

I. Project Title: Remote monitoring of endangered fishes in the middle Green River

II. Bureau of Reclamation Agreement Number: R19AP00059

Project/Grant Period: Start date: 10/01/2018  
End date: 09/30/2023  
Reporting period end date: 09/30/2019  
Is this the final report? Yes \_\_\_\_\_ No X

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IV. Abstract: In order to increase encounters of endangered fish in the Green River sub-basin, the Utah Division of Wildlife Resources Vernal Field Office deployed remote submersible PIT antennas in the middle Green River to complement Recovery Program Project #169. Six antenna sites included known and suspected razorback sucker spawning locations and flooded tributary mouths. In 2019, remote submersible antennas logged 9,468 total detections, comprised of 3,198 unique individual fish. We were able to associate 2,893 of these tags with database records, indicating that we detected 2,761 razorback sucker, 62 Colorado pikeminnow, 54 bonytail, 10 flannelmouth sucker X razorback sucker hybrids, and four flannelmouth sucker. For the second consecutive year this project yielded great numbers of native fish detections, predominantly razorback sucker. However, we will continue making adjustments as needed for future implementation as we collect more data for comparisons.

V. Study Schedule: 2018-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.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. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring and data management).
  - V.D.1. Implement razorback sucker monitoring plan.
- VII. Accomplishment of FY 2019 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

### **Task 1. Submersible antennae deployment, maintenance, and downloads.**

Passive detection of PIT-tagged fish at Razorback Bar (RM 310.9) is undertaken annually by the Green River Basin Fish and Wildlife Conservation Office (GRB-FWCO) under Recovery Program Project #169 and has proven to be an efficient means of detecting PIT-tagged razorback sucker (Smith et al. 2018; Webber and Beers 2014). Therefore, to compliment this project, we deployed three remote submersible PIT antennas in the middle Green River in 2019 to further increase razorback sucker encounters. As in 2018, antennas were deployed at cobble substrate microhabitats downstream of Razorback Bar (Partlow et al. 2018). Following antenna downloads, we associated PIT-tagged individuals to deployment records and past encounters cataloged in the Recovery Program's STReAMS database (STReAMS, 11/01/2019). Unique detections with associated records are quantified on a site by site basis in Table 1.

#### ***Escalante Ranch***

For consistency, in 2019 we deployed antennas in the same three Escalante Ranch locations as in 2018 (Partlow et al. 2018). These locations included sites on the right bank at RM 309.7 (Escalante Ranch #1) and RM 309.5 (Escalante Ranch #2), and the left bank at RM 306.8 (Escalante Bar). All three sites successfully detected large numbers of unique razorback sucker respective to their location (Table 1).

We deployed antennas at both Escalante Ranch sites from 5 April to 30 May 2019 and at Escalante Bar from 19 April to 30 May 2019. The antenna at Escalante Ranch #1 detected 884 individual razorback sucker, while just downstream 882 razorback sucker were detected by the Escalante Ranch #2 antenna (Table 1). Colorado pikeminnow, bonytail, flannelmouth sucker X razorback sucker hybrids, and flannelmouth sucker were also detected (Table 1). At Escalante Bar we detected 746 razorback sucker as well as several Colorado pikeminnow, and bonytail (Table 1). Each of the three Escalante Ranch area antennas had increased numbers of unique razorback sucker detections compared to 2018 data (Partlow et al. 2018).

#### ***Other antenna locations***

In an attempt to increase detections of Colorado pikeminnow and bonytail, and to provide additional opportunities for razorback sucker detections, we deployed antennas in flooded tributary mouths and backwater habitats. These sites included Ashley (RM 299.0) and Brush creeks (RM 304.6). Additionally, after detecting multiple Colorado pikeminnow in 2018 (Partlow et al. 2018), an antenna was again deployed at Placer Point (RM 315.9), in Dinosaur National Monument, from 28 June to 12 September 2019.

A single antenna was deployed in Ashley creek from 19 April to 23 June 2019. At this site we detected 455 razorback sucker (Table 1), similar in abundance to the 449 razorback sucker detected in 2018 (Partlow et al. 2018). Furthermore, bonytail, Colorado pikeminnow, flannelmouth sucker x razorback sucker hybrids and a flannelmouth sucker were also detected in Ashley Creek (Table 1). Moreover, bonytail detections increased in 2019 and greater than 50% (32 of 54) of these individuals were detected in Ashley Creek (Table1). It should be noted that the majority (n=28) of bonytail detected in Ashley Creek had been recently stocked at nearby river miles (RM 294.0 and 303.0) by Ouray National Fish Hatchery.

We also deployed a single antenna near the mouth of Brush Creek from 6 April to 28 June 2019. This antenna detected 168 razorback sucker, 11 bonytail, and eight Colorado pikeminnow (Table 1). Brush Creek detections increased in 2019, likely because the antenna was exposed last year upon retrieval due to low water levels (Partlow et al. 2018). Higher water levels this year likely made this tributary more accessible to fish.

Detections at Placer Point included 16 Colorado pikeminnow, two bonytail, and one razorback sucker (Table 1). It should be noted that due to a significant drop in Green River water levels in early July, the antenna at Placer Point was exposed and therefore unable to detect fish activity for up to one week.

Additionally, one antenna was deployed in the Stewart Lake outlet canal near the control gate structure to document fish attempting to enter the wetland. Data from this antenna are summarized in the Recovery Program Project #165 annual report.

#### VIII. Additional noteworthy observations:

We had fewer total detections in 2019 than in 2018 (Partlow et al. 2018). However, we were able to associate PIT tags to a greater number of unique individual fish in 2019. Fewer detections compared to last year could be attributed to higher water conditions, which may have decreased chances of fish swimming within the necessary distance to be detected by submersible antennas. In 2019 we detected 3,198 unique tags, which is 1,471 more individuals than in 2018 (Partlow et al. 2018), and 1,331 more razorback sucker than the previous year (2018 N=1,430 RZB). The increase in detections of razorback sucker were primarily observed by antennas located in the Escalante Ranch area.

Last year 671 tags (38.9 % of total) were detected on both Recovery Program Project #169 and Project #172 antennas. This year 1,588 tagged individuals (49.7 % of total) were detected by antennas from both projects; 1,343 of these were identified in STReaMS as razorback sucker.

Overall, fewer Colorado pikeminnow were detected by our submersible antennas in 2019. In 2018, Placer Point detected 52 of 88 total pikeminnow in just 20 days of deployment (Partlow et al 2018). In an attempt to detect high numbers of Colorado pikeminnow, the antenna at Placer Point remained active into September, based on late season larval Colorado pikeminnow detections in the Yampa River (K. Bestgen, Colorado State University; personal communication). This year only 16 of the 62 total unique Colorado pikeminnow individuals were detected at Placer Point despite having the antenna in

approximately the same location for a longer period of time (Table 1). Fewer detections could be due to variations in hydrology, giving the fish access to different habitat. For example, drier hydrology in 2018 may have limited access to upstream spawning sites in Yampa Canyon, possibly forcing pikeminnow to seek alternative spawning sites (Partlow et al. 2018). Although detections at this location were less prominent this season than in 2018, we consider that it provides valuable information about a potential alternative spawning area utilized during lower water years.

IX. Recommendations:

- Continue to deploy an antenna at the Placer Point location in the future to obtain additional data on this prospective low-water spawning habitat.
- Analyze overlap between Recovery Program Projects #169 and #172 to determine how fish utilize different parts of the middle Green River in response to annual fluctuations in hydrology.

X. Project Status: On track and ongoing

XI. FY 2019 Budget Status

- A. Funds Provided: \$8,739.67
- B. Funds Expended: \$8,739.67
- C. Difference: \$0
- 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: Data were submitted to the database manager on 31 October 2019.

XIII. Signed: Keena Rose Elbin 11/12/2019  
Principal Investigator Date

XIV. Works Cited

Partlow, M.S., G.T. Tournear, and M.J. Breen. 2018. Remote monitoring of endangered fishes in the middle Green River. Annual Report to the Upper Colorado River Endangered Fish Recovery Program. Denver, CO.

Smith, C.T., D. Beers, and M.T. Jones. 2018. Detecting endangered fishes using PIT tag antenna technology in the Upper Colorado River Basin. Annual Report to the Upper Colorado River Endangered Fish Recovery Program. Denver, CO.

Species Tagging, Research and Monitoring System (STReaMS). 2019. Accessed via the internet at <http://streamsystem.org> on 11/01/2019.

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.

**Table 1.** Remote submersible PIT antenna locations and detections by species in the middle Green River in 2019. Unique detections are reported for each site (STReaMS, 11/01/2019), but some individuals may have been detected at more than one site. River mile (RM) locations are included by site name for reference.

<b>Site</b>	<b>Species</b>	<b>Unique Detections</b>
<u>Ashley Creek (RM 299.0)</u>		
	Razorback sucker	455
	Bonytail	32
	Colorado pikeminnow	10
	Flannelmouth sucker X razorback sucker	6
	Flannelmouth sucker	1
<u>Brush Creek (RM 304.6)</u>		
	Razorback sucker	168
	Bonytail	11
	Colorado pikeminnow	8
<u>Escalante Bar (RM 306.8)</u>		
	Razorback sucker	746
	Colorado pikeminnow	12
	Bonytail	8
<u>Escalante Ranch #1 (RM 309.7)</u>		
	Razorback sucker	884
	Colorado pikeminnow	17
	Bonytail	3
	Flannelmouth sucker X razorback sucker	2
	Flannelmouth sucker	1
<u>Escalante Ranch #2 (RM 309.5)</u>		
	Razorback sucker	882
	Colorado pikeminnow	12
	Bonytail	6
	Flannelmouth sucker X razorback sucker	4
	Flannelmouth sucker	2
<u>Placer Point (RM 315.9)</u>		
	Colorado pikeminnow	16
	Bonytail	2
	Razorback sucker	1