

I. Project Title: **Assessment of Stocked Razorback Sucker Reproduction in the Lower Green and Lower Colorado Rivers**

II. Bureau of Reclamation Agreement Number: R14AP00007

Project/Grant Period: Start Date: 05/01/2014
End date: 09/30/2018
Reporting period end date: 09/30/2018
Is this a final report? Yes No

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IV. 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 presence/absence, distribution, and spawning period of razorback suckers in the Green River downstream from the town of Green River (since 2009) and in the Colorado River downstream of Moab (since 2014). 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of multiple age classes, and congregations of ripe razorback suckers (2001-2003 and 2006-2008; Bestgen et al 2012, UDWR unpublished data) during Colorado pikeminnow surveys. Larval razorbacks have been successfully collected every year since the beginning of the project by either light trapping and/or seining. Total number of larvae captured annually via light trapping has increased on both the Green and Colorado rivers since sampling began in 2009 and 2014, respectively. In 2018, young-of-year (YOY) razorback suckers were documented on the Colorado River for the first time during this study.

V. Study Schedule: Initial year 2009, final year ongoing.

VI. 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.A. Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions.

COLORADO RIVER ACTION PLAN: MAINSTEM

- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).
- V.A. Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions.

VII. Accomplishment of FY 2018 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 15 sites between river miles 119.6 (Saleratus Wash) and 19.7 (Deadhorse Canyon) during three sampling events from 5/4/2018-6/12/2018. These sampling events occurred in conjunction with Green River Colorado pikeminnow estimates (Project #128). A total of 113 light trap samples were collected. Seven of the traps contained zero larval fish. The 106 samples that contained larval fish were sent to Colorado State University Larval Fish Laboratory (CSU LFL) for identification. During sampling, main channel temperatures ranged from 17.0°C to 24.0°C with a median temperature of 20.0°C. Habitat temperatures ranged from 17.5°C to 28.0°C with a median temperature of 20.0°C.

A total of 126 light trap samples were taken in 2017 and 112 were sent to CSU LFL for identification of larval fish contained in samples. Analysis and resubmission of the 2017 report will occur pending identification.

Task 2: Lower Green River sampling for YOY and age 1+ razorback sucker: Seine samples were collected between river miles 119.6 and 4.3 during one sampling trip, 7/22/2018-7/25/2018. A total of 1,291m² was seined in 41 seine hauls within 26 individual habitats. These habitats included backwaters, which constituted 81.5% of all areas sampled, embayments (3.7%), shorelines (11.1%), and flooded tributaries (3.7%). One sample was sent to CSU LFL for fish identification. The majority of other small-bodied fish were identified in the field and released. Two additional larval seine hauls were completed near Anderson Bottom (river mile 30.9) on 6/12/2018. A total of 10 m² was seined in these two hauls. Both hauls contained larval fish that we preserved and sent to CSU LFL. During sampling, main channel temperatures ranged from 26.0°C to 30.0°C with a median temperature of 29.0°C. Habitat temperatures ranged from 26.0°C to 33.0°C with a median temperature of 29.0°C.

A second seining pass for the Green River did not occur as a result of funding reallocations to Southwestern Native Aquatic Resources and Recovery Center (SNARRC) and Utah Division of Wildlife Resources for Colorado pikeminnow broodstock collection.

A total of 117 seine samples were collected during 2017 and 22 were preserved and sent to CSU LFL for fish identification. Analysis and resubmission of the 2017 report will occur pending sample identification.

Task 3: Colorado River light trap sample collection: Light trap samples were collected at 11 sites between river miles 61.2 and 21.2 during two sampling events from 5/14/2018-6/03/2018. A total of 50 light trap samples were collected. Four samples contained no larval fish. The 46 samples containing larval fish were preserved and sent to CSU LFL for identification. During sampling, main channel temperatures ranged from 17.0°C to 22.0°C with a median temperature of 19.5°C. Habitat temperatures ranged from 18.0°C to 24.0°C with a median temperature of 21.2°C. Due to low river flows, we were unable to complete a third pass.

A total of 85 light trap samples were taken in 2017, and 75 samples were sent to CSU LFL for identification of larval fish. Analysis and resubmission of the 2017 report will occur pending sample identification.

Task 4: Colorado River sampling for YOY and age 1+ razorback sucker: Seine samples were collected between river miles 63.8 and 12.0 during one sampling event between 7/10/2018-7/12/2018 and on 7/25/2018. A total of 1,199m² was seined in 37 seine hauls within 20 habitats. These habitats included backwaters, which constituted 65% of all areas sampled, flooded tributaries (5%), shorelines (5%), isolated pools (20%), and island tips (5%). Thirteen samples were sent to CSU LFL for fish identification. We were able to collect larvae utilizing larval seine hauls within three individual habitats during one event (6/19/2018). A total of 29m² was seined within six seine hauls; three samples contained larval fish and were sent to CSU LFL for identification. During sampling, main channel temperatures ranged from 22°C to 27.5°C with a median temperature of 23°C. Habitat temperatures ranged from 19°C to 32°C with a median temperature of 25°C.

Young-of-year razorback suckers were documented for the first time during this study from river miles 54 to 32. A total of 10 individuals were found with total lengths ranging from 45-81mm. The last time we encountered YOY razorback in this reach was during fall seining efforts that occur around September under Project 138: Young-of-the-year Colorado Pikeminnow Monitoring (Creighton 2012). A total of three individuals were documented from river miles 49.1-43.9 with a median total length of 98.43mm.

Razorback sucker spawn on the ascending limb of the hydrograph and usually before water temperatures reach 14°C, which occurred earlier in 2018 than in previous years (Bestgen et al. 2002). Lower peak flows created higher than normal temperatures that may have increased the duration of the growing season for larval razorback suckers. The

average flow during our sampling efforts this year was around 2,246 CFS, whereas the average for the last four years has been around 5,100 CFS. The extended growing season combined with increased water temps may create conditions where larvae are less susceptible to predation, which may explain why we were able to capture YOY razorbacks this year. The flow regime this year was similar to 2012: low discharge with numerous small peaks. This provides support for the notion that during low waters years, the fluctuations in flow and warmer water temperature are important for the success of razorback sucker recruitment.

A second seining pass for the Colorado River did not occur as a result of funding reallocations to Southwestern Native Aquatic Resources and Recovery Center (SNARRC) and Utah Division of Wildlife Resources for Colorado pikeminnow broodstock collection.

A total of 80 light trap samples were collected in 2017 and of those, 75 samples were sent to the CSU LFL for identification. Analysis and resubmission of the 2017 report will occur pending sample identification.

Task 5: Preliminary sample identification, data entry, analysis and reporting: All data have been entered. Collected samples have been submitted to CSU LFL for identification. This annual report will be updated and resubmitted upon completion of the larval fish identification.

VIII. Additional noteworthy observations:

Lake Powell inflow area: One additional exploratory sampling trip was conducted around the inflow area of the Colorado River into Lake Powell. As spring runoff increases the level of Lake Powell, water backs up along shorelines providing potentially beneficial habitat for YOY and juvenile native fish. Light trap and larval seine samples were taken between river miles 196.6 and 167.9 (North Wash/lake mile 140), between 6/20/2018-6/21/2018. These habitats consisted of backwaters, flowing tributary stream, shorelines, and flooded tributaries. A total of eleven light trap samples were collected. All samples were preserved and sent to CSU LFL for identification of larval fish. Thirteen larval seine samples were taken. A total of 82m² was sampled. Habitats included backwaters, flooded tributaries, embayments, isolated pools, and shorelines. Identifiable fish were sorted and enumerated in the field. Any specimen that we were unable to accurately identify was preserved in ethanol. Fish were preserved from eleven samples and sent to CSU LFL for identification.

As light trapping samples are pending identification by CSU LFL additional observations are limited to fish large enough to be identified in the field during seine sampling. The preliminary results are listed below.

Green River: Other native fishes captured in the Green River during this study included YOY flannelmouth sucker (n=31) with a median total length of 55 mm (33-63 mm), YOY Colorado pikeminnow (n=244), and speckled dace (n=2). Nonnative fishes

captured on the lower Green River included red shiner, sand shiner, fathead minnow, common carp (n=8), channel catfish (n=229), green sunfish (n=34), black bullhead (n=36), largemouth bass (n=1), and black crappie (n=2).

Other native fishes captured in the Green River during the Colorado pikeminnow broodstock enhancement effort included YOY Colorado pikeminnow (n=372), flannelmouth sucker (n=29), speckled dace (n=23), unidentified chub (n=2), and unidentified sucker (n=2).

Colorado River: Other native fishes captured in the Colorado River included flannelmouth sucker (n=26) with a median total length of 35 mm (20-64 mm), juvenile Colorado pikeminnow (n=13) with a median total length of 96 mm (74-200 mm), one *Gila sp.* with a total length of 39 mm, and speckled dace (n=1). Nonnative fishes captured on the Colorado River included red shiner, sand shiner, fathead minnow, channel catfish (n=90), common carp (n=118), black bullhead (n=8), black crappie (n=58), green sunfish (n=12), largemouth bass (n=36), smallmouth bass (n=4), gizzard shad (n=749), western mosquitofish (n=79), white sucker (n=6), and bluegill (n=1).

IX. Recommendations:

- 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.
- Continue seining in both the Colorado and Green Rivers (August-September) to determine successful recruitment of YOY and juvenile razorback suckers.
- Continue experimental sampling in the Lake Powell inflow area to determine if larval, YOY, and juvenile razorback sucker are utilizing flooded vegetative shorelines.
- Consider expanding sampling reach below the confluence of the Green and Colorado Rivers from Gypsum Canyon to North Wash in an effort to capture YOY and juvenile razorback sucker which may move out of zero-velocity habitats by mid to late summer.
- Consider expanding light trap sampling below confluence of the Green and Colorado Rivers from Gypsum Canyon to North Wash to determine extent of larval drift.
- Consider using alternative sampling methods to document recruitment success in areas that are difficult to sample via seine. Alternative methods may include using a trawl to sample cobble bars and higher velocity habitats.

X. Project Status: On track and ongoing.

XI. FY 2018 Budget Status

A.	Funds Provided:	\$ 60,611
B.	Funds Expended:	\$ 60,611
C.	Difference:	\$ 0
D.	Percent FY 2018 work completed:	100%
E.	Recovery Program funds spent for publication charges:	\$ 0

XII. Status of Data Submission: All data will be submitted upon completion of larval identification by CSU.

XIII. Signed: Chelsea Gibson November 7, 2018
Principal Investigator Date

XIV. Literature cited:

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

Bestgen, K.R., G.B. Haines, R. Brunson, T. Chart, M. Trammell, R.T. Muth, G. Birchell, K.Christopherson, and J.M. Bundy. 2002. Status of wild razorback sucker in the Green River Basin, Utah and Colorado, determined from basinwide monitoring and other sampling programs. Draft Report of Colorado State University Larval Fish Laboratory to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

Creighton, K., J.A. Scorupski, M.J. Breen, B. P. Kiefer. 2012. Young-of-year Colorado pikeminnow monitoring, Annual Report. Upper Colorado River Endangered Fish Recovery Program Project 138.