

**SJRIP O&M of Existing PIT Tag Antennas and Evaluation of Data  
2016 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. These antennas require periodic maintenance and support to keep them running and operational. Additionally, cell and satellite service is required to access the antennas and download data and perform diagnostics. Locations and numbers of antennas at various sites are listed below:

- 1) PNM Weir and Fish Passage
  - a. Four pass-over antennas, modified with concrete bases are located below the weir
  - b. Two pass through antennas are located in the fish passage.
  - c. All six antennas are served by a single master controller located in a protected shed at the fish passage facility. The master controller is accessed using a Verizon cell data modem.
- 2) Hogback Irrigation Canal and Fish Weir, ~ 20 miles upstream of Shiprock, NM
  - 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.
- 3) TNC Restoration Site ~ 20 miles west of Shiprock
  - a. Four pass-over antennas are installed in a secondary channel created by restoration activities conducted by TNC.
  - b. The four antennas are served by a single master controller and solar-energy supplied battery bank on an island created by the restoration activities. The site is accessed using a satellite data modem.
- 4) McElmo Creek, ~ 25 miles upstream of Bluff, UT
  - a. Five pass-over antennas were installed in McElmo Creek approximately 200m upstream of the confluence with the San Juan River.
  - b. The antennas are served with a multiplexing antenna controller and the controller is accessed using a Verizon cell data modem.
- 5) Submersible antennas located near the waterfall on the San Juan River near Gouldings, AZ.
  - a. Submersible antennas are installed at various locations including the waterfall near Gouldings, AZ, and Colorado pikeminnow spawning bar near 4-Corners Bridge, CO, UT, AZ, NM.
- 6) Floating PIT tag antenna system
  - a. A floating PIT Tag antenna system has been constructed and used in the San Juan in several locations including below the waterfall in the San Juan River and in the river between Hogback diversion and Bluff, UT. The system will also be deployed in the upstream portions of the San Juan Drainage including the Animas and upper San Juan rivers.

**OBJECTIVE**

Acquire detection data from all remote or passively operated PIT antennas on June 30, 2016 and package antenna detections in a database to ultimately provide a template for future data additions and to facilitate fast analyses and open access among other researchers (i.e., within the SJR Recovery Program and/or the STReAMS database).

**METHODS**

- 1) Stationary PIT tag antennas will be contacted periodically (bi-weekly) to check the settings, download the data, and perform diagnostics of the systems. Sometimes problems arise (batteries drain down due to lack of sun, antennas are washed away, wires are cut) that cannot be solved remotely. In these cases a site visit must be conducted by a technician to repair the system. The SOW and budget include the replacement of one antenna during the work period. If an antenna is not replaced the funding will be used to purchase additional PIT tags or submersible antennas to be used by other biologists.
- 2) Submersible antennas will be deployed at the waterfall for a continuous period from late February 2016 until August 2016 in an attempt to document fish movements and useage of the river immediately downstream of the waterfall.
- 3) The data manager will compile all detection data up to June 30, 2016 from any remote or passively operated PIT tag antenna used in the San Juan River. This would allow all antenna systems installed before early-2015 to collect detection data for over a full calendar year. Antenna data compiled will include, but not be limited to, detections from submersible (Four Corners bridge CPM spawning bar, waterfall), continuous stationary directional arrays (McElmo Creek since 2012; Hogback Diversion since 2014; PNM Fish Passage since 2014; and PNM weir since 2015); temporary portable antennas (Chaco Wash 2012 and 2013; Chinle Wash in 2013; McElmo Creek arrays seasonally since 2012; Yellow Jacket Creek seasonally since 2012), and floating antennas (Chaco Wash 2010; San Juan River 2014; and Waterfall 2015).

**TASKS – 2016**

1. Maintain and operate stationary and portable PIT tag antennas
2. Replace one PIT tag antenna (likely at McElmo or TNC Restoration site)

**FY 2016 BUDGET****O&M of Existing Antenna Systems, Replacement of one Antenna, and Data Management****A) Labor**

Position	Salary total/hr	No. persons	Total Hours	Total cost
BOR Technical Representation for Contracts and Agreements	\$80.00	1	100	\$8,000.00
BioMark or USU Staff (contract)	\$80.00	1-2	200	\$16,000.00
Contract Employee Data Management	\$50.00	1	440	\$22,000.00
<b>Total</b>				<b>\$46,000.00</b>

**B) Travel**

Position	Destination	Purpose	Days	Lodging per day/total	Per diem per day/total	Total	Total
Reclamation Technical representative	Farmington, Shiprock	Project evaluation or field trips	4 trips @ 5 days/trip	\$100/\$500	\$40/\$800	\$2750	\$3,300.00
BioMark/USU representative	Boise, ID; Kennewick, WA; various	Field trips O&M Antennas	3 trips @ 5 days/trip	\$100/\$1000	\$40/\$600	\$2500	\$2000.00 \$1,500.00
Contract Employee	Durango Farmington	Field work Reporting	2 trips @ 4 days/trip	\$100/\$800	\$50/\$400	\$1200	\$655.00
<b>Total</b>				<b>\$2300.00</b>	<b>\$1,400.00</b>	<b>\$6,450.00</b>	<b>\$11,255.00</b>

\*mileage of 5,000 mi at \$0.55/mile

**C) Equipment**

Item	Unit Cost	Number	Total cost
Antenna system	\$10,000	1	\$10,000
<b>Total</b>			<b>\$10,000.00</b>

**Budget Summary  
FY-2016**

Category	Total
Labor	\$46,000.00
Travel	\$6,450.00
Equipment	\$10,000.00
<b>Total FY2016 Budget</b>	<b>\$62,450.00</b>

**Projected funding:**  
**FY-2017** \$63,000.00  
**FY-2018** \$64,000.00