# YAKIMA BASIN SIDE CHANNELS

## FY 2014 ANNUAL REPORT

## MAY 1, 2014 – FEBRUARY 29, 2016

## CONTRACT #56662 REL 61

## PROJECT #1997-051-00

Prepared by

Yakama Nation

Yakima/Klickitat Fisheries Project (YKFP)

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## I. Introduction:

The project serves as the overarching habitat stewardship program for YKFP in the Yakima Subbasin, for off-reservation activities. Examples of work that is performed under this project includes all aspects of stream restoration including revegetation, weed control, fencing, removal of fish passage barriers, installation of NOAA-compliant fish screens, placement of woody material in streams at strategic locations, levee removal and road relocation. Other activities include collaboration with other resource management entities, review and input on restoration plans and programs, review and comment on land use plans and development projects. The project has a strong history of collaboration with many entities. Over 50 miles of habitat has been reopened to anadromous fish through this program, dozens of screens have been installed and over 80 restoration and protection projects have been implemented.

## II. Restoration Projects:

### a. Big Creek Fish Passage:

A substantial barrier to upstream fish passage once existed in Big Creek located on the Ensign Ranch, 8 mi west of Cle Elum, WA. This channel spanning concrete slab created a 3 ft. vertical drop and was located ¼-mile above the confluence of Big Creek with the Yakima River, blocking an estimated 20 mi of upstream habitat. The structure was originally designed to provide fish passage, but time and weathering disintegrated the passage infrastructure, resulting in a full passage barrier during most flows. In 2014, the Yakama Nation significantly improved fish passage at this location by removing the barrier and constructing a roughened channel for the benefit of anadromous fish including chinook and coho salmon, steelhead and Pacific Lamprey.

Passage was improved by constructing a roughened channel to allow unrestricted upstream and downstream passage for native fish species. The roughened channel included large boulders and other rocks and gravel that altered the stream bed elevation, reconnecting two sections of the river separated by a vertical drop. The materials used to create the roughened channel bed and banks included angular rock that ranged from 24 to 48 inches in size. Small gravel and sand was sprayed into the voids between large boulders with a fire hose to pack materials into the cracks in order to keep Big Creek flowing over the new materials instead of becoming subsurface through the roughened channel reach.

The project was completed in October 2014. This work successfully restored passage at this site for all native fish species and all life-stage in both upstream and downstream directions opening up 20 miles of upstream habitat.

**Status:** Completed

**Targeted Populations:** Chinook, Coho, MCR Steelhead, Pacific Lamprey

**Location Area (Basin, sub-basin):** Upper Yakima River, Big Creek

**In partnership with:** BPA

**Limiting Factors:** fish passage

**Project Manager:** Kelly Clayton

Figure 1. Before and after construction

### b. Oak Creek Wood Replenishment Phase I

This project was successful in placing 300 logs into the channel/floodplain of Oak Creek utilizing AmeriCorps hand crews thinning stream adjacent overstocked uplands. Wood was placed using grip hoists and tractor skid winches. All trees were harvested onsite, but outside the 130 foot riparian zone. Work was undertaken from 11/01/2014 through 02/01/20215. All work was completed over frozen ground. Work was halted for approximately 2 weeks during rain and some minor surface thawing.

Figure 2. Before and after construction

**Status:** Active

**Targeted Populations:** Middle Columbia River Steelhead

**Location Area (Basin, sub-basin):** Yakima River, Naches River, Tieton River, Oak Creek

**In partnership with:** BPA

**Limiting Factors:** Floodplain connectivity, elevated temperatures, low streamflows

**Project Manager:** John Marvin

### c. Yakima River Edge Habitat Enhancement Phase I

The Yakima River Edge Habitat Enhancement Project (Edge Project) is a multiphase effort to enhance edge habitat on the mainstem Yakima River near the Cle Elum Supplementation and Research Facility in Cle Elum, WA. Fish habitat productivity in this reach has been compromised by flow regulation and floodplain loss. Railroad and interstate revetments prevent side channel development and irrigation delivery from 800k acre feet of reservoirs that keep the flows artificially high in the summer, while reducing the frequency of flood flows that were the geomorphic agents. Eurosettlement resulted in removal of wood from the floodplain and stream channel. This location (and many other areas) is seen by many as an irrigation conduit - efficient water conveyance straight and boring. However, there is opportunity to rebuild habitat complexity and improve salmonid production. Abundant numbers of spring Chinook salmon spawn upstream of this project. The goal of this project is to provide optimal edge habitat for juvenile salmonids, with the intent to increase rearing habitat in this compromised reach.

Wood structures were constructed on river banks and gravel during low flows, after cessation of irrigation delivery in the fall. Three types of structures have been designed; Type 1 structures will be along the banks with vertical posts providing stability to interwoven logs. Type 2 structures will be built on existing gravel bars during low flow; also using posts for stability and Type 3 structures will be post stabilized large snags. Each structure type has been carefully selected to provide habitat and to be stable at the 100-year flow event. These structures are expected to capture naturally recruited large wood over time and therefore may reduce large wood accumulations downstream on the South Cle Elum Bridge.

The project permitting process was much longer than anticipated. The site was selected because boater use is much less than in other areas of the mainstem river. Most boaters are experienced fishers in drift boats or rafts with rowing frames. This reach is downstream of naturally wood-rich stream reaches. This perspective was supported by private fishing guides and WDFW Research Scientists. The site was also selected because Yakama Nation expended over $2,600,000 to purchase and protect this reach, and because the reach is extremely homogeneous.

Phase I focused on river left (looking downstream) directly adjacent to the Cle Elum Hatchery. Phase II will include restoration on the other side of the river. After meeting with Washington State Parks and Recreation personnel much discussion has occurred since January about options for driving piles. If possible, alternative techniques will be utilized next phase in order to minimize turbidity and reduce costs.

Figure 3. Type 1 structures

Figure 4. Type 2 structures

Figure 5. Type 3 structures

**Status:** Active

**Targeted Populations:** Spring Chinook Salmon

**Location Area (Basin, sub-basin):** Upper Yakima River

**In partnership with:** BPA

**Limiting Factors:** floodplain loss, altered flows, lack of complexity, deficient in LWD

**Project Manager:** Scott Nicolai

### d. Yakima River Edge Habitat Enhancement Phase II

This is a continuation of efforts completed February 2015. This report will be based on phase 2 construction. The reach was a simplified plane bed reach, lacking woody habitat and complexity. Snorkel surveys in October, 2015 revealed an absence of salmonids along the right bank where construction took place later. Conversely, juvenile salmonid abundance was extremely high

adjacent to and within edge habitat structures constructed just downstream of the Yakima River Side Channels Project in 2015.

Figure 6 is an example of the pile driving activities that occurred. A Movax was used to get the 14 inch piles to the specified 12’ embeddedness. A clay layer, approximately 7’ in depth was encountered approximately 2’ below the river bed which caused pile driving progress to initially go extremely slow. To improve efficiency, piles were sharpened on the tip, and steel tips were fastened to the piles (figure 7). This improved driving speed slightly but not enough. Next, an 18’ H-pile was modified to pre-drive a bore to depth prior to driving the wooden piles with the steel tips (figures 8 and 9). This proved very successful in improving pile driving efficiency. The pile driving activities produced very little turbidity. Turbidity was visually monitored throughout all in water work activities.

*Figure 6 Habitat conditions during pile driving activities with a Movax. Note: flows were elevated and water was naturally turbid at the beginning of the project construction activities*

*Figure 7 Sharpened vertical pile with steel tip fastened.*

*Figure 8 Modified H-Pile used to produce a bore for wooden pile driving*

*Figure 9 Habitat conditions during pile driving activities. An H-pile was used which essentially pre-drilled the bore to speed efficiency of pile driving and ensure all piles were driven to depth.*

An engineer was on call during the construction activities, and Yakama Nation fish biologists monitored project construction during all project phases. Special care was taken during project layout to ensure the structures would not capture the main river thalweg and ensure the appropriate site distance needed to achieve boater safety measures. Additionally, as depicted in figure 8, upstream voids in the structures were packed with slash and racking materials to ensure a suitable backwater eddy was produced and reduce the chances of a strainer developing which could put boaters at risk.

The furthest downstream structure design was modified by engineers to compensate for a lack of vertical piles. Bedrock was encountered that prevented piles to drive to the specified depth. The final product was a log jam that had double the amount of materials as the other jams and the core of the jam will be able to handle the river forces despite the absence of the originally specified number of piles.

Ultimately, 10 Type one engineered log jams (ELJ) were constructed over 0.25 miles with very little turbidity on the right bank of the main stem Yakima River. The site was vegetated with native plant species and erosion control measures are in place. Lessons learned from this project are:

- Be willing to be creative and adapt to challenging situations (i.e making modifications to equipment, design, or tools to safely and efficiently construct a habitat project).
- For structures designed for juvenile fish, it is almost impossible to have too much slash.
    - Good communication between the contractor and the project sponsor is essential, especially when the project sponsor is overseeing construction activities on-site.

- Know where your species of interest (Middle Columbia River Steelhead) are spatially located among life history stages thru communication with M&E biologists etc., to have the option of potentially extending in water work windows.


*Figure 10 Habitat conditions during Type 1 log jam construction*

*Figure 11 Completed Type 1 engineered log jam. Care was taken to ensure the structures did not produce a "straining" effect to improve boater safety.*

*Figure 12 Furthest downstream engineered log jam near completion. This site proved challenging in that the total specified piles were not able to be driven to specified depth. A new design was engineered to mitigate the lack of piles which included increased bank excavation, installation of whole, small diameter trees in the back water downstream of this image. Two ELJ's worth of materials were installed at this one location. The end result more than doubled juvenile salmonid rearing and forage habitat.*

Disturbed soil was covered with a native seed mix and weed free mulch for erosion control. Potted native upland and riparian plant species were applied to the surface using AmeriCorps labor crews.

**Status:** Active

**Targeted Populations:** Spring Chinook Salmon

**Location Area (Basin, sub-basin):** Upper Yakima River

**In partnership with:** BPA

**Limiting Factors:** floodplain loss, altered flows, lack of complexity, deficient in LWD

**Project Manager:** Ryan DeKnikker

### e. Indian Creek Wood Replenishment Phase I

Designing this project occurred over a period of five years, from initial discussions to implementation. The state-owned project area is managed by Washington Department of Natural Resources as school trust lands. Implementation took five weeks and was completed in early December, 2015. A total of 900 pieces of large woody material was placed on 1.3 stream miles in the channel and on the floodplain. About 250 of these pieces included rootwads, all pieces were between 15 and 60 feet in length. In addition approximately 40 cubic yards of timber harvest slash (tree branches) was placed in the stream channel and in existing artificial ditches to retard surface flow during wet conditions. No clearing of existing woody vegetation occurred. Sediment delivery to surface water was controlled by limiting operation to dry or frozen ground, with the exception of one short period when rainfall created soft soils. Equipment operation ceased during that time period. Straw mulch and locally-gathered forest duff was placed on disturbed ground to control runoff, and surfacing with crushed rock was done on approach roads that were sloping toward the stream course.

Future plans call for monitoring, more ambitious treatment in artificial ditches that capture groundwater and route it quickly to stream channels. The intent with ditch-treatments will be to return the topography to pre-european human presence conditions, in order to keep groundwater tables as high as possible. Qualititative, visual monitoring of the site may result in additional restoration proposals, including placement of additional woody material, repositioning of same, and/or revegetation with native woody riparian plants. Photos of before, during and after conditions are displayed below. Also, a narrative of observations and lessons learned from Phase One implementation is attached.

*Figure 13 Indian Creek Floodplain before restoration project. Note lack of woody material.*

*Figure 14 Indian Creek Floodplain during restoration.*

*Figure 15 Indian Creek Floodplain after restoration project.  Note woody material on the floodplain.*

Thoughts and Lessons Learned

1. Trimming branches back to 1-3' seems to help maintain them. Repeated shuttling logs quickly breaks off all branches. Skidder onsite should help reduce loss of branches.
2. Skidder at Indian would've saved time. Can we rent a skidder and run it ourselves? We had to move 100 or so logs several hundred feet with cable loader. That went really slow.
3. Having 2 tractors was really helpful. We opened access across ditches, picked up and moved lots of slash. The FRM tractor can skid 3-4 logs/trip, which helped minimize time with the cable loader. But a skidder would've saved a lot more time!
4. The brush bucket on the small tractor – super helpful.
5. WCC – really effective for placing slash in creek upstream of wood jams, final positioning of wood instream, filling ditches.
6. Slash – really important. Having dozens of logs jam's instream results in trapping mobile wood at upstream end of project area. Downstream jams remain porous. Slash placement minimizes that.
7. When transporting with self-loader, have logs fanned out at site, and place them directly in the creek wherever possible.
8. Self-loader is extremely valuable tool. If we have the wood placement locations well marked it can strategically place wood in small groupings. Can also haul a lot of slash in a log "basket".
9. With self-loader, off-loaded wood should be spread out rather than stacked in a deck. This protects branches and should make placement easier.
10. Our 18' flatbed trailer could be an effective slash hauler with side boards, rope lashing and perhaps hog panels.
11. Placed a single tree with rootwad at downstream terminus of the project area (Section 16). Subsequent to placement the watershed experienced a rain on snow event, 40 cfs estimated at downstream gauge. I checked to see if this piece of wood had moved during high flow - no. Created small scour pool.
12. Keeping voice recorded notes everyday – great way to go. I transcribed notes on another file.
13. December 14th, 2015: The Cable yarder/loader worked a total of six days, 8 hours/day, and placed almost all wood; some wood at upper end needs to be placed instream via line. Remaining wood will be placed on the access route with tractor. Other work yet to be completed:
    - lots of slash above each log placement area;
    - recontour the access route with tractor blade and box blade;
    - Seed and rake disturbed soils;
    - Place more slash in upper ditches;
    - Haul two more loads of wood from Section 33 if possible.

**Status:** Active

**Targeted Populations:** Middle Columbia River Steelhead

**Location Area (Basin, sub-basin):** Upper Yakima River, Teanaway Watershed, Indian Creek

**In partnership with:** BPA

**Limiting Factors:** Floodplain connectivity, elevated temperatures, low streamflows

**Project Manager:** Scott Nicolai