

**COLORADO RIVER RECOVERY PROGRAM
FY-2011 ANNUAL REPORT**

Project 146

Stationary PIT detection system in the Maybell Canal, Yampa River, CO

Lead Agency: U.S. Bureau of Reclamation

Submitted by: Dave Speas

U.S. Bureau of Reclamation—Upper Colorado Regional Office
125 South State St. room 6107
Salt Lake City UT 84138-1147
801-524-3863
dspeas@usbr.gov

Peter MacKinnon
Fish Detection Engineer
Fish Ecology Lab
Department of Watershed Sciences
Utah State University
435 770 6959
pdmackinnon@gmail.com

John Hawkins
Larval Fish Laboratory
Department of Fishery and Wildlife Biology
Colorado State University
Ft. Collins, CO 80523
Ph: (970) 491-2777
FAX: (970) 491-5091
jhawk@lamar.colostate.edu

Date: Dec 2, 2011

- I. Project Summary: Evaluation of entrainment of Colorado pikeminnow in the Maybell Canal near Maybell, CO is required by the Yampa Programmatic Biological Opinion (USFWS 2005). To determine whether entrainment is taking place, we installed a stationary passive internal transponder (PIT) detection system in the Maybell Canal on April 20, 2011. The system was operated without disruption during the irrigation season (May through late October 2011) but did not detect presence of PIT tagged native or endangered fish.
- II. Study schedule: November 2010 through November 2012.
- III. Relationship to RIPRAP:

Green River Action Plan: Yampa and Little Snake rivers

II. Restore habitat

II.A.2. Reduce /eliminate entrainment of Colorado pikeminnow at diversion structures.

II.A.2.a. Identify and evaluate existing structures for entrainment of Colorado pikeminnow.

II.A.2.b. Develop and implement remedial measures, as necessary, to reduce or eliminate entrainment.

IV. Accomplishments of FY2011: The goal of this study is to determine likelihood of Colorado pikeminnow entrainment in the Maybell Canal, Yampa River near Maybell, Colorado. Tasks to be completed in 2011 consisted of the following:

Task 1: November 2010: Initial site visit to acquaint landowners with project personnel, select antennae location and collect antennae system design information.

Task 2: November 2010-March 2011: Develop solar-powered PIT detection system

Task 3: Installation, testing and activation of PIT system in Maybell Ditch; instruct CSU personnel on download/ operation/maintenance of system.

Task 4: April-October 2011: Operate system; download antennae data, perform diagnostics, repair system if necessary; system shut-down

Task 5: December 2011: Annual report – including a tabular summary of all PIT tags detected.

With minor deviations, all scheduled tasks for 2011 were completed as planned. In autumn of 2010, Recovery Program managers secured agreements with Maybell Ditch operators and landowners to build, install and operate a PIT tag antenna in the Maybell Ditch on private land for two irrigation seasons. On November 3rd, 2010, principle investigators met with Maybell rancher Darryl Steele to agree on a suitable location for the PIT antenna and make preliminary physical and ambient electrical measurements. After a follow-up visit on November 17th to further evaluate electrical interference, it was clear that we could install a highly efficient system immediately above the first lateral head-gate of the canal. The location for the antenna we selected was situated a few miles upstream from a boat launch on the Yampa River, also, so we could access the canal either by truck or by boat.

Principle investigators installed the PIT system on April 20-21, 2011. Personnel from CSU assisted with the installation and were briefed on the system's operation and minor operation and maintenance tasks. The system consists of two 4' x 16' rectangular antennae loops housed in schedule 80 PVC pipes which are installed upright in the canal and anchored to the canal streambed with duck-bill anchors and to the canal's banks with t-posts and webbing (Figure 1). The antennae are operated with a Destron-Fearing FS1001M multiplexing PIT reader, and the entire antennae system is powered by two 160 Watt solar panels with a 256 amp hour battery bank. This configuration affords continuous operation for 5 days without solar input. The system is monitored remotely by satellite uplink, which allows data downloads as well as system diagnostics to be performed. All electronics are enclosed in a locked steel job box and together with the solar panels is fenced with barbed wire to exclude cattle (Figure 2).

When the canal began flowing on May 2nd, we visited the site to evaluate the physical configuration of the antennae and remove debris entrained on them by the initial pulse of water. We reconfigured the antennae from "hybrid" positions (i.e., deployed at an angle with only the bottom antenna beam anchored) to an upright, "pass-through" configuration that would pass any additional floating debris. On June 8, we received a report that the extreme upper portion of the Maybell Canal had been breached by high water. To evaluate any potential impacts to the system, Peter Mackinnon visited the system on that day but reported no impacts to the system or the job site. Colorado State University personnel visited the system in September 2011 to inspect the system and reported no or minimal damage due to cattle encroachment, debris entrainment in the canal or erosion. They straightened up cables, rebar and other components, but otherwise reported that the system appeared much as it did immediately following installation.

The system operated without disruption from April 21 through November 3, 2011. No PIT tags other than system test tags were recorded, indicating that tagged endangered or non-listed native fish were not present at that location of the canal during the 2011 irrigation season.

Following system shut-down on November 3rd, the multiplexer, data logger and modem were removed from the system for the winter to minimize damage due to cold. The remaining solar array will keep the batteries in a charged state over the winter and no freezing issues are anticipated.

Principle investigators were and will remain in close contact with landowners and ditch operators preceding each visit to the antennae site and are extremely grateful for their willingness to grant access to it.

- V. Recommendations: Begin operation for the second irrigation season in 2012 as scheduled. Principle investigators should be prepared to access the antenna site by

boat (as they had in April 2011), as access to the canal by truck is not possible if the canal road is wet.

While we visited the site on three separate occasions during the irrigation season in 2011, we did not visit the PIT antenna site once per month as specified in the original SOW as it appeared unnecessary. Based on preliminary visits and discussions with the ditch operators, it became evident that impacts due to debris entrainment were likely to be minimal. Also, remote monitoring indicated no electronic or other operational problems and hence no need to physically access the system to download data or tune the system. Still, we will continue to visit the system periodically in 2012 to inspect the site and perform maintenance as needed.

VI. Project status: project is on track and ongoing.

VII. FY11 Budget Status:

Funds provided: \$52,712.52

Funds expended: \$52,712.52

Difference: \$-0-

Percent of FY2011 completed: 100%

Recovery Program funds spent for publication charges: N/A

VIII. Status of data submission: no data beyond system test tags and other diagnostics were received during this project.

IX. Signed: /s/ Dave Speas 12/2/11

X. References

USFWS (U.S. Fish and Wildlife Service) 2005. Final programmatic biological opinion on the Management Plan for Endangered Fishes in the Yampa River Basin dated January 10, 2005. Mountain-Prairie Region (6). Denver, Colorado.



Figure 1. Passive PIT detection system antennas in the Maybell Canal near Maybell, CO immediately following installation on April 21, 2011.



Figure 2. Electronics enclosure and solar panel array for Maybell PIT system.