

**Canyon Creek Fish Passage Improvements and Monitoring
FINAL REPORT
FWS Agreement # F13AP00551**

Friends of the Teton River

November 2014



This project was conducted in cooperation with the Idaho Department of Fish and Game, US Forest Service, Canyon Creek landowner Conn Crapo, and funding from the Jackson Hole One Fly Foundation, Patagonia, and the National Forest Foundation.

EXECUTIVE SUMMARY

PROJECT TITLE: **Canyon Creek Fish Passage Improvements and Monitoring**

PROJECT START DATE: July 30, 2013
PROJECT COMPLETION DATE: September 30, 2014

FUNDING:

TOTAL USFWS GRANT	<u>\$ 23,000</u>
TOTAL EXPENDITURES OF USFWS FUNDS	<u>\$ 23,000</u>
TOTAL MATCH ACCRUED	<u>\$ 31,360</u>
Match detail:	
\$3,600 (Jackson Hole One Fly)	
\$3,500 (Patagonia)	
\$660 (FTR)	
\$16,020 (in-kind materials)	
\$7,580 National Forest Foundation	
BUDGET REVISIONS	<u>\$ 0</u>
TOTAL EXPENDITURES	<u>\$ 54,360</u>

ABSTRACT:

Project partners installed a series of 3 step-pools at the “lower pump station,” which was completed in December 2013. This is one of three passage improvements made on Canyon Creek from 2012-2014, which together, have connected a total of 45 miles of stream between the upper reaches of Canyon Creek and its tributaries with the Teton River. As a part of a long-term restoration and monitoring strategy, Friends of the Teton River (FTR) installed an interrogation site on Canyon Creek (August 2014), conducted electro-fishing surveys and PIT tagged trout, and installed stream flow and temperature loggers (April 2014) during the grant period. Monitoring data will be used to inform future management decisions for native Yellowstone cutthroat trout and the efficacy of the completed restoration work.

PROJECT SUMMARY:

Canyon Creek is considered an important stronghold stream for fluvial Yellowstone cutthroat trout in the Teton Watershed and is one of the most important spawning tributaries to the Teton River Canyon, according to a recent US Forest Service report. (Jenkins, 2009 Yellowstone Cutthroat Trout Distribution Survey Report). According to Idaho Department of Fish and Game (IDFG) and USFS observations (Schrader 2002, Mabey 2009 respectively), there is a known run of fluvial cutthroat that use the upper (National Forest) reaches/tributaries of Canyon Creek to spawn. Three major barriers to fish passage were identified on Canyon Creek at the Canyon Creek Canal diversion (9.7 miles upstream from the Teton River confluence), and at two irrigation pump stations located upstream of the Hwy (please see Figure 1).

The Jenkins report specifically recommends "addressing the impacts of diversions on stream connectivity and fish entrainment." In addition, climate change models for the region (Gresswell and Williams 2011) assert the importance of restoring connectivity and access to high-elevation habitats for fluvial salmonids seeking coldwater refugia. FTR has been working with project stakeholders since 2008, including landowners and irrigators on Canyon Creek, and government agencies, to develop a project plan that meets the diverse needs of the parties involved. A watershed-scale strategy was undertaken to address passage issues, habitat degradation, long-term monitoring and data gaps.

In 2012, FTR implemented the first of three passage projects at the "upper pump station" as a demonstration project for the Canyon Creek Canal Company irrigators. It consisted of step pools constructed to aid fish passage past a pump station. The success of this project for the landowner led to approval of the construction of a similar project located at the "lower pump station" in 2013, and finally a larger-scale passage project located at the Canyon Creek Canal main diversion in 2014. These projects together, address all major passage issues on the creek and have reconnected 45 miles of valuable YCT habitat with the Teton River.

Baseline and long-term monitoring are a key element to evaluating the efficacy of these projects and impacts to native trout, as well as informing future management strategies for this and other YCT stronghold streams. To address data gaps in water quality and quantity, FTR installed stream flow and temperature loggers in April 2014. This is real-time data that is logged and can be downloaded on-demand. FTR has flow monitoring data starting on 4/25/14 and expects to keep the flow loggers in-stream for another irrigation season, through 2015. This data will help FTR establish baseline data and develop future flow augmentation strategies.

Fisheries population and abundance data was collected via electro-fishing surveys in 2012 and 2013 at established sites. With this data, FTR completed a Canyon Creek fisheries report on 6/13/14, which summarizes that population composition for surveyed sites have stayed the same since 2000. Population estimates will be completed after survey work in 2015. During electro-fishing surveys on Canyon Creek and in the Teton River Canyon, FTR tagged 330 trout (natives and non-natives) with passive integrated transponders (PIT tags), as part of a long-term study regarding trout migration and life history. FTR installed an interrogation site on Canyon Creek 8/5/14, which is the eighth in our current network of monitoring sites. This interrogation site will continue to collect data about trout movement in Canyon Creek for at least the next ten years and will help to inform FTR and the agencies about the extent on non-native invasion, and it will help FTR to monitor the efficacy of the fish passage projects on this tributary.

All monitoring data will be analyzed as a part of a 10-year YCT status evaluation (2005-2015) conducted by FTR, their Science Review Committee, and the YCT Interstate Working Group in 2015. This evaluation will lead to an overall region-wide strategy prioritizing the restoration and protection of Yellowstone cutthroat trout within their remaining strongholds. FTR agency partners have focused efforts on holistic strategies for restoring and monitoring tributary streams where stronghold populations exist. Continued efforts that focus on restoring YCT spawning tributaries and connecting core habitats are critically important to the persistence of this species and circumventing a potential ESA listing.

PROJECT LOCATION:

Canyon Creek is located in southeast Idaho, in Madison County, on the northwest slope of the Big Hole Mountains. (43°47'31 N, 111°26'22 W) The drainage encompasses approximately 45 miles of stream.

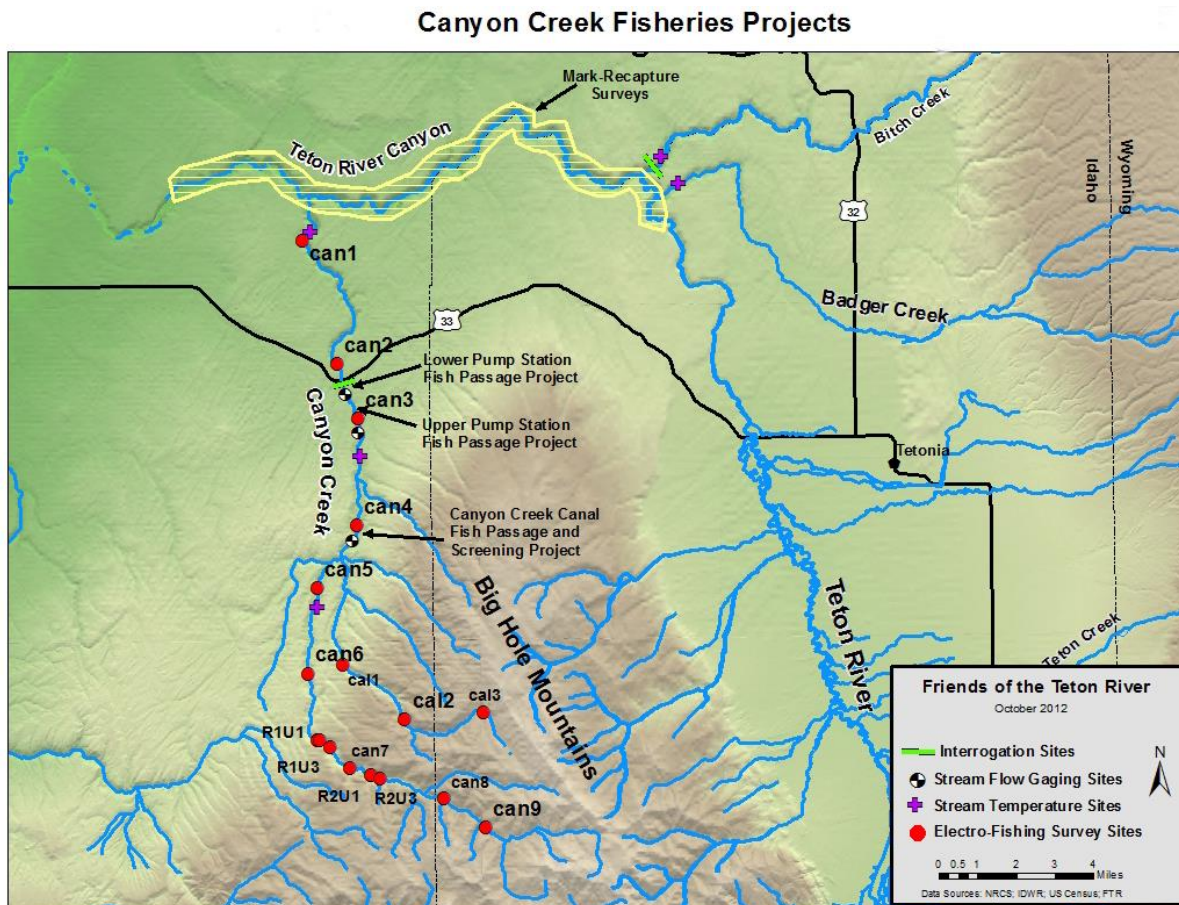


Figure 1. Project locations and monitoring sites

CONSTRUCTION:

Prior to construction, a 5-foot tall check dam structure placed across the stream at the irrigation diversion was problematic for Yellowstone cutthroat trout (YCT) migrating upstream to spawning reaches and back downstream to the Teton River. It was especially problematic for YCT moving upstream in search of cold water refugia in the summer months when flows are restricted and temperatures increase dramatically in Canyon Creek below the check dam. Contractors spent a week constructing three V-weirs downstream from the check dam using 400 cubic yards of rock boulders.



Figure 2. Pre-project photo of the check dam

The weirs were designed to back-up water over the concrete slab to create a pool 1-foot in depth over the slab, while also allowing for improved stream function and stability downstream of the diversion structure.



Figure 3. Upstream view of two of the rock weirs and submerged check dam slab.



Figure 4. Downstream view of rock weirs.

A metal impoundment board with a 5" x 8" gate was placed on top of the concrete check dam slab. The other check boards were then placed on top of the metal impoundment board. The gate opening in the impoundment board allows fish to pass between the check dam pool and the pool downstream of the check dam which was created by the rock weirs.



Figure 5. Metal impoundment board.

Project construction at the lower pump station was completed on December 11, 2013.

MONITORING:

The monitoring efforts associated with this project were summarized previously. Please see the figures below and photos on the next page.

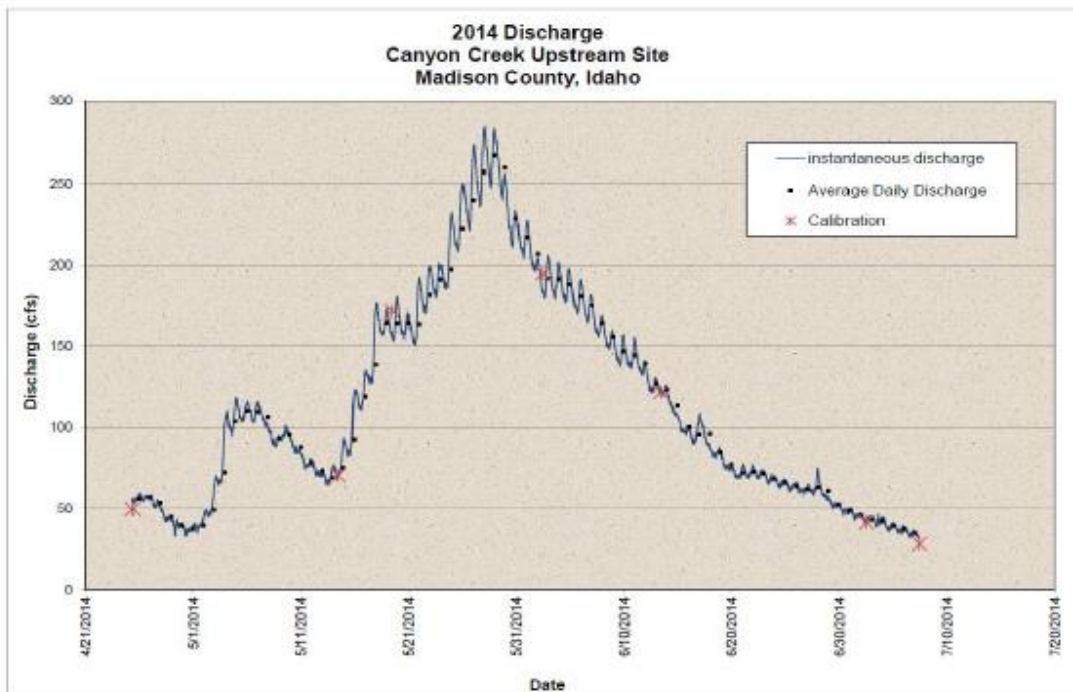
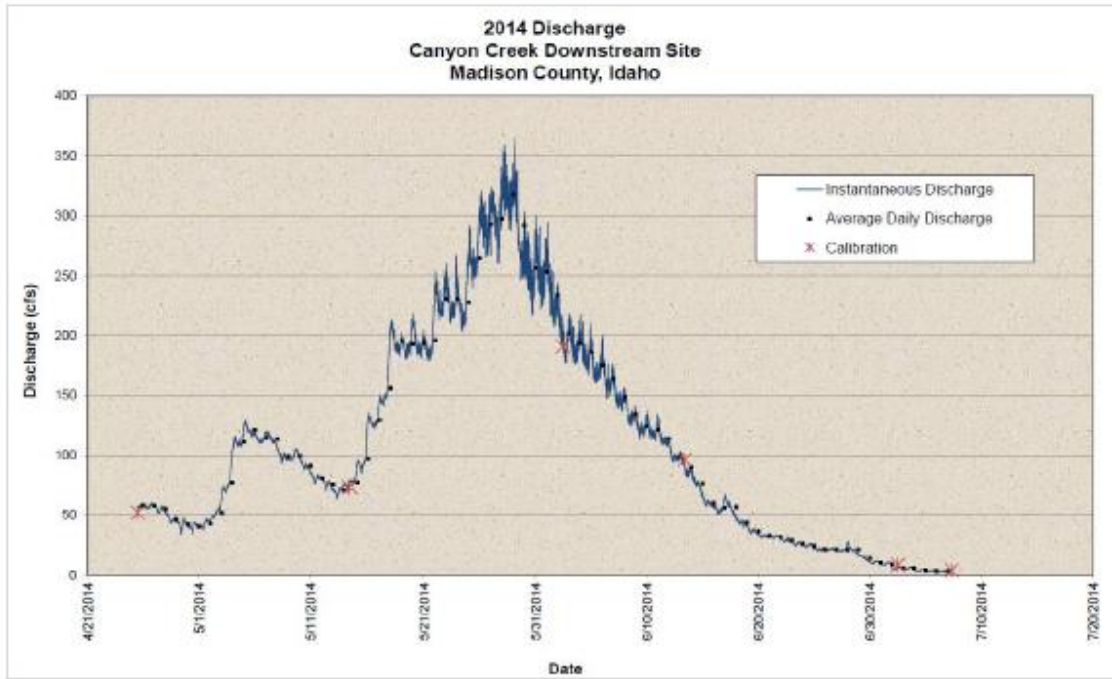


Figure 6: Example of discharge data from 4/25/14—7/9/14 at two site on Canyon Creek. FTR will continue to collect and download data through the 2015 irrigation season.

Monitoring photos:



Volunteer helping to set up a block net during Canyon Creek electro-fishing in August 2013.



An Idaho Fish and Game employee helps collect and tag YCT in Canyon Creek.



A Yellowstone cutthroat trout from Canyon Creek.



Installed Interrogation site and solar panel on Canyon Creek.



Stream discharge and temperature monitoring site.