. No native fish were captured at the Stirrup.

VIII. Additional noteworthy observations:

IX. Recommendations:

- We recommend continuing light trapping to evaluate the entrainment of RZB, as well as other native species, under the Larval Trigger Study Plan. This work provides information on presence of larval RZB in monitored floodplain habitats, which has not historically been part of the long term light trapping study under Project 22f.
- Continue to manage Johnson Bottom for larval RZB entrainment and growth. Sample fish through use of seines during summer to track growth and survival.
- Focus wetland sampling and management more intensively on Johnson Bottom. Despite collecting larval RZB at several sites this spring, fall netting was unsuccessful in documenting survival of these fish to the juvenile stage. A growing body of evidence suggests natural floodplain connections without nonnative fish exclusion rarely results in RZB survival, especially if the wetland harbors a pre-existing population of nonnative species. Fall sampling is labor intensive, and we believe effort would be better spent attempting to maximize success at Johnson Bottom. In the event wetlands become reset naturally, we would revisit this strategy and sample previously fishless wetlands after successful entrainment in spring, as we did in 2011 and 2014.
- 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.

X. Project Status: on track and ongoing

XI. FY 2016 Budget Status

- A. Funds Provided: \$34,369
- B. Funds Expended: \$34,369
- C. Difference: -0-
- D. Percent of the FY 2016 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 2016.

XIII. Signed: M. Tildon Jones
Principal Investigator

30 November 2016
Date

LTSP Floodplains: Physical Data Matrix - 2016

Green River at Jensen cfs	Wetland	Breach No.	Date and Time of Visit	Max depth at inlet	Inlet Flow Measurement ¹	Photo of Inlet	Overall Photo of Wetland?	Floodplain Staff Gage reading	Comments
				cm(s) or inches	(cfs)	'Y' or 'N'	'Y' or 'N'	cm(s) or inches	
13K -14K	Stewart Lake (f)								
	Above Brennan (f)	outlet	6/28/2016 10:30	not connected		y	y		large debris pile at outlet
	Old Charley Wash (s)								
	Thunder Ranch (f)	outlet	7/1/2016 9:45	54cm		y	n		Avg Daily Q @ Jensen on 6/28 = 12,600cfs; on 7/01 = 10,300
	Bonanza Bridge (f)	outlet	7/1/2016	not connected		y	y		
	Johnson Bottom (s)	breach	6/28/2016 12:00	11cm		y	y	4.25	
	Stirrup (s)	outlet	7/1/2016	7cm		y	y		
	Leota								
	15K -16K	Stewart Lake (f)							
Above Brennan (f)									
Old Charley Wash (s)									
Thunder Ranch (f)									
Bonanza Bridge (f)									
Johnson Bottom (s)									
Stirrup (s)									
Leota									
~18.6K	Stewart Lake (f)								
	Above Brennan (f)	1	6/6/2016 11:54	72cm		Y			breach gage read 22cm
		2	6/6/2016 11:54						inaccessible; no distinct breach; large flooded area
	Old Charley Wash (s)		6/6/2016 6/10 = 19,700cfs						drove by--connected through outer unit--outlet gate closed
	Thunder Ranch (f)								Avg Daily Q @ Jensen on 06/06 = 18,300cfs; on 6/10 = 19,700cfs
	Bonanza Bridge (f)	1	6/6/2016 9:47	0					
		2	6/6/2016 9:50	24cm					NOT CONNECTED TO WETLAND HERE
		3	6/6/2016 10:04	72cm		Y	y		this is the bottom outlet
	Johnson Bottom (s)		6/6/2016 13:30	64cm		y	y		20cm in most of breach; road flooded
Wyasket Lake		6/10/2016 8:00						water in lake, but not ONWR managed pond; not filling through canal	
Stirrup (s)		6/6/2016 11:03	56cm		y	y		15cm@wetland	
Leota	1	6/6/2016 15:06	54cm						