

COLORADO RIVER RECOVERY PROGRAM
FY 2014 ANNUAL PROJECT REPORT

RECOVERY PROGRAM
PROJECT NUMBER: NEW-PIT

I. Project Title: Detecting endangered fishes using PIT tag antenna technology in the Upper Colorado River Basin

II. Bureau of Reclamation Agreement Number: R13PG40020

Project/Grant Period: Start date: 10/01/2012
End date: 09/30/2015
Reporting period end date: 09/30/2014
Is this the final report? Yes _____ No X

III. Principal Investigator(s):
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IV. Abstract: This project is designed to detect as many endangered fish as possible using PIT-tag antenna technology. In particular, we sought to collect information on razorback sucker survival by deploying antennas at Razorback Bar, where these fish are known to congregate during spawning. This year we were given access to new antennas that did not require cables to connect to the tag reader or power source. These submersible antennas greatly expanded our ability to deploy readers in more difficult sites and over a greater portion of the spawning bar. We were able to detect 496 unique tags, representing 461 razorback sucker, 15 flannelmouth sucker, 8 bonytail, 1 roundtail chub, and 1 Colorado pikeminnow.

V. Study Schedule: 2012-2015.

VI. Relationship to RIPRAP:
General Recovery Program Support Action Plan
V.A.1.a.(2). Investigate improving recapture rates through passive PIT tag monitoring, nets, etc. to improve population abundance estimates.
Green River Action Plan: Mainstem
V.D.1. Implement razorback sucker monitoring plan.

VII. Accomplishment of FY 2014 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

We deployed two flat plate antennas on 31 March at Razorback Bar, a known spawning location for razorback sucker. These antennas functioned through the end of May. We also deployed additional submersible antennas, as their availability allowed. These newer antennas were built by Peter MacKinnon from Biomark, and were loaned to us to troubleshoot. We did experience issues with downloading the date and time stamp on these antennas, but we were able to decode PIT tags that they detected. The submersible antennas allowed us to deploy the technology in more difficult locations, where cable

length is limited or a dry location for batteries and electronics is not available. They also increased the coverage area where we were scanning for PIT tags. Between all five antennas, we detected 501 PIT tag codes. Five of these appear to be noise generated by the submersibles. There were 496 codes that could be traced in the Recovery Program database. Of these, we were unable to retrieve records for six detections, but they were tags distributed to Program field offices. Finally, there were 4 tags detected that likely belonged to razorback sucker stocked from Ouray National Fish Hatchery in 2011, and were part of a group where stocking records were lost. Out of 490 tags, we were able to identify 465 razorback sucker, 15 flannelmouth sucker tagged under Three Species work by the Utah Division of Wildlife Resources, 8 bonytail, 1 roundtail chub, and 1 Colorado pikeminnow. Tag information by species is listed below.

Razorback sucker

We were able to detect 465 razorback sucker, which included 4 individuals presumed to be from a 2011 stocking cohort from Ouray NFH and 4 fish that were river captures without tags. The stocking year for these fish is illustrated in Figure 1. The majority of stocked razorback sucker detected were stocked in 2009 and 2010. These fish have been at large since fall of their stocking year, either 4.5 or 3.5 years, respectively. This is consistent with data from 2012–2013, which showed the majority of fish detected at the spawning bar had been at large 2.5–4.5 years post-stocking. The majority of fish (96%) were stocked from Ouray NFH. Fish at this hatchery are spawned in early May, and stocked in fall as 1+ year olds. These data suggest the majority of these fish are returning to the spawning bar as 4–6 year-olds. This is consistent with other work that shows razorback sucker mature at 3–4 years (McAda and Wydoski 1980; Minckley 1983). There were, however, tags detected from fish that had been at large as long as eleven years. Webber and Beers (2014) found that the majority of razorback sucker (93%) detected in 2012–2013 on these antennas had not been previously captured during active river sampling. Four hundred forty-four fish had been stocked from Ouray NFH, 13 were from the Baeser Bend wetland, and 4 were from the Grand Junction 24 Road hatchery. All fish had been stocked between Green River, Utah and Split Mountain.

We also analyzed the number of razorback sucker detected on the flat plate antennas relative to river water temperatures. We were only able to use the flat plate data since the submersibles did not reliably collect time and date information. The results show more razorback sucker were detected when water temperatures were increasing, and generally when temperatures were greater than 10°C (Fig. 2).

Other species

We only detected one Colorado pikeminnow this year. There are a few tags still remaining to identify, and they were distributed for Colorado pikeminnow population estimates. If these tags are in Colorado pikeminnow, this would bring the total to seven fish. The Colorado pikeminnow we could confirm was originally tagged in 2006 at a length of 399 millimeters total length (mm TL). UDWR captured this fish at Green River mile 67.5. It was then captured as a 478 mm TL fish at Green River mile 110 in 2007. This fish was detected on 12 April and then again on 16 May.

We also detected tags from 8 bonytail. These included four fish from Ouray NFH stocked at Rainbow Park in 2013, and four fish from Mumma hatchery stocked to Echo

Park last year. Five of the bonytail were scanned between 5–20 April, while the remaining three were encountered 14–21 May. These fish demonstrate some level of overwinter survival for stocked bonytail, and downstream movement of 16–33 miles.

The antennas also recorded 15 flannelmouth sucker tags. These fish were marked by UDWR predominantly in 2008-2009 as part of their “Three Species” monitoring. Fourteen of these fish were tagged between Split Mountain and the White River confluence. One was tagged in 2011 as a 440 mm TL adult at Green River mile 14. This represents a movement of almost 300 miles upstream. It is unclear if this movement represents a spawning migration, but it does demonstrate the ability for this species to move throughout the Green River basin. It is slightly concerning that flannelmouth sucker were encountered at a known razorback sucker spawning location. The two species can interbreed, and flannelmouth sucker were detected during periods when many razorback sucker were present, presumably to spawn.

Finally, we also detected one tag belonging to a roundtail chub. This fish was originally tagged in 2013 in Split Mountain canyon. Roundtail are generally rare in this reach of river, so this individual was unusual.

VIII. Additional noteworthy observations:

IX. Recommendations:

- Obtain more of the submersible antennas once the equipment has proven reliable and can record date and time. The antennas we used were loaned to us, and we would like to acquire them for use in this project. These antennas allowed us to deploy the equipment in locations where cable length or flooding hazard limited the utility of our flat plate antennas. They are also relatively portable and could be used in other locations.
- Continue to use PIT tag antennas to monitor fish at Razorback Bar. The fact that fish congregate in this location for spawning increases the chances for detection of fish that may otherwise be spread over large distances. Continuing the use of these antennas during years where razorback sucker are collected during field work could allow for better survival estimates, and perhaps derived population estimates.
- Compare dates of high razorback sucker detections to back-calculated age for larvae collected. This may allow us to determine if these tag detections can be used as a relative index of spawning activity. It would also increase our confidence that fish detected at this location are likely engaging in spawning activity.
- Deploy these antennas in other locations where fish are likely to be in higher densities. We have been discussing the feasibility of using these antennas (particularly the submersible kind) at other spawning locations, such as the Echo Park spawning bar for razorback sucker and the Yampa River spawning bar for Colorado pikeminnow. These locations are more remote, posing logistical constraints, and their location in a national monument with high river use adds additional concerns that must be addressed before they can be deployed.

X. Project Status: On track and ongoing

X. FY 2014 Budget Status

A. Funds Provided: \$17,510.47

B. Funds Expended: \$17,510.47

C. Difference: -0-

D. Percent of the FY 2014 work completed: 100%

E. Recovery Program funds spent for publication charges: -0-

XI. Status of Data Submission: Data are still being compiled and will be submitted to the database manager by 31 December 2014.

XII. Signed: M. Tildon Jones 14 Nov. 2014
Principal Investigator Date

Literature Cited

McAda, C.W. and R.S. Wydoski. 1980. The razorback sucker, *Xyrauchen texanus*, in the upper Colorado River basin, 1974-1976. U.S. Fish & Wildlife Service Technical Papers 99, Washington, D.C.

Minckley, W.L. 1983. Status of the razorback sucker, *Xyrauchen texanus*, in the lower Colorado River basin. *Southwestern Naturalist* 28: 165-187.

Webber, P.A. and D. Beers. 2014. Detecting razorback suckers using passive integrated transponder tag antennas in the Green River, Utah. *Journal of Fish and Wildlife Management* 5: 191-196.

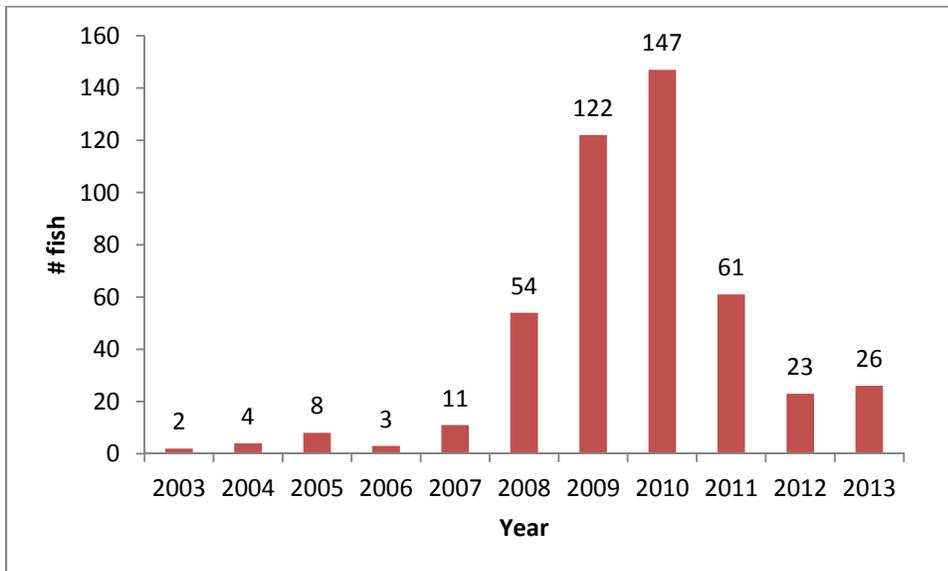


Figure 1. Year of stocking for razorback sucker detected with the PIT antennas in 2014.

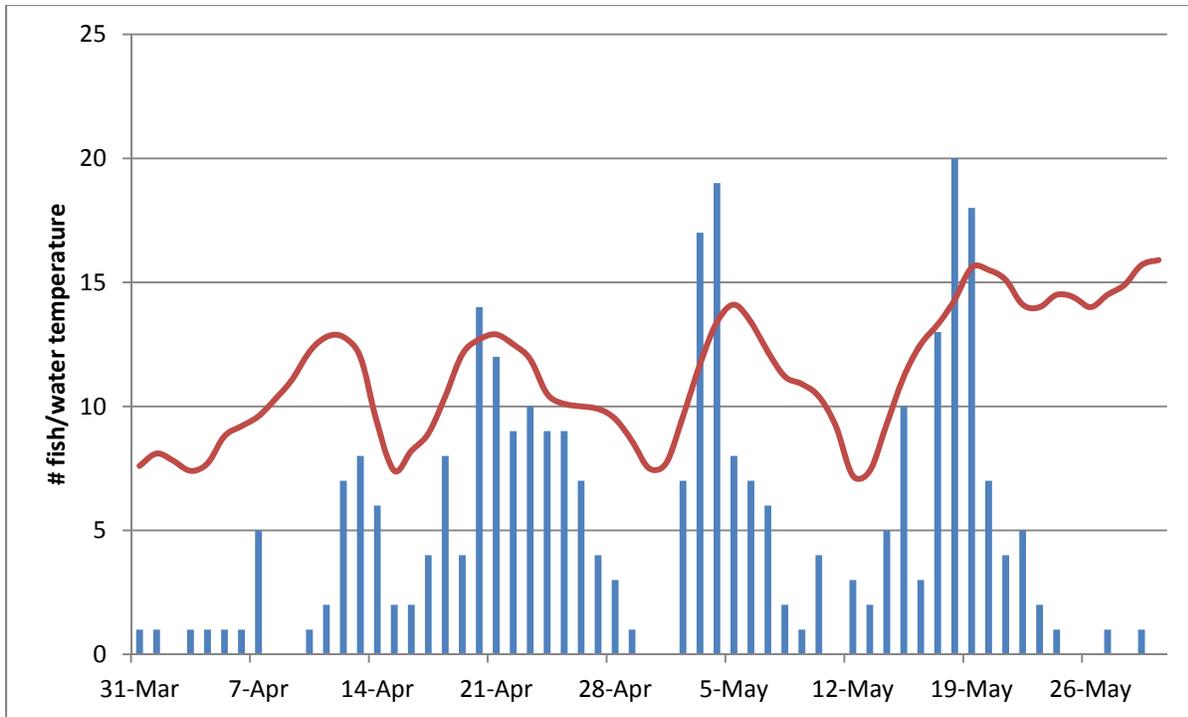


Figure 2. Number of razorback sucker detected each day and water temperatures for the Green River gage at Jensen.