

I. Project Title: Matheson Preserve Larval Razorback Sucker Entrainment

II. Bureau of Reclamation Agreement Number: R14AP00007

Project/Grant Period: Start date: 5/1/2014
End date: 09/30/2019
Reporting period end date: 09/30/2019
Is this the final report? Yes _____ No x

III. Principal Investigators:

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IV. Abstract:

In 2019, modification 006 to R14AP00007 repurposed \$171,000 for completion of Task 1 on the modification/rehabilitation of the Matheson Preserve project (Project 176). The work prescribed work included installation of a gate and fish screens with the goal of managing wetlands in the preserve to benefit the razorback sucker. Gate and screens were installed as planned in FY 2019.

V. Study Schedule: 2019

VI. Relationship to RIPRAP:

COLORADO RIVER ACTION PLAN: MAINSTEM
II.A. Restore and manage flooded bottomland habitat
II.A.7. Matheson
II.A.7.c. Construct
II.A.7.d. Operate and maintain
II.A.7.e. Monitor and evaluate success

VII. Accomplishment of FY 2019 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1: Install gate and fish screens at control structure.

The following structures were installed successfully:

- *Vertical leaf gate* to manage flooding, water storage and draining (Photo 1).

- *Dual fish screens* (in and out) with ½-inch openings to exclude large bodied non-native fishes while allowing passage of fish larvae (Photo 2).

VIII. Additional noteworthy observations:

Sampling summary

Fifty-six larval light trap samples and four larval seine hauls were collected in the Matheson Preserve between 24 April and 5 July 2019. Preliminary larval identification was conducted in Moab by UDWR in remote consultation with the Larval Fish Laboratory at Colorado State University (LFL), U.S. Fish and Wildlife Service Green River FWCO, and American Southwest Ichthyological Researchers (ASIR). Larval samples containing fish for identification (n = 34) were transferred to the LFL.

Small-bodied fish were sampled by seine (15' x 4' x 1/8" mesh) on 5 July, 29 July and 14 August 2019. Preserved samples (n = 4) were also transferred to the LFL.

Submersible PIT antennas deployed in the wetland inlet channel detected 88 unique PIT tags. Of these, nineteen tags are currently attributed to fish in STReAMS – eleven razorback sucker and 8 bonytail.

Timeline of wetland flooding & observations

9 May 2019: First larval fish of any species collected at wetland inlet channel.

13 May 2019: Larvae preliminarily identified as razorback sucker collected from wetland inlet channel.

17 May 2019: Stop logs replaced with improvised fish screen to allow filling of wetland.

20 May 2019: Larvae preliminarily identified as razorback sucker collected inland of fish screen, inside wetland.

Early June 2019: Debris carried by peak flows destroys improvised fish screen. Large bodied nonnative fish (common carp *Cyprinus carpio*) enter wetland. River elevation nears bank-full height at Preserve (Photo 3).

16 June 2019: Smell of decomposition and observed fish mortalities indicate anoxic conditions in wetland. Data from MiniDOT loggers deployed throughout runoff season confirm rapid decline in dissolved oxygen concentration (Figure 1). Decomposition of submerged terrestrial vegetation is suspected to have contributed to anoxia in the wetland. This has been observed at other wetland sites in their first year of operation (Jones et al. 2017).

July & August 2019: Deoxygenated water slowly drains from wetland into Colorado River as river elevation decreases.

IX. Recommendations:

- Continue Project 176 as outlined in the FY20 SOW.

X. Project Status: On track and ongoing.

XI. FY 2019 Budget Status

- A. Funds Provided: \$171,000
- B. Funds Expended: \$112,833.97
- C. Difference: \$58,166.03
*Balance of Task 1 cost was covered by other funding sources.
- D. Percent of the FY 2019 work completed, and projected costs to complete: 100%
- E. Recovery Program funds spent for publication charges: \$0

XII. Status of Data Submission (Where applicable):

Seining and submersible antenna data will be entered and submitted to the database by 15 January 2020. Larval samples will be submitted to the database pending identification by the Larval Fish Laboratory at Colorado State University.

XIII. Signed: Zach Ahrens 20 November 2019
Principal Investigator Date

REFERENCES

Jones, T., C. Smith, and D. Beers. 2017. Middle Green River floodplain sampling. Project FR-164 annual report to the Upper Colorado River Endangered Fish Recovery Program, U. S. Fish and Wildlife Service, Denver, CO.



Photo 1. One of two opposing fish screens at the Matheson Preserve wetland water control structure.



Photo 2. Installation of LOPAC vertical leaf gate in Matheson Preserve wetland water control structure.



Photo 3. Central Pond of the Matheson Wetland Preserve at near maximum functional capacity (i.e. below elevation river elevation at which over-bank flow occurs), 12 June 2019, approximately 33,000 cfs at USGS Potash gage. Inlet channel, control structure and excavated linear pond are visible in foreground on left. Extent of flooding can be seen as clear water around margins of Central Pond (right). Future work will extend linear pond further inland to connect with open water habitat of the Central Pond.

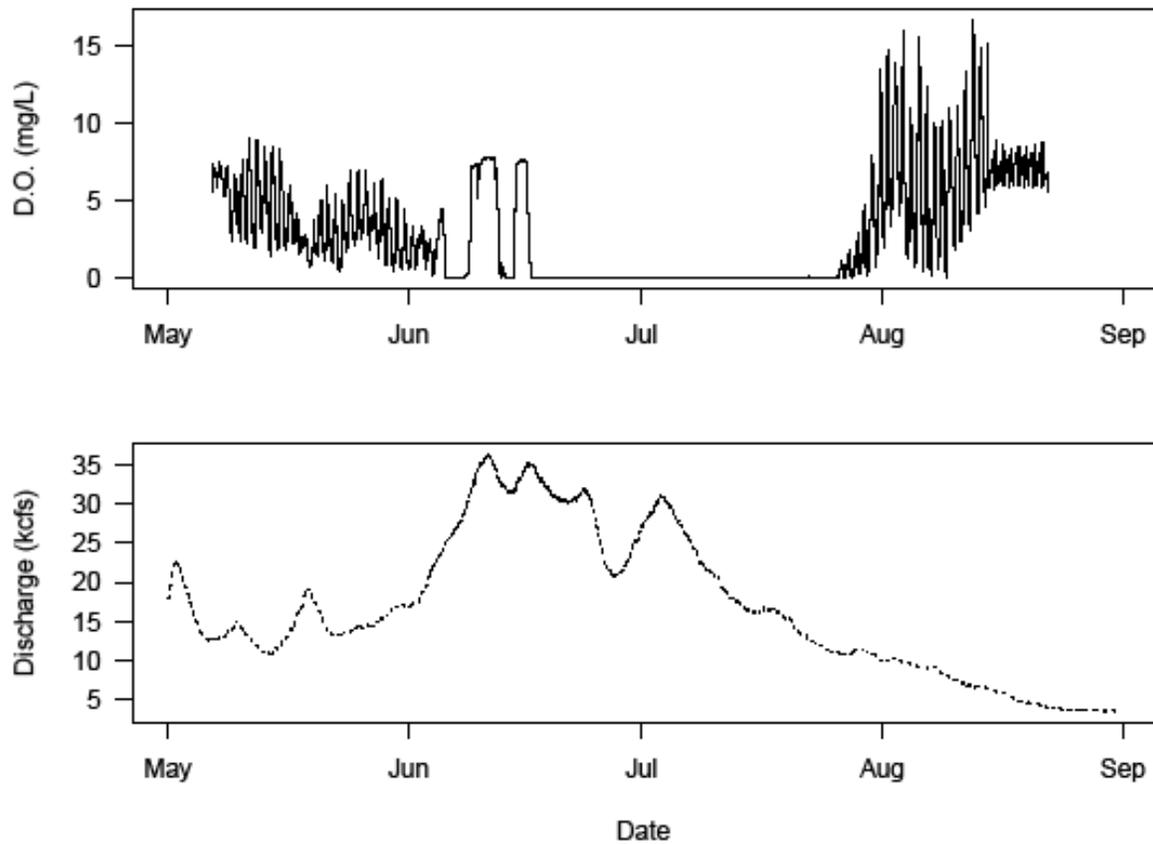


Figure 1. Dissolved oxygen concentration in the Matheson Preserve wetland (top) and Colorado River discharge (USGS Potash gage; bottom) during 2019 runoff. The decline in dissolved oxygen associated with peak discharge coincides with observed fish mortalities and may be the result of rapid decomposition of submerged terrestrial vegetation.