

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

FY 2021 ANNUAL REPORT

PROJECT: 160

Project Title

Assessment of Stocked Razorback Sucker Reproduction in the Lower Green and Lower Colorado Rivers

Bureau of Reclamation Agreement Number:

R14AP00007

Project/Grant Period:

Start date: 10/01/2018

End date: 09/30/2023

Reporting period end date: 09/31/2021

Is this the final report? Yes _____ No X

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Abstract:

Determining the location, timing, extent, and success of razorback sucker spawning is essential for evaluating the effectiveness of the stocking program, identifying recruitment, and guiding future management. This study was designed to determine the spawn timing as well as presence/absence and distribution of larval, young-of-year (YOY) and juvenile razorback suckers in the Green River downstream from the town of Green River and in the Colorado River downstream of Cisco. The study was prompted by increasing razorback sucker encounters, the presence of multiple age classes, and congregations of ripe razorback suckers (2001 – 2003 and 2006 – 2008; Bestgen et al. 2012, UDWR unpublished data) during Colorado pikeminnow surveys. In 2021, larval fish samples were collected during light trapping on both the lower Green and Colorado rivers. Low discharge conditions limited the availability of flooded tributary mouths so a variety of other low-velocity habitats, not typically sampled in the past, were sampled with light traps. Larval fish were captured in both reaches and sent to the Colorado State University Larval Fish Lab (LFL) for identification. In July and August, two passes of seining for juvenile razorbacks were conducted on both reaches, but no confirmed juvenile razorback suckers were captured. A total of 17 samples of unidentifiable suckers were collected and sent to the CSU Larval Fish Lab. During seining efforts in both July and August, a total of only 9 identifiable native fish were captured, while a total of 1457 non-native species (not including red shiners, sand shiners, and fathead minnows) were captured.

Study Schedule:

Initial year 2009-Ongoing

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

Relationship to RIPRAP:

GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).
- V.A. Measure and document population and habitat parameters to determine status and biological response to recovery actions.
- V.B.2. Conduct appropriate studies to provide needed life history information.

GREEN RIVER ACTION PLAN: MAINSTEM

- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).
- V.D.1. Implement razorback sucker monitoring plan.

COLORADO RIVER ACTION PLAN: MAINSTEM

- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).
- V.E. Implement razorback sucker monitoring plan.

Accomplishment of FY 2021 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1: Lower Green River light trap sample collection:

Larval light trap samples were collected at 19 unique sites between river miles (RM) 28.9 and 119.6 (Saleratus Wash) during two sampling events that took place 5/12/2021 – 5/23/2021 and 6/1/2021 – 6/5/2021. A total of 55 light trap samples were collected. Five of the traps contained no larval fish. The 50 samples that contained larval fish were sent to LFL for identification. During sampling, main channel water temperatures ranged from 16.0 °C to 23.5 °C with an average temperature of 20.3 °C. Habitat water temperatures ranged from 17.0 °C to 28.0 °C with an average temperature of 22.5 °C.

Additionally, six larval seine hauls were completed at two site locations using a 1m x 1m larval seine. These hauls sampled a backwater at RM 114.6 (just below Little Grand Wash) and the mouth of Red Wash (RM 94.9). These seine hauls covered an area of 26.5 m². The hauls contained no larval fish.

Typically, a third pass of larval sampling would have been completed in May, however, low water conditions early in the season caused us to postpone sampling. We rescheduled the first sampling pass in mid-May, anticipating an increase in discharge and flood of tributary mouths. However, discharge did not increase, but because of time constraints, we sampled despite low discharge conditions. During this first pass, we sampled only one flooded tributary mouth at Keg Spring (RM 79). The other habitats sampled were low-velocity off-channel areas such as backwaters. Historically, we have exclusively sampled flooded tributary mouths for razorback larvae (apart from one backwater sampled in 2016). Razorback larvae have consistently been detected in flooded tributary habitats over the course of this study, so we expect to accurately determine presence or absence of razorback larvae by sampling in these locations. The lack of flooded tributary habitat this year may affect the comparability of presence/absence to previous years.

In 2021 on the lower Green River during both passes, of 19 unique sites that were sampled by light trapping, 11 were flooded tributary mouths (58%), 5 were backwaters (26%), 1 site was low velocity

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

shoreline within a side channel, 1 site was an isolated pool, and 1 site was a low velocity eddy in the main channel. Larval fish were collected in each of these habitat types.

Task 2: Lower Green River sampling for YOY and age 1+ razorback sucker:

Seine samples were collected between river mile 0 (the confluence with the Colorado River) and 119.6 (near Saleratus wash) during two sampling passes. The first pass was conducted 7/6/2021 – 7/8/2021. The second pass was conducted 8/17/2021 – 8/18/2021. Unfortunately, the second pass of sampling on the lower Green was only completed from RM 119.6 down to RM 52 (near Mineral Bottom boat ramp) due to motor issues that occurred after a flash flood on August 19th which did not allow us to continue downstream.

During both sampling passes, an estimated total of 5,288 m² was seined in 91 seine hauls within 45 habitats. These habitats included backwaters, which constituted 82% of all habitats sampled, embayments (9%), side channels (4%), isolated pools (2%) and shorelines (2%). The estimated area of individual habitats ranged from 60 m² to 10,500 m² with an average habitat area of 1,761 m² ± 328 m². The maximum depth of habitats ranged from 0.27 meters to over a meter deep. Forty-five percent of the habitats sampled had a maximum depth of one meter or greater.

During sampling, main channel water temperatures ranged from 21.0 °C to 28.0 °C with an average temperature of 25.0 °C. Main channel Secchi disk measurements ranged from 85 mm to 230 mm with an average Secchi of 174 mm ± 8.9 mm. Habitat water temperatures ranged from 20.0 °C to 33.0 °C with an average temperature of 27.6 °C. Habitat Secchi disk measurements ranged from 60 mm to 380 mm with an average Secchi of 221 mm ± 84 mm.

During seine sampling on the lower Green River, there were 12 samples of unidentified suckers preserved and sent to LFL for identification. These samples were all collected during the first pass of sampling in July and each contained one to three fish. There were no juvenile (age-1+) razorback suckers captured during seining. Only one sample of an unidentified fish was preserved during the second pass of sampling in August.

A very limited number of native, identifiable fish were captured during seining on the lower Green River this year (Table 1). The only native fish captured, apart from the preserved unidentifiable suckers, were five flannelmouth suckers. The total length of flannelmouth suckers ranged from 43 to 69 mm with an average length of 56 mm ± 4.2 mm. Four of these five flannelmouth suckers were captured during the second pass and one was captured during the first pass.

Non-native species captured during 2021 seining efforts on the lower Green River can be found in Table 2. Other non-native fish captured (not reported in Table 2) include: red shiner, sand shiner, and fathead minnow.

Task 3: Lower Colorado River light trap sample collection:

Larval light trap samples were collected at 14 unique sites between river mile 21.2 and 63.8 (Courthouse Wash) during three sampling events that took place 5/4/2021 – 5/12/2021, 5/25/2021 – 5/28/2021, and 6/6/2021 – 6/11/2021. A total of 62 light trap samples were collected. Seventeen of the traps contained no larval fish. The 45 samples containing larval fish were preserved and sent to LFL for identification.

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

During sampling, main channel water temperatures ranged from 12.0 °C to 22.0 °C with an average temperature of 18.7 °C. Habitat water temperatures ranged from 13.0 °C to 24.0 °C with an average temperature of 19.9 °C.

Additionally, three larval seine hauls were completed at the flooded mouth of Lockhart Canyon (RM 26.6) using a 1m x 1m larval seine. These seine hauls covered an area of 18.4 m². All three hauls contained larval fish that were preserved and sent to LFL for identification.

In 2021 on the Colorado River as on the lower Green, not all flooded tributary mouth habitat was inundated during the first sampling pass. Thus, we could not sample all sites and some backwaters were sampled instead. During the three sampling passes, of 14 unique sites that were sampled by light trapping, 11 were flooded tributary mouths (79%) and 3 were backwaters (21%). Larval fish were collected in each of these habitat types. There were no larval fish detected in tributaries sampled near the town of Moab from 5/4/2021 – 5/5/2021.

Task 4: Lower Colorado River sampling for YOY and age 1+ razorback sucker:

Seine samples were collected between river miles 3.5 and 110.1 (near the Cisco boat ramp) during two sampling passes. The first pass was conducted 7/9/2021 – 7/15/2021. The second pass was conducted 8/10/2021– 8/12/2021. Unfortunately, the second pass of sampling on the Colorado was only completed from RM 110.1 (Cisco boat ramp) down to RM 35 (near Shafer Canyon) due to motor issues that occurred after a flash flood on August 19th which prevented us from sampling from the confluence (RM 0) up to RM 35.

During both sampling passes, an estimated total of 7,600 m² was seined in 130 seine hauls within 62 habitats. These habitats included backwaters, which constituted 69% of all habitats sampled, embayments (11%), side channels (10%), isolated pools (6%) and shorelines (3%). The estimated area of individual habitats ranged from 48 m² to 8,750 m² with an average habitat area of 1,392 m² ± 226 m². The maximum depth of habitats ranged from 0.7 meters to over a meter deep. Thirty-two percent of the habitats sampled had a maximum depth of one meter or greater.

During sampling, main channel water temperatures ranged from 21.0 °C to 28.0 °C with an average temperature of 23.7 °C. Main channel Secchi disk measurements ranged from 45 mm to 640 mm with an average Secchi of 309 mm ± 29 mm. Habitat water temperatures ranged from 18.0 °C to 34.0 °C with an average temperature of 26.1 °C. Habitat Secchi disk measurements ranged from 55 mm to 495 mm with an average Secchi of 225 mm ± 19 mm.

During seining on the Colorado River, there were 5 samples of unidentifiable suckers preserved. These samples were all collected during the first pass of sampling in July, and each contained one to three fish. There were no juvenile (age-1+) razorback suckers captured during seining.

Similar to the lower Green, a very limited number of native, identifiable fish were captured during seining on the Colorado River this year (Table 1). The only native fish captured, apart from the preserved unidentifiable suckers, were four roundtail chub found between RM 103 and 110.1 (just below the Cisco boat ramp). The total lengths of these roundtail ranged from 85 to 125 mm with an average length of 97 mm ± 9.5 mm. Two were captured during the first pass of sampling in July, and the other two were captured during the second pass of sampling in August.

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

Non-native species captured during 2021 seining efforts on the Colorado River can be found in Table 2. Other non-native fish captured (not reported in Table 2) include: red shiner, sand shiner, and fathead minnow.

Task 5: Preliminary sample identification, data entry, analysis and reporting:

All data has been entered. Collected samples have been submitted to LFL for identification. This annual report will be updated and resubmitted upon completion of fish identification.

Additional noteworthy observations:

Effect of monsoonal activity on sampling effort:

During the second pass of seining in August and during seining for ISMP project #138 in September, habitats on both the Colorado and Green rivers were inundated with silt due to monsoonal activity and subsequent flash floods that occurred in late July and early August. As suggested by Howard (2013), in the annual report for this project, monsoonal activity likely affects quality and usage of backwater habitats and may explain lack of razorback encounters. Additionally, the amount of silt in these low velocity habitats limited the functionality of the seine. In the future, when monsoonal conditions cause habitat alteration, exploring new sampling techniques and sampling different habitat types may be more effective for monitoring efforts.

Recommendations:

- Continue seining in both the Colorado and Green Rivers (July-September) to determine successful recruitment of YOY and juvenile razorback suckers.
- Continue sampling via light trapping for larval razorback sucker in both the Colorado and Green Rivers (May-June) to determine the annual success and timing of reproduction.
- Consider using alternative sampling methods to document recruitment success in areas that are difficult to sample via seine. Alternative methods may include boat electrofishing and using a trawl to sample cobble bars and higher velocity habitats.
- Consider prioritizing the transfer of data for this project into a database, to facilitate data analysis. Through better data management, we may be able to conduct analyses to understand what conditions support reproduction of razorback sucker and survival from larval to early juvenile stages.
- Consider conducting further research to help determine what conditions contribute to high YOY razorback captures in our study area. This may then aid in developing a hypothesis for what conditions support survival of razorback sucker from larval to early juvenile stages.

Project Status:

On track and ongoing

FY 2021 Budget Status

Funds Provided: \$53,575

Funds Expended: \$53,575

Difference: \$0

Percent of the FY 2021 work completed, and projected costs to complete: 100%

Recovery Program funds spent for publication charges: \$0

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

Status of Data Submission

All data will be submitted upon completion of fish identification by CSU LFL.

Signed:

Karen Burke
Principal Investigator
October 26th, 2021

Literature Cited:

Bestgen, K.R., Zelasko, K.A., and G.C. White. 2012. Monitoring reproduction, recruitment, and population status of razorback sucker in the upper Colorado River basin. Final report of Colorado State University Larval Fish Laboratory to Upper Colorado River Endangered Fish Recovery Program, Denver, CO.

Howard, J. 2013. Lower Green River Razorback Sucker Larval and Young-of-Year Monitoring Pilot Study, Annual Report. Upper Colorado River Endangered Fish Recovery Program Project 160.

Snyder, D.E., Muth, R.T., and C.L. Bjork. 2004. Catostomid Fish Larvae and Early Juveniles of the Upper Colorado River Basin – Morphological Descriptions, Comparisons, and Computer-Interactive Key. Colorado Division of Wildlife Technical Publication No. 42.

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

Table 1. Counts of identifiable native fish captured via seining on the lower Green and Colorado Rivers (n represents the number of seine hauls). This table does not include any fish that were preserved for identification by CSU LFL. Species abbreviations are as follows: RZ = razorback sucker; CS = Colorado pikeminnow; CH = unknown chub; FM = flannelmouth sucker; BH = bluehead sucker; RT = roundtail chub; SD = speckled dace.

Reach	RZ	CS	CH	FM	BH	RT	SD
Green River (RM 0-119.6) n=91	0	0	0	5	0	0	0
Colorado River (RM 3.5-110.1) n=130	0	0	0	0	0	4	0
Total	0	0	0	5	0	4	0

Table 2. Counts of non-native fish captured via seining on the lower Green and Colorado Rivers (n represents the number of seine hauls). This table does not include any fish that were preserved for identification by CSU LFL. Species abbreviations are as follows: CP = common carp; GS = green sunfish; GZ = gizzard shad; GA= western mosquitofish; SM = smallmouth bass; BB = black bullhead; BG = bluegill sunfish; PK = plains killifish; CC = channel catfish.

Reach	CP	GS	GZ	GA	SM	BB	BG	PK	CC
Green River (RM 0-119.6) n=91	37	27	17	0	0	8	0	0	41
Colorado River (RM 3.5-110.1) n=130	23	203	132	313	40	539	28	2	47
Total	60	230	149	313	40	547	28	2	88