FY2018 ANNUAL REPORT

MARCH 1, 2018 THROUGH FEBRUARY 28, 2019

YAKAMA RESERVATION WATERSHEDS PROJECT

BPA Project #1996-035-01-Contract #56662 REL 152

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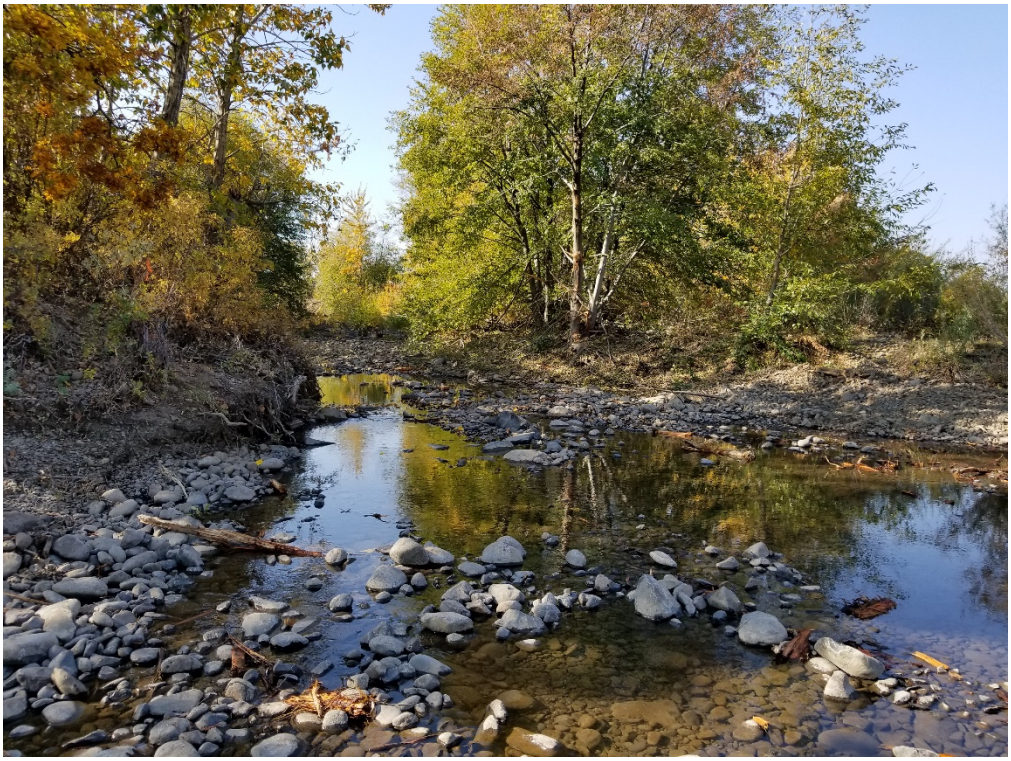
This report was funded by the Bonneville Power Administration (BPA), U.S. Department of Energy, as part of BPA's program to protect, mitigate, and enhance fish and wildlife affected by the development and operation of hydroelectric facilities on the Columbia River and its tributaries. The views in this report are the author's and do not necessarily represent the views of BPA.



This report should be cited as follows: Resseguie, Tim, and Dallas Reed. 2018. Yakama Reservation Watersheds Project: 2018 Annual Report, 3/1/2018-2/28/2019. Project No. 1996-

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Introduction:

Project Overview

The YRWP conducts comprehensive watershed restoration activities including (1) headwater wetland rehabilitation; (2) adult and juvenile fish passage restoration; (3) stream channel and riparian area restoration including bringing stream channels back to grade, reconnecting side channels and floodplains, planting native vegetation in conjunction with riparian and range fencing; (4) minimum instream flow implementation and modification of irrigation water sources and uses; along with (5) physical monitoring that includes precipitation, groundwater, discharge from streams, canals and drains, temperature, water quality, fish habitat structure and quality according to accepted protocols; and (6) biological monitoring including spawning ground surveys, snorkel surveys and smolt trapping. Stream channel, floodplain and vegetation restoration projects addressing habitat related limiting factors (i.e., flow, key habitat quantity, habitat diversity, temperature, sediment load, channel stability) that were identified in the Yakima Subbasin Plan Supplement (2004, pp. 11-13) form the core of our project. The ultimate goal of the project is to restore the natural hydrologic function of the watersheds as much as possible without causing an overwhelming burden to economic interests (i.e., timber harvest, agriculture) on the reservation. This in turn will increase steelhead spawning success and juvenile survival to outmigration. In addition to steelhead, restoration work will likely benefit other anadromous and resident fish species (e.g., coho salmon, chinook salmon, bull trout, and westslope cutthroat trout) and many wildlife species as well. The Satus, Toppenish and Ahtanum watersheds are home to almost half the total spawning abundance—and two of the four distinct populations—of Yakima Subbasin steelhead. Currently, these watersheds are habitat limited for a variety of reasons. As in other areas in the Columbia River basin, anadromous fish stocks have declined drastically in these three Yakima River tributaries. Some estimates place the adult steelhead returns to the Yakima Subbasin at ten percent of historical levels (Yakima Subbasin Plan Supplement 2004, p. 8). In March 1999, Middle Columbia River steelhead were listed as threatened under the Endangered Species Act. The importance and cultural significance of steelhead to the Yakama Nation, their status as a threatened species under the Endangered Species Act, and the critical role of Yakama Reservation steelhead populations in steelhead recovery are our rationale for making steelhead the primary focal species of the Yakama Reservation Watersheds Project (YRWP). In 2005, the three primary watersheds (Satus, Toppenish and Ahtanum) were combined to be monitored and restored under The Yakama Reservation Watersheds Project (YRWP). During 2018, YRWP staff has continued several tasks including; close monitoring of stream discharge and irrigation withdrawals, monitoring of juvenile steelhead outmigration, steelhead spawning surveys, and analysis of irrigation extent and timing. We have also continued our restoration efforts in these three watersheds, completing a levee and diversion removal project on Toppenish and constructing an off-channel livestock watering site to replace the surface water withdrawal site. We also provided assistance and

materials on two other projects including a fish screen installation on Ahtanum Creek and a large wood supplementation project on Satus Creek.

Restoration Projects

A. Three-Way Levee and Irrigation Diversion Removal

Background and Location:

Toppenish Creek provides spawning and rearing habitat for about 11 percent of the Yakima Basin Population of the Middle Columbia River steelhead. The Yakama Nation Fisheries Program (YNFP) identified a levee constructed upstream from the three-way diversion at river mile 42 as a feature that bisects the floodplain and inhibits natural stream channel migration and formation. Straightened stream channels provide poor spawning and rearing habitat for salmonids and other fish species. Yakama Nation Fisheries first proposed removing, or setting back this levee in the late 1990's about 20 years after it was built to control flooding. Funding (through BPA and NRCS), landowner consent, and consensus on design and risk did not fall into line until around 2015. The project was finally implemented and completed in October 2018.

Restoration Goals:

The primary objective of this project was to reconnect the flood plain in a section of Toppenish Creek that was straightened by the construction of a levee in the 1970s. We also decommissioned an unused irrigation diversion at this site (Figure 1). To prevent flooding, a smaller set-back levee was constructed connecting high ground and blocking several old distributary channels that could deliver flood water toward the town of White Swan. Four new sections of stream where created to mimic the sinuosity of the stream in un-diked portions of Toppenish Creek upstream from this location (Figure 3). The old sections of stream were blocked at the upper end but left open and connected to the new channel at the lower end to create three small alcoves that provide slow water refuge for migrating steelhead. Parts of these alcoves will likely silt in and create habitat for juvenile lamprey. A fourth large alcove could not be constructed due to cultural resource finds at that location. Engineered Log Jams (ELJ's)(Figure 4) were constructed through-out the project area to provide habitat for rearing steelhead and to aid in the formation of pools. Pile fields were constructed through-out the flood plain to collect wood and other debris transported from upstream during flood events. After the major construction was completed for this project, native trees, shrubs, and grasses were replanted in areas where the existing riparian vegetation could not be saved. We believe the new stream channel will attract more spawning steelhead than the previously diked stream channel and improve the spawning capacity of this reach of Toppenish Creek. It should also improve spring runoff retention and infiltration into the Toppenish Creek alluvial fan.

B. Solar Livestock Watering Site

Background and Location

The Olney-Cleparty Ditch is located within Allotment #175-E located in Township 10 North, Range 17 East, Section 20 SE. Historically the Olney-Cleparty ditch was created to provide a water source for residential and agricultural use and was functional for a short time throughout the year. Due to its location on the Toppenish Alluvial Fan and geomorphology of the area, the ditch began to dry up earlier in the season and during high flow periods it would not be suitable for a fish screen.

Goal and Objective

To supplement for the lack of water the Yakama Reservation Watershed Project (YRWP) drilled a stock water well and provided a solar powered pump. The pump is activated by a float switch controlled by the level of water within a 300 gallon tank. The well is pit-less which enables it to function in cold weather without freezing by drawing the water back out of the pipe and returning it to a level below the frost line. The project was surrounded by a buck and pole fence to keep livestock from damaging the structure (as shown in figures 5 and 6).

C. Satus Creek Large Wood Supplementation

Background and Location

Between Hwy 97 and Tule Rd, Satus creek had an insufficient amount of Large Woody Debris (LWD) and is considered to be "Not Properly Functioning" by the matrix of pathways and indicators issued by the National Marine Fisheries Service, also known as 'NMFS' (or nymphs). Due to this lack of LWD, the power of the flowing creek cuts into the earth and the banks begin to erode and over time become deeply incised and steep. While Satus creek is part of an important spawning migration path for the ESA listed, Mid-Columbia River Steelhead, its floodplain and riparian corridor provide equally important habitat for deer, birds and other wildlife as well acting as a filter from run off and high water events.

Types of structures:

2x – a two log structure for limiting stress on exposed banks (figure 8).

3x – three log structure for limiting stress on exposed banks (Figure 9).

Channel Spanning – 8 log structure for forcing water out of the channel and out onto the floodplain and riparian zone (figure 7).

Alcove – 7 log structure for retaining water in a back-water setting after a high low event (Figure 10).

These structures are designed to interlock, however, they are not designed to stay in one place permanently. Normally, these engineered log jams would be buried into the banks and held in place with large rocks and other "racking" material, whereas these structures are designed to migrate throughout the system, minimally/slowly. These types of structures are placed to take

pressure off stream banks, yet eventually create logs jam somewhere near a pre-determined racking area that will naturally create back-water features and force water flow to new areas within the floodplain and re-establish riparian corridors.

Goals and Objectives

To minimize disturbance and expedite a natural and normally lengthy process, Yakama Nation Fisheries and Wildlife Programs teamed up with NRCS and Columbia Helicopters to place 400 logs in Satus Creek and just up the mouth of Dry Creek. These logs are used to force water out onto the floodplain during high flow events and to encourage the retention of water as high flows recede while creating quality fish and wildlife habitat both instream and adjacent.

The Yakama Nations Fisheries Yakama Reservation Wildlife Program used a helicopter to add large wood instream structures to Satus Creek, a tributary to the Yakima River. Satus Creek is used by Endangered Species Act–listed Middle Columbia River steelhead (*Oncorhynchus mykiss*) whose habitat and populations are threatened by human activities. The large wood structures are designed to be placed in a manner that will most effectively address channel incision, floodplain disconnection, rapid erosion of fines into the channel, lack of instream complexity, and impaired riparian function.

Engineers used existing and gathered data to determine wood placement in Satus Creek. An instream field survey was completed in late June of 2018 and the data collected were combined with the 2017 light detecting and ranging (LiDAR) data, U.S. Geological Survey (USGS) gage data, large woody debris stability analysis calculations, and a one-dimensional (1D) hydraulic model to determine the recommended placement approach.

Construction Photos:

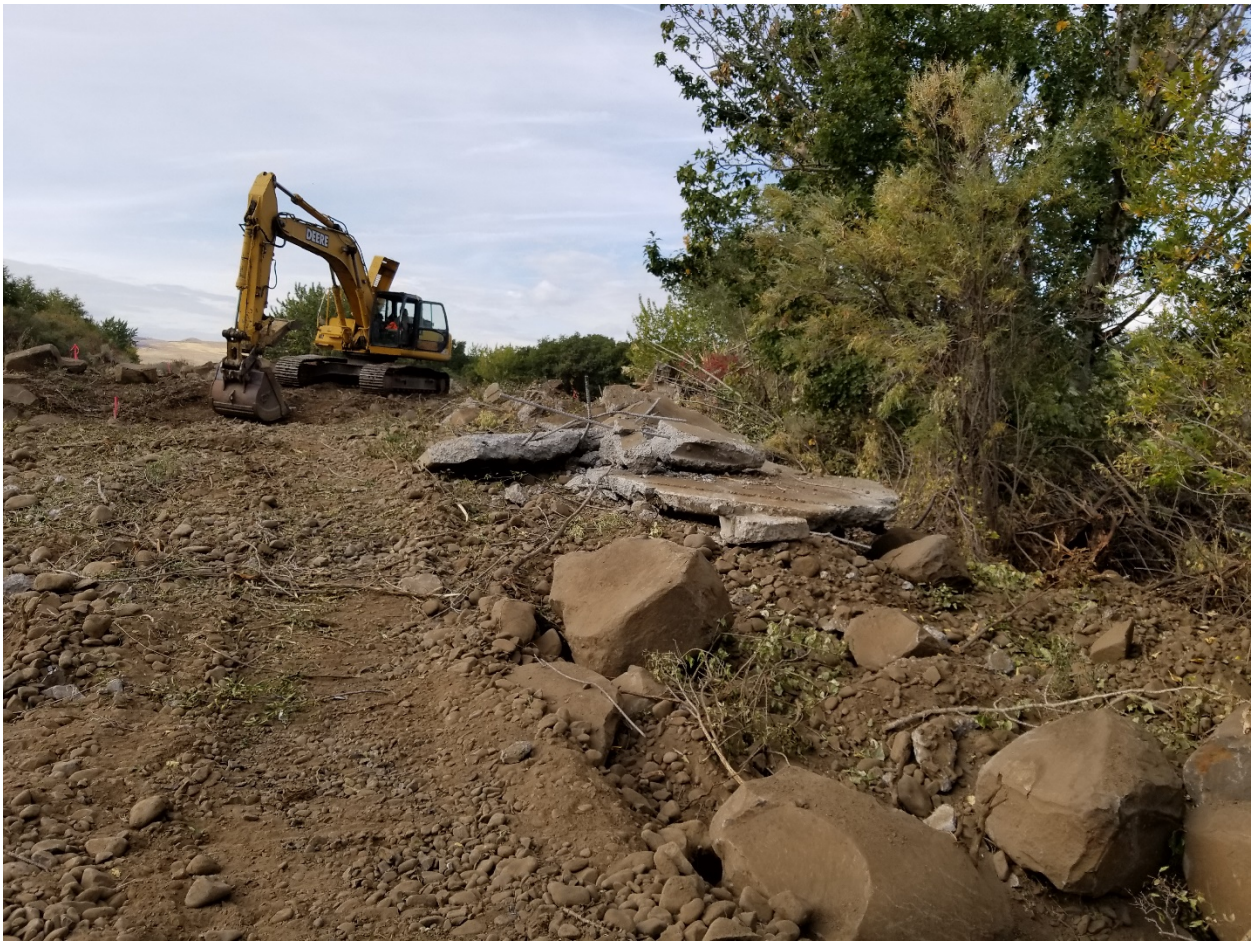

Figure 1. Removal of the 3–way irrigation diversion structure.

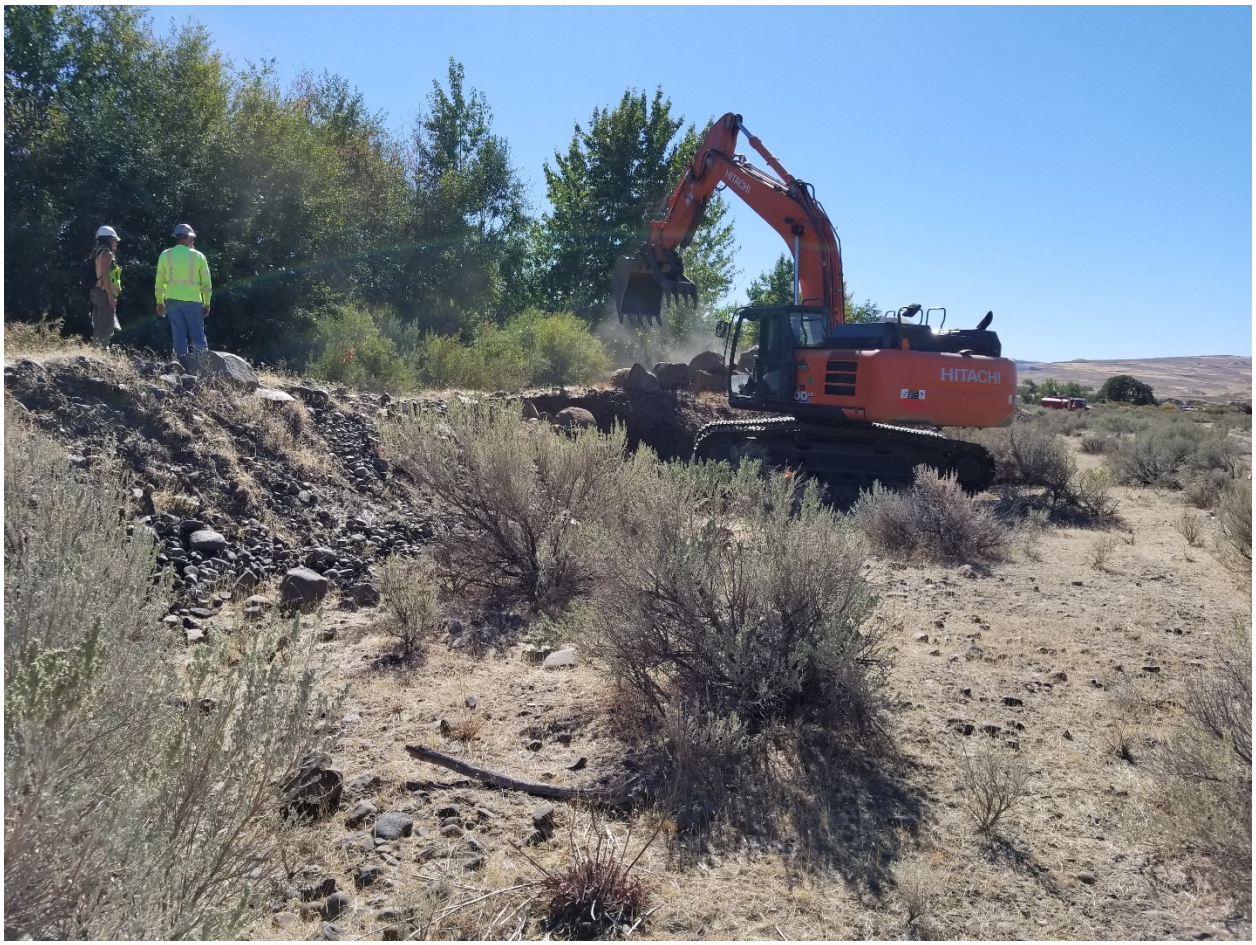

Figure 2. Removal of the 0.3 mile section of levee upstream from the diversion structure.

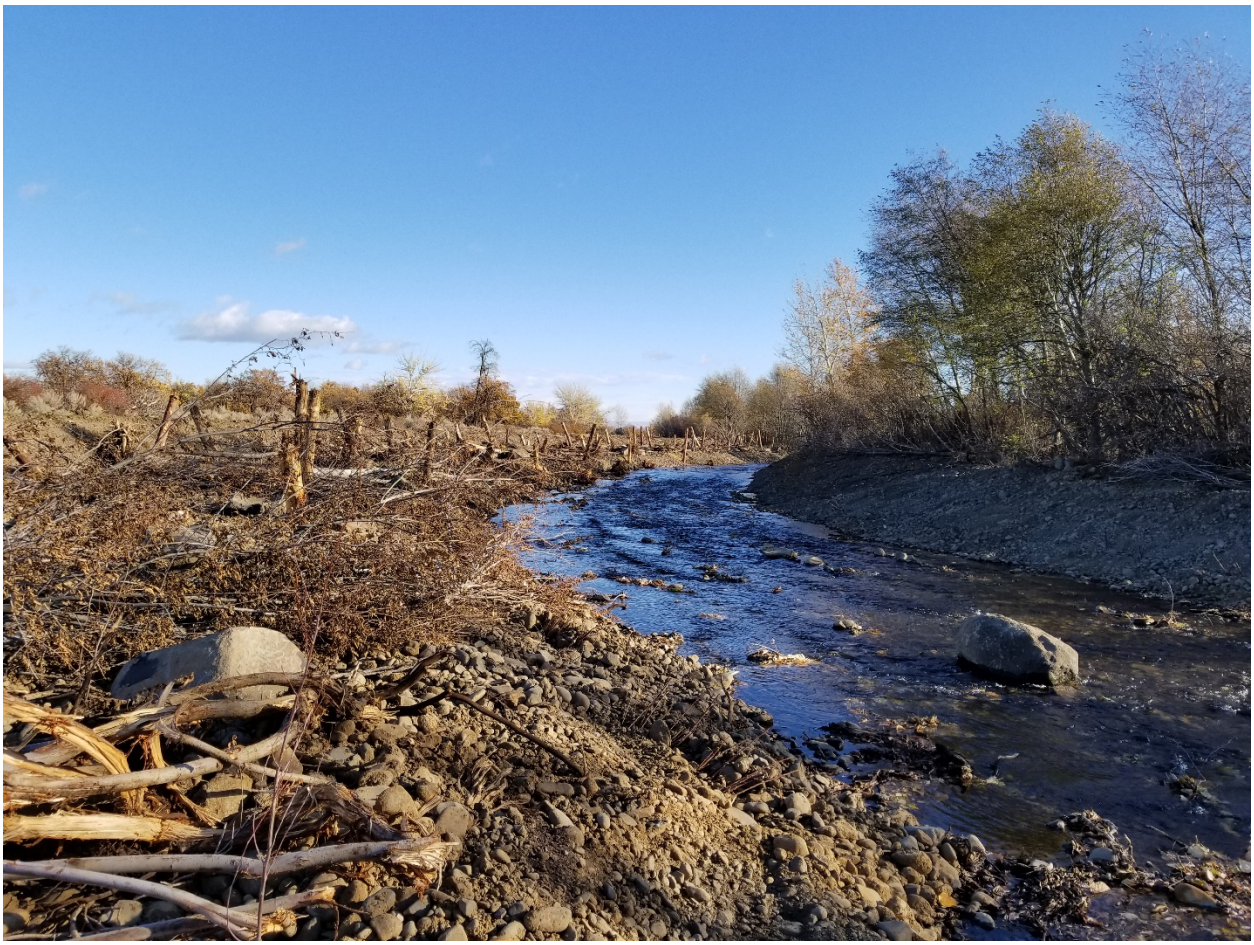

Figure 3. Newly constructed stream channel of Toppenish Creek and inset floodplain in the location where the 3-Way Levee was removed.

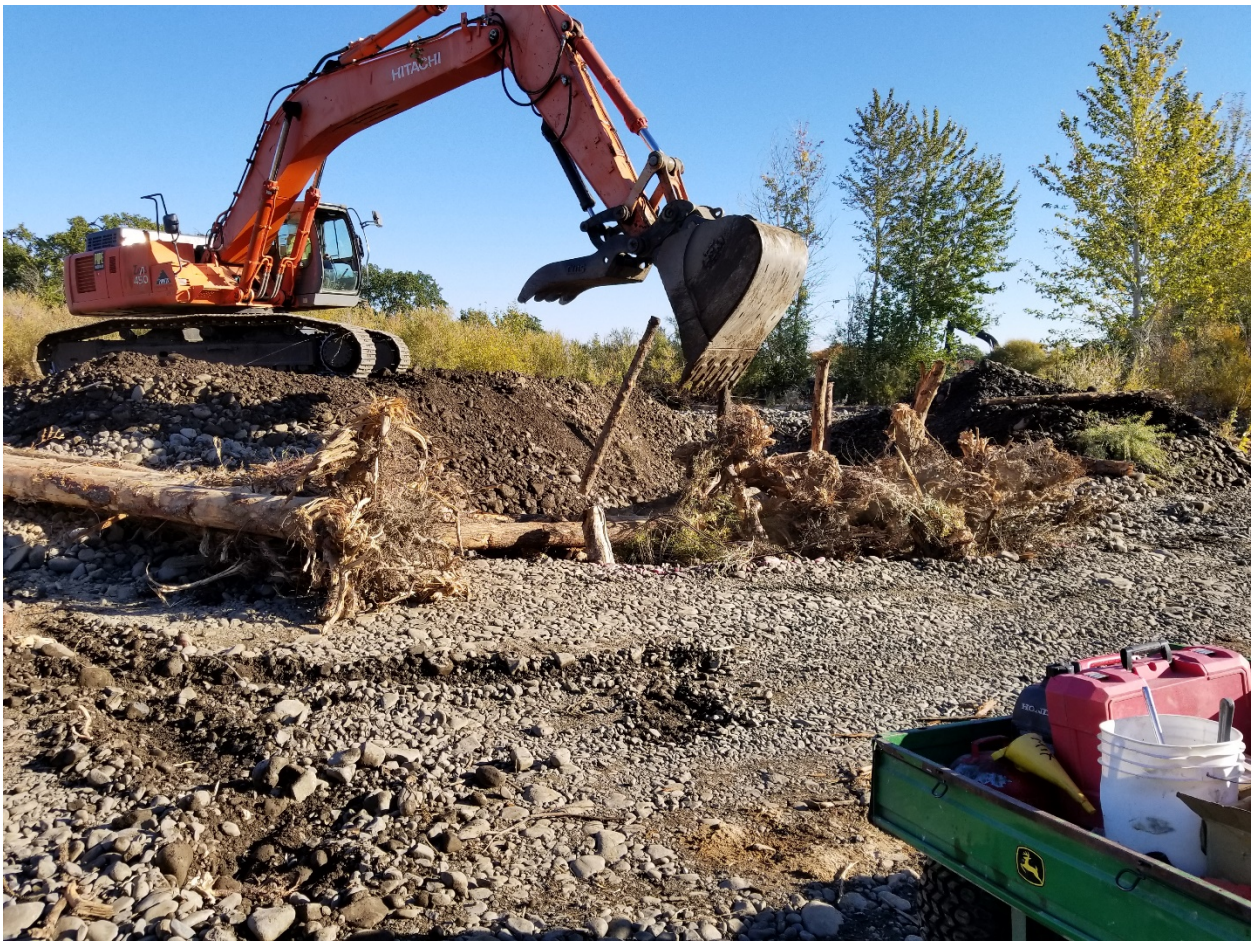

Figure 4. Construction of a large engineered log jam (ELJ) for bank stabilization at the lower end of the 3-Way Levee removal project site.

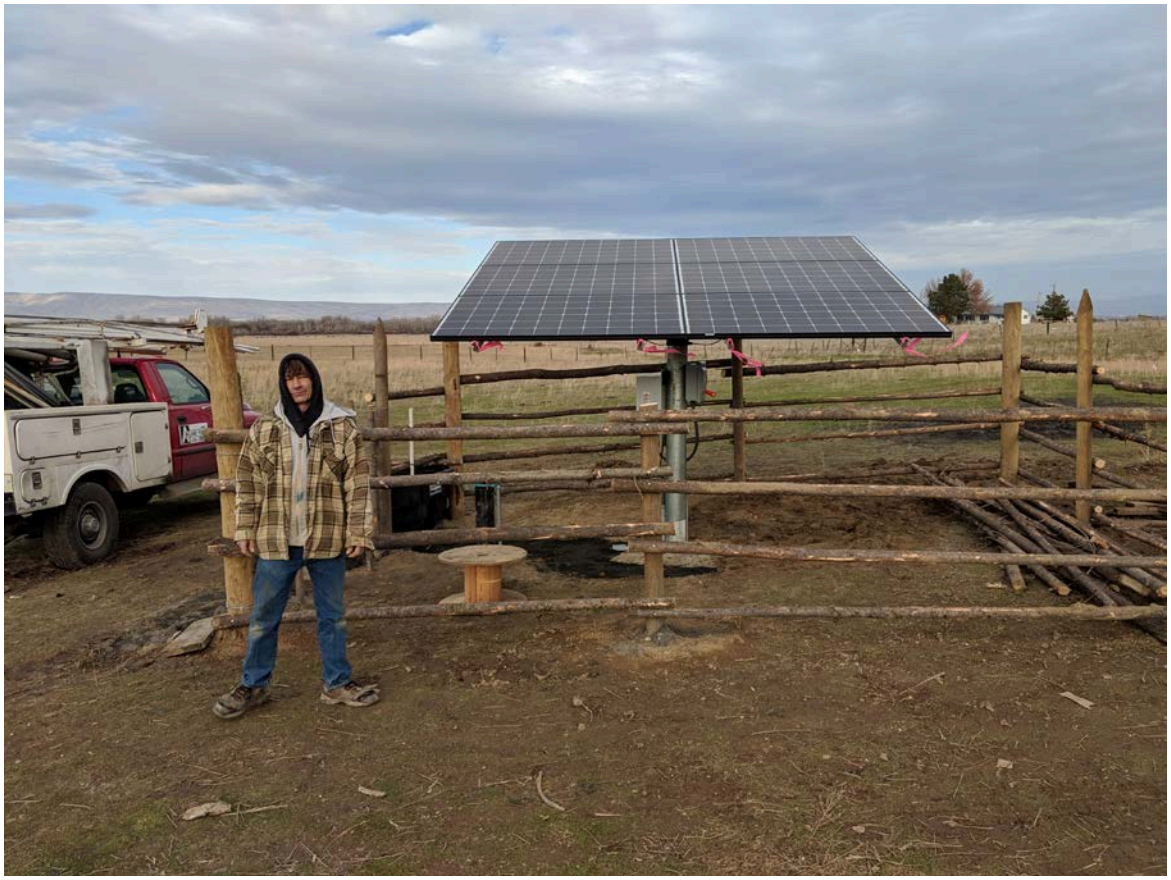

Figure 5. Solar Panels, fence and stock water tank, completed.

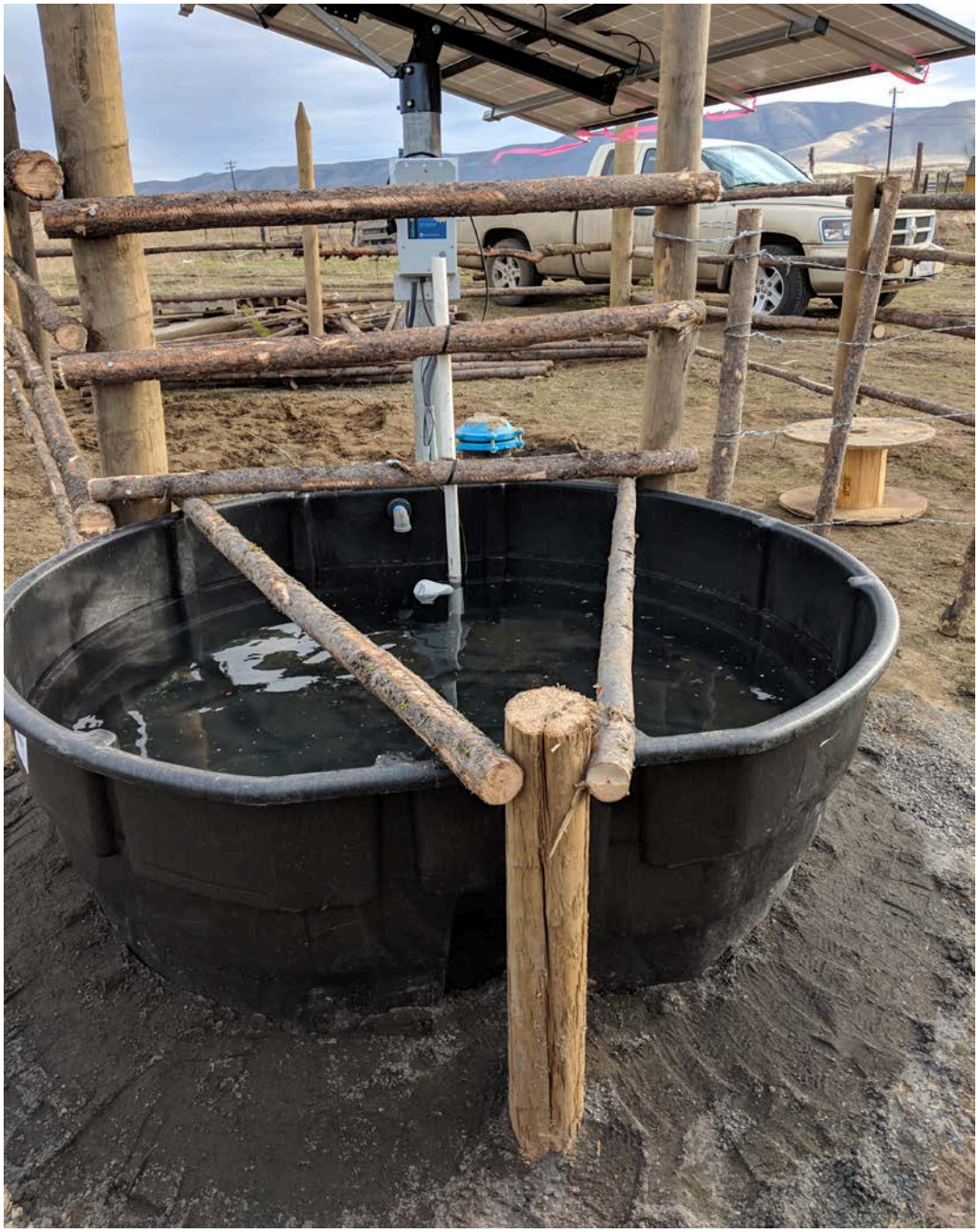

Figure 6. Stock tank and Float Switch.

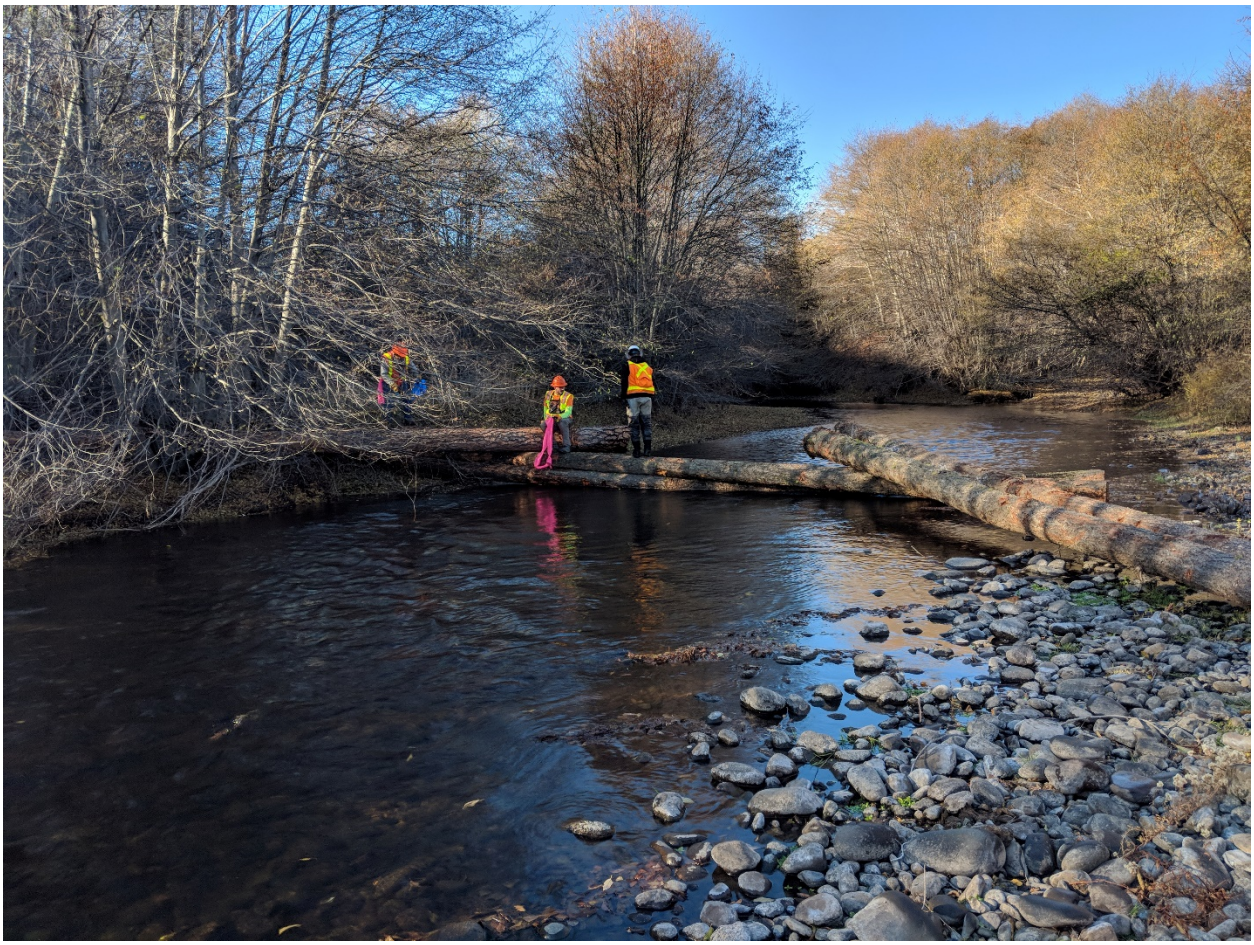

Figure 7. Channel spanning structure designed to forces water out of stream channel and onto floodplain and riparian zone.

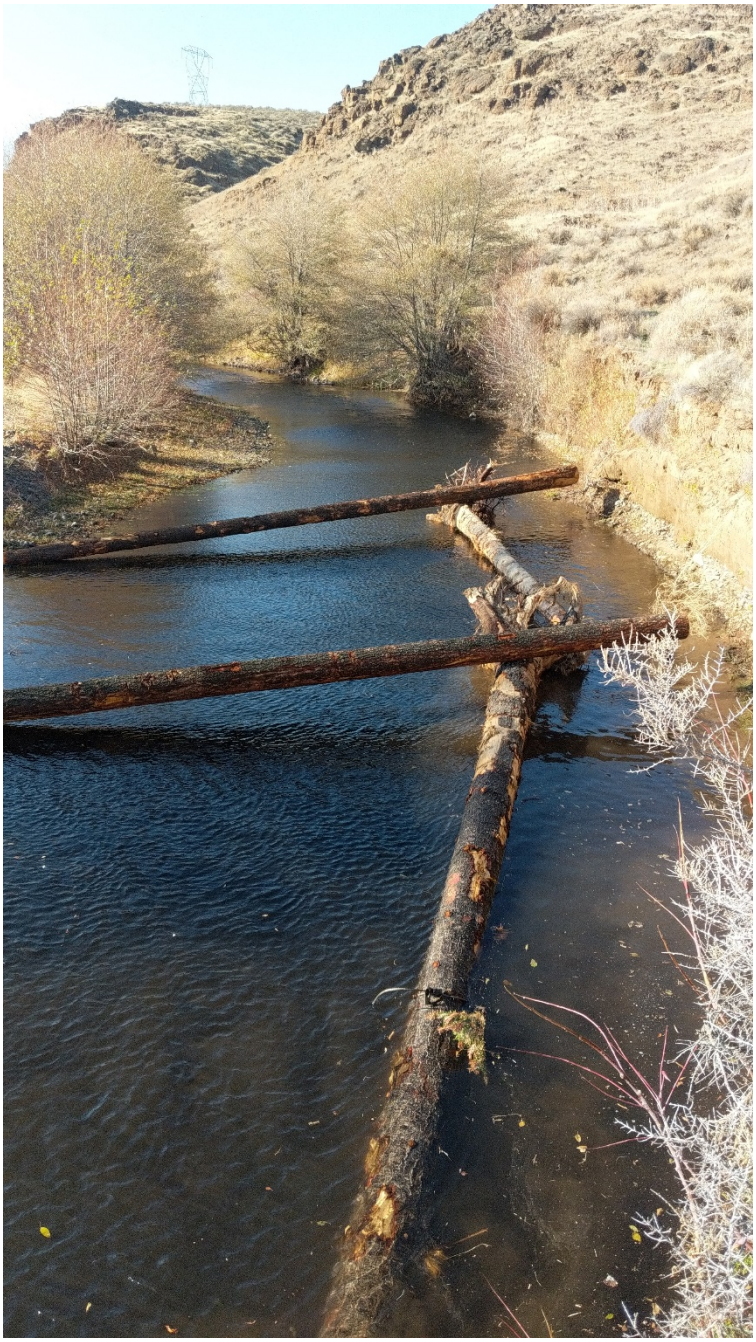

Figure 8. 2x structure designed to limit pressure on the exposed and eroded right bank.

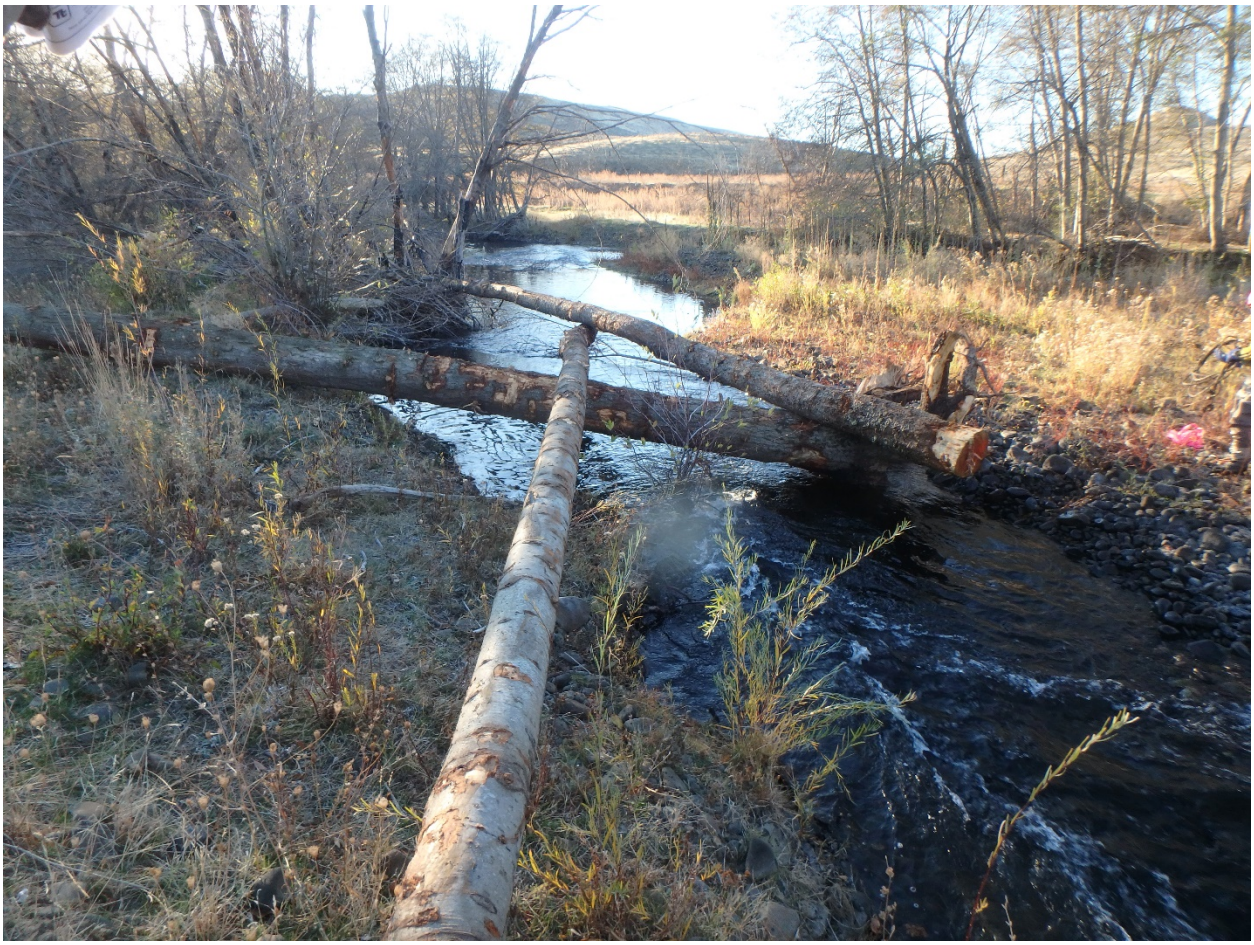

Figure 9. Example of 3x Structure. Includes one (1) root wad and two (2) logs. Designed to relieve banks of high stream energy.

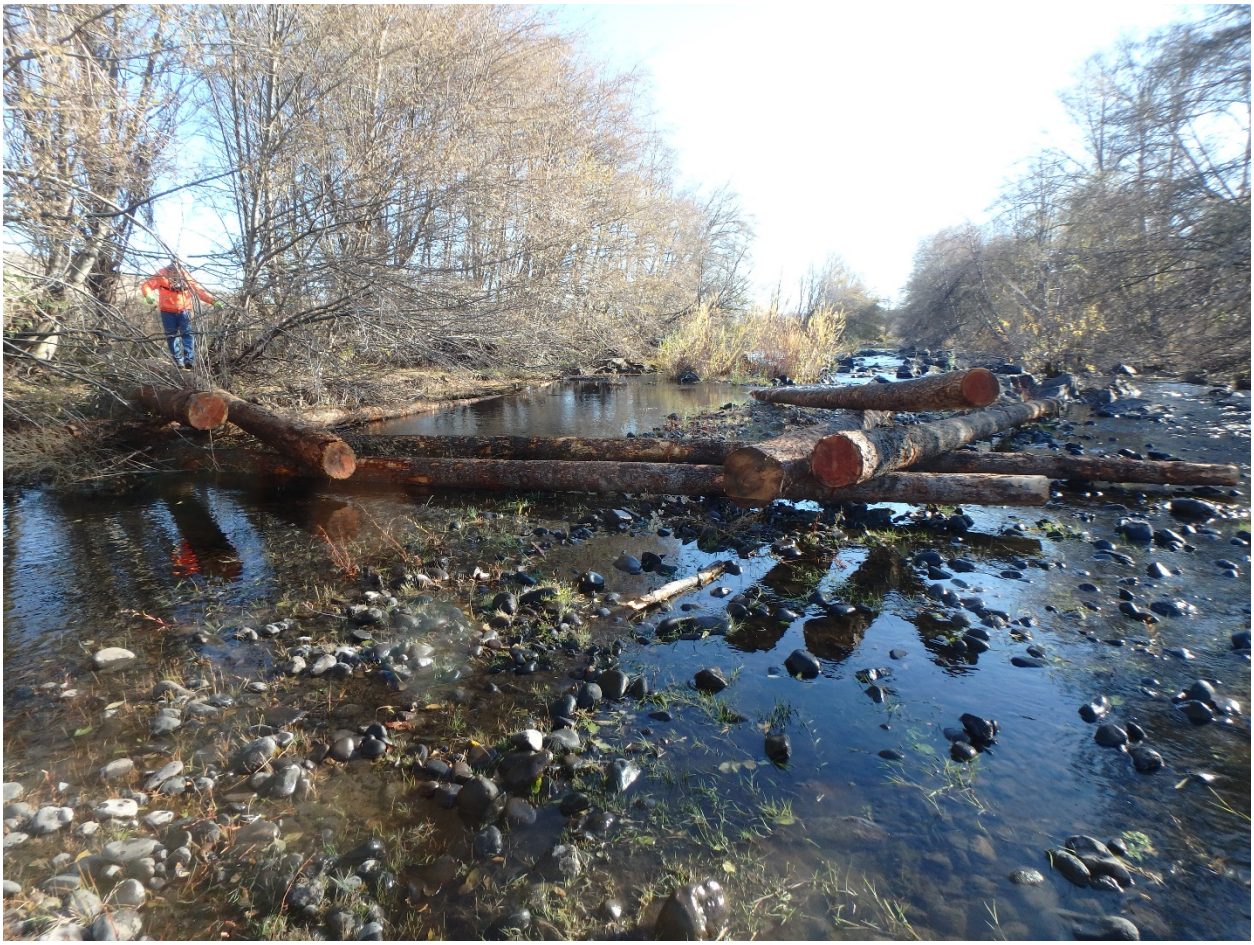

Figure 10. 7 log structure for retaining water in a back-water setting after a high low event.

Fencing*:*

A. **Existing Fence Maintenance:**

Exclosure fencing reduces grazing impacts and prevents motor vehicle travel in sensitive areas. Headwater meadows and streams are of particular interest due to their ability to store cool clean water that helps augment summer base flows and provide culturally important foods to people of the Yakama Nation. Exclosure fencing allows for increased soil retention at each site, increased function of meadow hydrology and native vegetation establishment. The YRWP annually maintains approximately 30 miles of fence and typically builds 2 to 3 miles per year over the last several years (Table 1). Fencing strategies vary depending on site and site conditions but include standard 4 strand barb-wire as the cheapest alternative and buck and pole

fencing which is more expensive but decreases ground disturbance and can be more wildlife friendly. Although no new fence was constructed in 2018, a signicant number of repairs including stream crossing and gates were constructed.

Table 1. Names and linear distances of exclosure fence constructed at various sites on the Yakama Reservation. YRWP staff regularly maintains all fences in these locations to try to prevent damage from livestock and motorized vehicles.

Name	Length (Miles)
Camas Patch Barb Wire/ Buck and Pole	6.75
Upper Toppenish	0.74
Lakebeds	2.68
Lincoln Meadows	1.06
Renchler's Meadow	1.22
Toppenish Creek River Mile 37	4.57
Seattle Springs	0.26
Seattle Springs	1.79
Starvation Flats	3.37
Toppenish Ridge	7.82
Totals	**30.26**

References

National Marine Fisheries Service (NMFS). 2009. Middle Columbia River Steelhead distinct population segment ESA recovery plan. National Marine Fisheries Service. Northwest Region. National Oceanagraphic and Atmospheric Administration. U.S. Department of Commerce.

Resseguie, Tim. 2018. STEELHEAD (ONCORHYNCHUS MYKISS) POPULATION AND HABITAT MONITORING IN LOWER YAKIMA RIVER TRIBUTARIES, 1/1/2018-12/31/2018 Annual Report, 1996-035-01

Yakima Subbasin Fish and Wildlife Planning Board. 2004. Management Plan Supplement: Yakima Subbasin Plan, pp. 1-47.