SJRIP PIT ANTENNA INSTALLATION AT HOGBACK FISH PASSAGE
2020 Project Proposal

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BACKGROUND:

PIT tags are implanted in various fish species captured through various projects directly supported by the SJRIP, or funded through other agencies and projects (CDP&W, BOR, BLM, NMG&FD, and UDWR). Stationary PIT Tag antennas have been installed at various locations in the San Juan River Basin to passively detect fish as they swim above, through, or underneath the antennas. This proposal is to add an additional series of PIT Tag antennas (Figure 1) at the Hogback Fish Passage to detect fish that either may or may-not use the fish passage. Existing antennas at Hogback currently cover the intake structure, the fish bypass at the weir, and the canal, in addition to the bypass at the canal headgate. Installation of this new set of antennas (Figures 2 & 3) will provide almost full coverage of the river at Hogback under all but the highest of flows.

The existing antennas include:

a. Seven pass-through antennas are installed at various locations in the Hogback Fish Weir facility.
b. Five antennas are served by a master controller and bank of batteries in a protected shed at the Hogback Irrigation Site that controls the various gates connected to the fish weir. The master controller is accessed using a Verizon cell data modem.
c. Two antennas are located approximately 0.5 mi upstream of the fish weir near the canal headgate. These antennas are served by a master controller and bank of batteries (connected to 110 AC power source) located at the antennas. This site is accessed using a Verizon cell data modem.
d. Six antennas are located in the Hogback Bypass and raft-launch channel that is south of the canal. These antennas are served by the same Master Controller and power source used to operate the antennas at the head of the headgates.

Antennas installed at Hogback Canal are being used in a "design" to give us information on how many, when, where, and how fish use the Hogback canal and fish weir. These antennas have been used under controlled experimental conditions and have given us some good information. If VFD pumps are replaced in the canal we can get good information on how the weir works under more

normal operating conditions. Antennas were installed at the canal intake, in the canal downstream of the fish weir, and in the fish bypass that leads back to the river. Under this design, in theory, we can evaluate numbers of fish that enter the intake, numbers of fish that are entrained or bypassed back to the river, direction of fish movement, as well as date and timing of movements.

Antennas installed at Hogback Bypass were installed primarily due to proximity to existing infrastructure and antennas in the Canal portion of the project. These antennas are not part of a design, but are giving us information on recaptures (i.e., survival), timing of fish movements, and potential information about use of the fish passage right next to it. There were two arrays of antennas installed at this site so, theoretically, movement direction as well as date and time can be evaluated at this bypass. Since this site is protected by a radial gate just upstream that regulates the amount of water than can go through this channel the antennas cannot be flushed out during high water.

The additional antennas (Figures 1-3) installed at Hogback would provide information on fish movements at the Fish Passage Structure and would provide information on successful fish passage.

METHODS:

1) Stationary PIT tag antennas will be installed in the fish passage (Figure 3) and at the bottom (Figure 2).
2) Data collected from these antennas will be provided to the SJRIP and STReaMS.

FY 2020 BUDGET—See attached Invoice from Biomark

Hogback Fish Passage

Budget Summary

Biomark
SPECIALISTS IN IDENTIFICATION SOLUTIONS
705 S. 8th St.
Boise, ID 83702
PHONE: (208) 275-0011
FAX: (208) 275-0031

SUMMARY	Subtotal	Grand Total	Cumulative Total
Phase 1: Site Visit	$4,901	$4,901	$4,901
Phase 2: System Test	$53,272	$53,272	$58,173
Phase 3: Installation	$12,878	$12,878	$71,051
Phase 4: O&M	$0	$0	$71,051
TOTAL	**$71,051.00**		

SUMMARY (all Phases)

Labor	CLIN	Hours	Rate	Subtotal
(1) Project Manager	*00410	10.5	$162.00	$1,701
(2) Computer Scientist	*00450	0	$136.00	$0
(3) Senior Scientist	*00400	0	$124.00	$0
(4) Biometrician	*00420	0	$133.00	$0
(5) Fisheries Specialist	*00390	5	$97.00	$485
(6) Field Technician (Biology)	*00440	0	$62.00	$0
(7) Habitat Biologist	*00430	0	$69.00	$0
(8) Electronic Technician	*00380	100	$111.00	$11,100
(9) Senior Engineer	*00370	0	$151.00	$0
Labor Total		115.5		**$13,286.00**
Nonlabor				
Travel				$3,048
Equipment				$54,717
Nonlabor Total				**$57,765.00**
Total				**$71,051.00**

* QUOTE GOOD FOR 90 DAYS
** IF PROJECT START DATE EXCEEDS 180 DAYS FROM BID DATE, PRICE ESCALATION MAY BE REQUIRED.
***NO RETURNS OR REFUNDS CAN BE ISSUED ON PROJECT RELATED PURCHASES AND SPECIAL ORDERS
****BIOMARK'S STANDARD WARRANTY APPLIES

Figure 1. PIT Tag antenna locations at Hogback Weir and Fish Passage. Proposed antennas are in yellow.

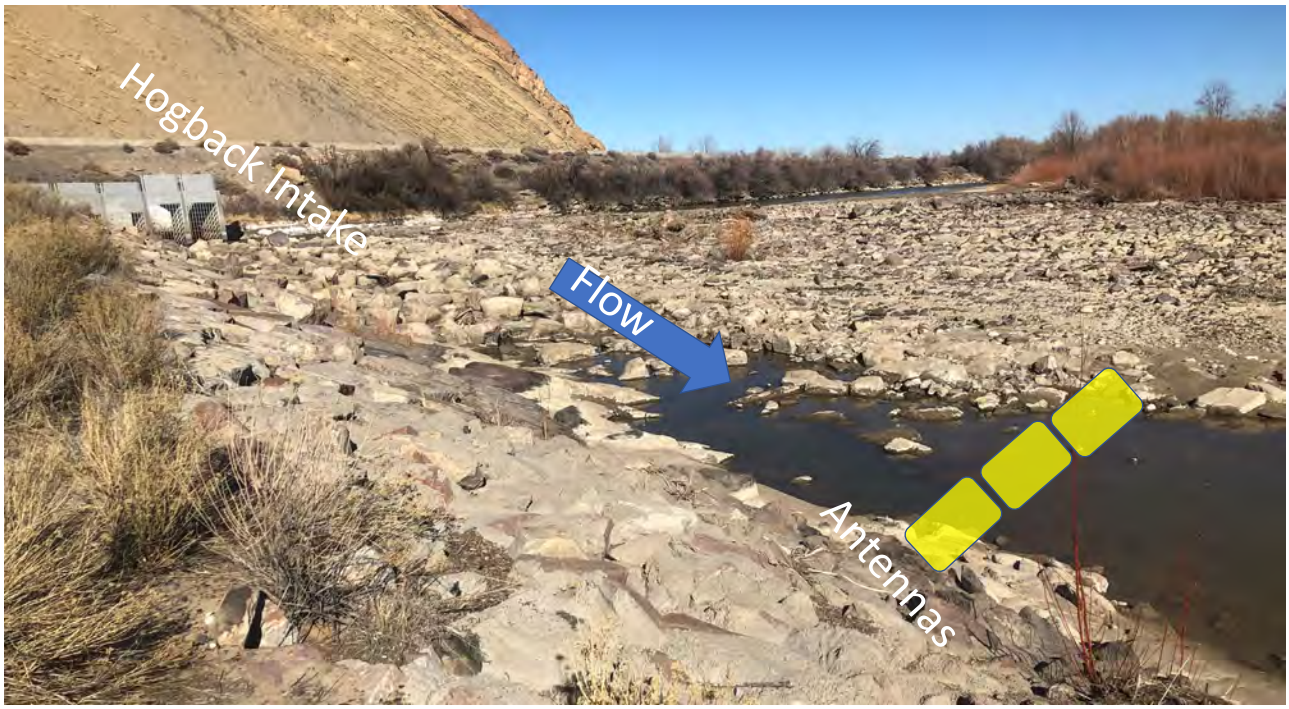

Figure 2. Proposed PIT Tag antennas at the bottom of the fish passage at Hogback Weir and Fish Passage.

Figure 3. Proposed PIT Tag antennas in the fish passage at the Hogback Weir and Fish Passage Facility.

Response to Comments

Scope #	Project	PI(s)
12	*SOW-20-32b-SJRIP PIT TAGS*	McKinstry

Wayne Hubert, Peer Reviewer

How can the technical aspects of this SOW be improved?

There is insufficient information in the SOW to provide a science based review.

A concern regarding the overall SJR PIT tagging effort is the opportunistic manner in which it has evolved and the lack of a systematic design. This concern addresses SOWs 12 and 32. The SOWs would benefit from a thorough assessment and description of the current status of the PIT-tagging work in the SJR. A huge amount of work has been done in PIT-tagging fish, developing and installing antennas for PIT-tag detection, and assimilating Pit-tag detection data into databases. The overall structure of the PIT-tagging work is in need of review. Because of the opportunistic way in which PIT-tagging efforts, there is not a "project" with defined goals and quantitative objectives, an experimental design, or mechanism for assessing project success or future needs. The SOWs regarding PIT tagging would greatly benefit from a formal review of PIT-tagging work and development of a formal PIT-tagging project to direct and assess these efforts into the future.

What is this SOW's contribution to recovery?

PIT tagging of the endangered species has become an integral part of recovery efforts and is yielding substantial amounts of information on movements of the species.

Response: Unfortunately the analysis of the data collected by this SOW is disconnected from the SOW to buy PIT tags and install the antennas. I agree that more effort could/should be put into analyzing the data collected from these sites, but we don't have specific plans at this point. The criticism on the lack of experimental design for the sites is valid, but other than the restoration site, we have an experimental design in place, which was explained in the SOW and are more detailed below:

PNM—several antennas have been positioned in the fish passage to show movements of fish up through the passage, indicating sequential movement through the passage and ultimately the success or failure of passage. Antennas have also been installed at the weir to identify fish that hit the weir and either find the passage or not. Lastly, antennas have been installed at the outlet for the passage to quantify success of fish navigating the structure. While formal reporting on these results has not been done, the data have been used to modify operation of the passage in a flow-through mode during March- May in an effort to increase passage rates. A more formal analysis of the data is planned once

we have several years to report on the operation of the facility.

Hogback—Hogback antennas were planned/designed in an effort to show passage through this weir structure. To date, we have used the antennas to show that few stocked fish actually go over the weir and no wild fish go over the weir. The antennas in the bypass and those planned for the fish passage are useful for showing fish that are not using the passage and give detections that are useful in survival analyses. We have the data for this site and we are planning to publish it shortly.

Piute Farms Waterfall—antennas at this location were installed to quantify the number of fish stacking up at this site and have demonstrated that more than 1900 endangered fish have hit this barrier in the lower river. This information is being used to formulate passage options and the data have been used in several publications that are either completed or in press.

This SOW has never been a formal "project" with annual reporting but rather the results have been discussed at meetings where we use the data to formulate management changes (like opening the passage) and discuss what can be done to improve the data collection. Efforts are in place to publish many of the data.