Lewis River Aquatic Fund Projects (SA 7.5.3.2)
Project Closeout Report

Project Title:	**Lewis River Hydroelectric Project** ***Eagle Island Site A Habitat Restoration***
Project Approved By:	Aquatic Coordination Committee April 2010
Original Project Sponsor:	Cowlitz Indian Tribe
Project Funding	$74,300
Project Description (work completed):	The Natural Resources Department of the Cowlitz Indian Tribe used ACC funding to leverage $354,966 dollars of Salmon Recovery Funding from the State of Washington to implement a restoration project on the North Fork Lewis River to enhance habitat quality for Lower Columbia Chinook, coho, and steelhead, all listed as *Threatened* under the *Endangered Species Act*. 1,600 linear feet of side channel were modified with over 300 pieces of wood 40 to 50 feet in length, 14 – 40 inches in diameter placed into 16 structures with four functions. Four apex bar jams were installed to split and maintain flows into and throughout the side channel. Five scour pool structures were installed to add and maintain scour pools throughout the side channel. Four habitat wood structures were installed to provide shade and refugia from velocity and predators. And lastly two large floodplain wood structures were built to add roughness elements in order to maintain energy at high flows into the intended channels. More structures are in place on the project site than are reflected in the construction drawings. Availability of materials and field-fitting of structures to existing conditions allowed us the opportunity to expand the project. InterFluve was onsite during the entirety of the construction period providing engineering and construction oversight. Warning signs are in place at both ends of the side channel and on the apex bar jam at the upstream entrance of the project. The entire channel was sealed off with coffer dams and dewatered using standard BMP for fish screening and fish rescue. Fish rescue was done over a two day period. The project area was segregated from the mainstem throughout construction. Log structures were ballasted down with two 4-man boulders with an average density of 170lbs/sq inch per log as well as 40 foot piles driven 30 to 35 feet into the substrate. Cabling and epoxy were used to hold the logs in place (see construction drawings for detail).

Two acres of riparian seed mix was spread out over the project site wherever bare soil was exposed. The seed mix consisted of Slough sedge (*Carex obnupta*), California brome (*Bromus carinatus*), Meadow barley (*Hordeum Brachyantherum*), Blue wildrye (*Elymus glaucus*) and Annual ryegrass at 18 pounds of seed mix per acre.

Invasive species treatment will consist of an intensive herbicide application over a two year period beginning in 2012 and concluding in 2013 to treat substantial Japanese knotweed (*Fallopia japonica*), Scotch broom (*Cytisus scoparius*) and Himalayan blackberry (*Rubus armeniacus* or *Rubus discolor*) populations on the project site.

Over 3,000 trees and shrubs for this project are being grown as of the writing of this report. In Early Fall 2012 the trees and shrubs will be installed on the project. These plantings will cover 2 acres of the project area providing shade, organic inputs into the system and future sources of woody debris in the system. The plantings will consist of the following species and numbers:

Oregon Ash	Fraxinus latifolia	30
Red-Osier Dogwood	Cornus sericea	650
Nootka Rose	Rosa nutkana	180
Douglas Spirea	Spirea douglasii	125
Douglas Hawthorn	Crateagus douglasii	100
Pacific Ninebark	Physocarpus capitatus	250
Willow (spp)	Salix Spp	1150
Black Cottonwood	Populus balsamifera	50
Red Alder	Alnus rubra	20
Ocean Spray	Holodiscus discolor	210
Serviceberry	Amelancheir alnifolia	125
Red Elderberry	Sambuca racemosa	125

Workforce:

- **Personnel (by craft)**

  Rudy Salakory (Biologist and Project Manager, Cowlitz Indian Tribe)
  William Norris P.E.(Engineer, InterFluve)

- **Contractors:**

  John M Willey Construction
  Boulder Creek Landscaping Inc
  Licensed Herbicide Applicator (Not yet contracted)

Schedule Summary:

Construction completed September 2011
Plantings installed Early Fall 2012
Invasive Species Management from Summer 2012 to Fall 2013
Project Completed in Fall 2013, effectiveness monitoring until 2021

Problems Encountered: River levels were raised to perform work in the reservoir without notification to our project team. The project site was protected by fast action of the project team. Difficulty in securing wood from PacifiCorp because of insurance constraints. Fish rescue took longer to complete due to a lack of volunteers available on the same date.

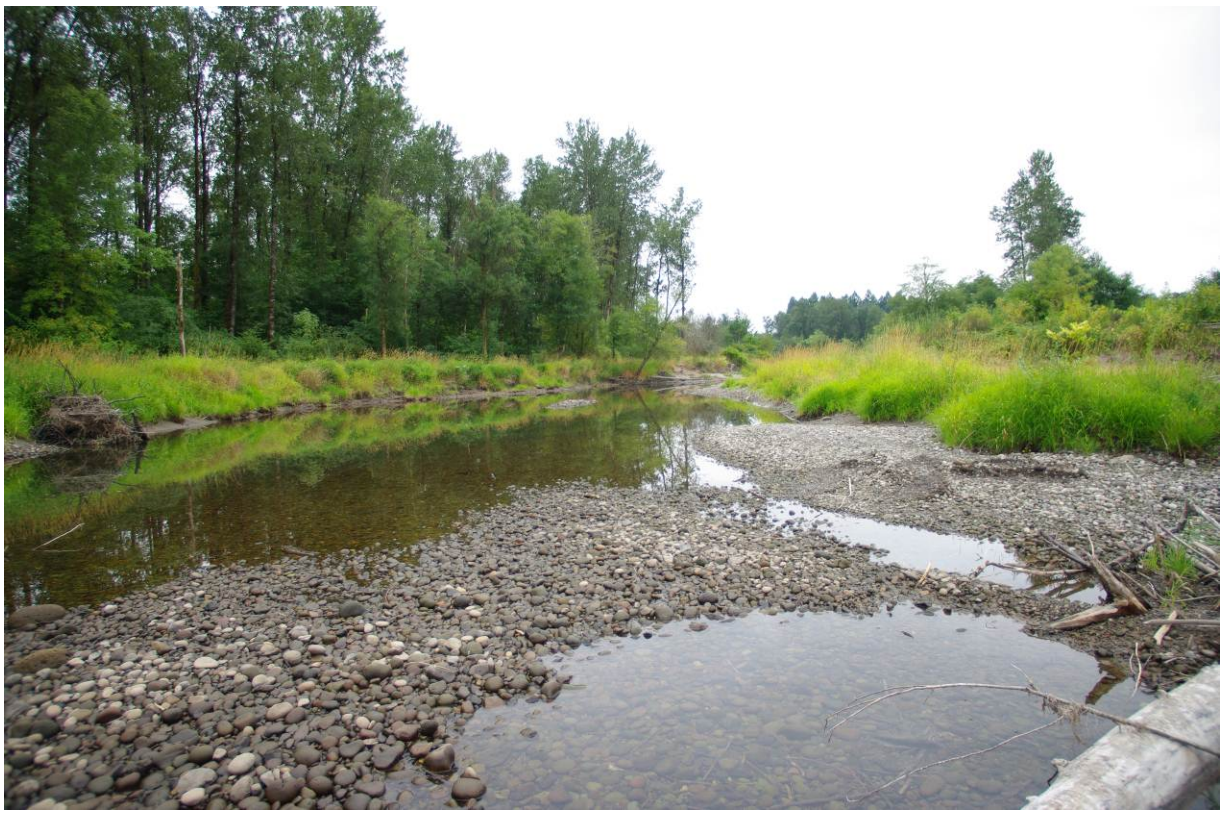
Things that went well: Project site was easily accessible, neighboring landowners were helpful and accommodating, materials and equipment were available for a rapid and successful execution of the project plans. Plans developed and executed with full stakeholder participation made the project flow smoothly and provided a sense of ownership to everyone involved.

Work Not Completed: Tree and shrub planting (Fall 2012)
Invasive species control (2012 and 2013)

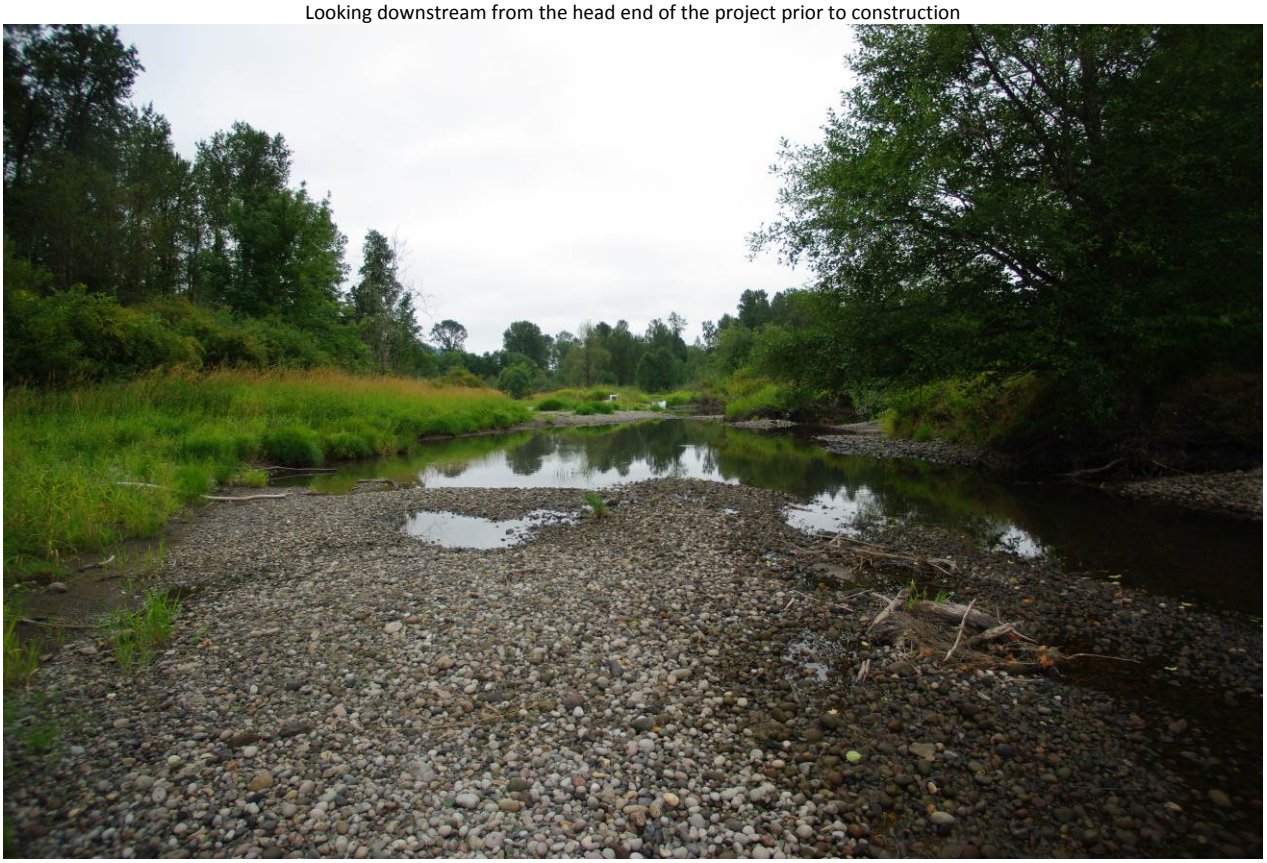
Lessons Learned: Work hard to establish and maintain lines of communication between PacifiCorp in regards to the planned release of water outside of the expected release amounts. Acquire and store donated materials further in advance of the project to ensure the availability of materials. Plan out a volunteer day farther in advance to ensure high attendance for fish rescue.

Attachments: Photos of the project and descriptions follow. Also attached are stamped construction drawings

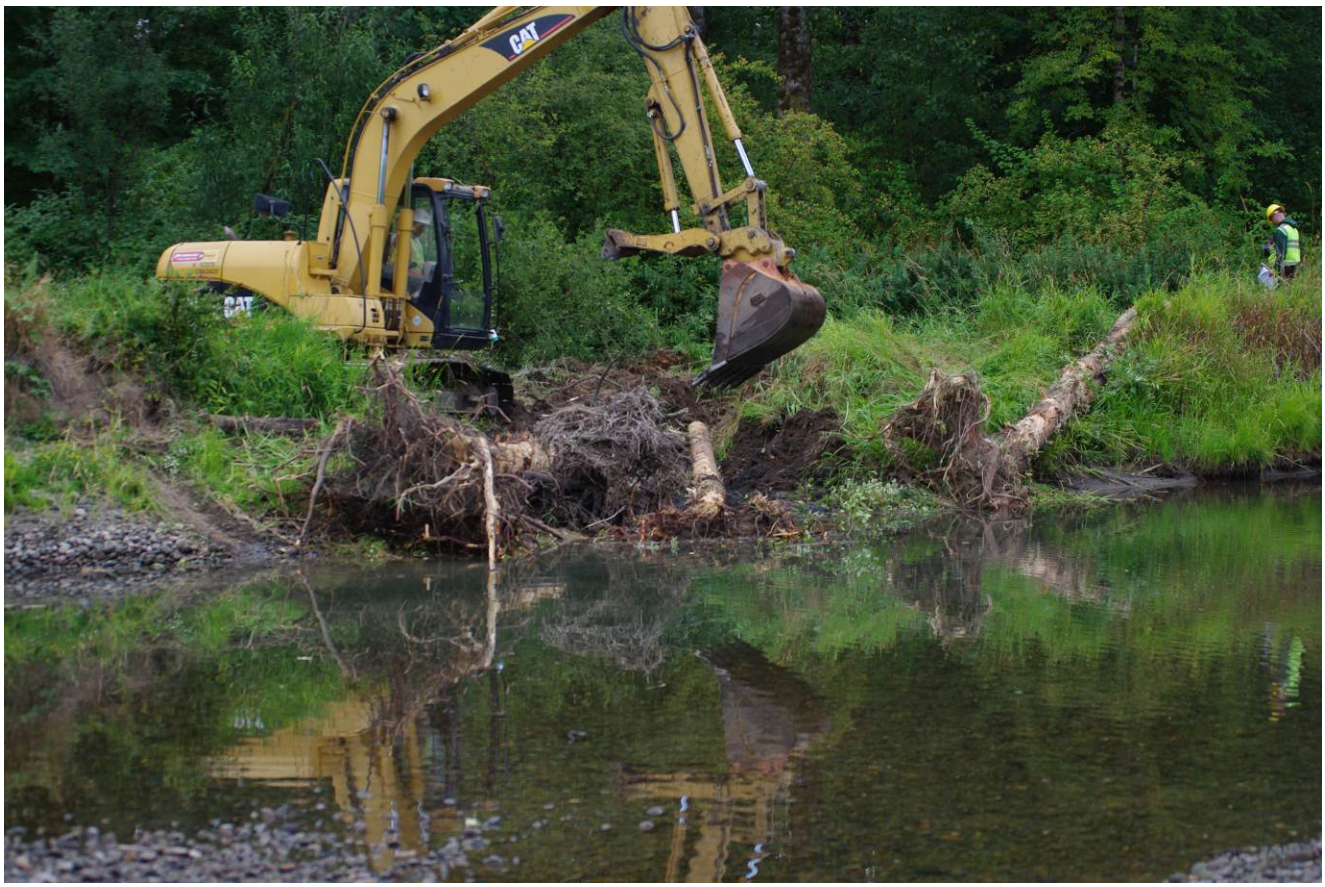
Looking upstream from near the center of the project area prior to construction



Looking downstream from the head end of the project prior to construction



Looking downstream from near the center of the project prior to construction



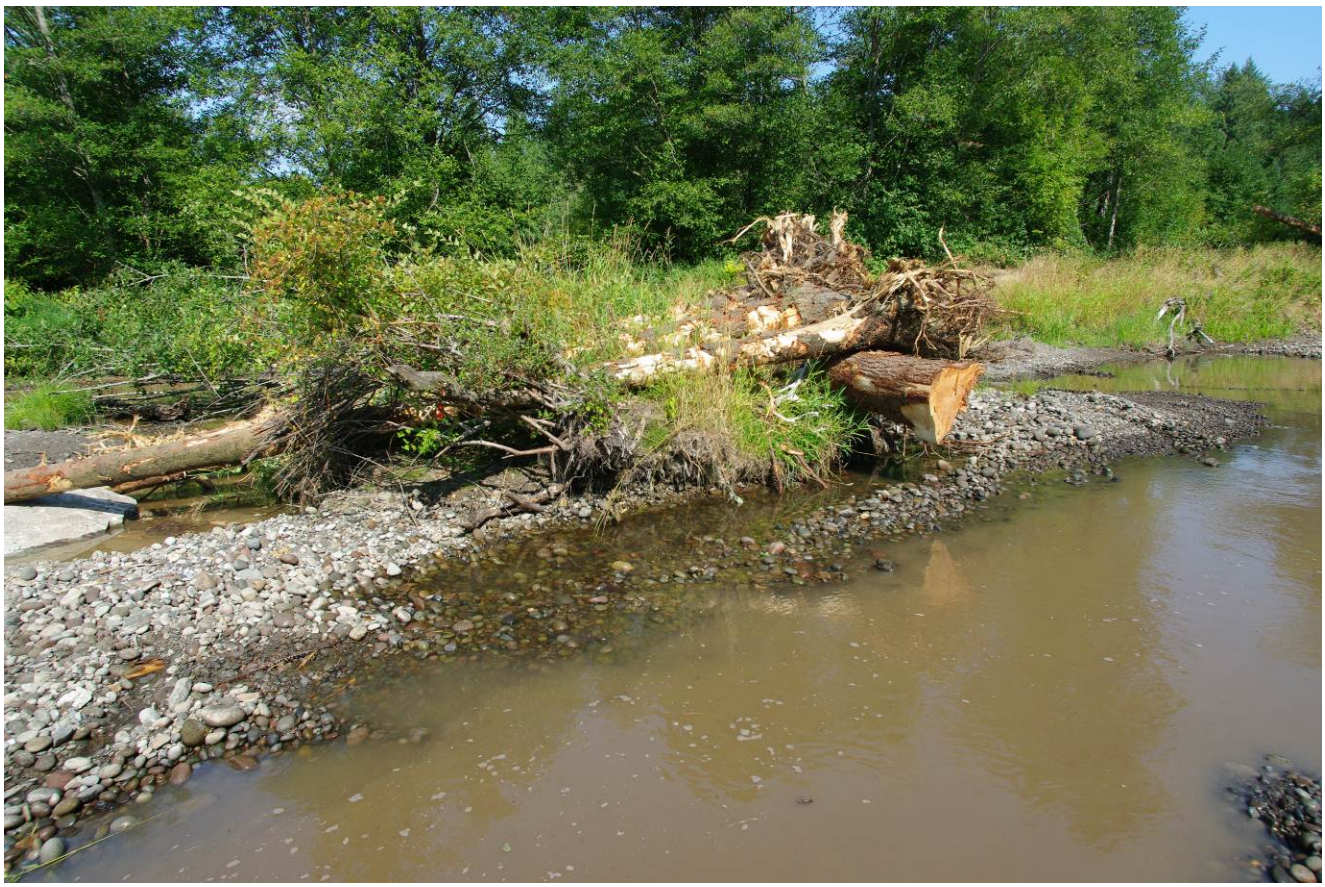
Installation of an upstream scour pool structure. This structure was buried and ballasted into the bank.

Upstream coffer dam. The entire project site was dewatered and kept from "live" water throughout the entirety of the construction phase.

Key log structure of the apex bar jam at the head end of the project. Note the boulders loaded into the excavation in preparation of the next key elements.

Incorporating an existing alder to make a habitat wood structure

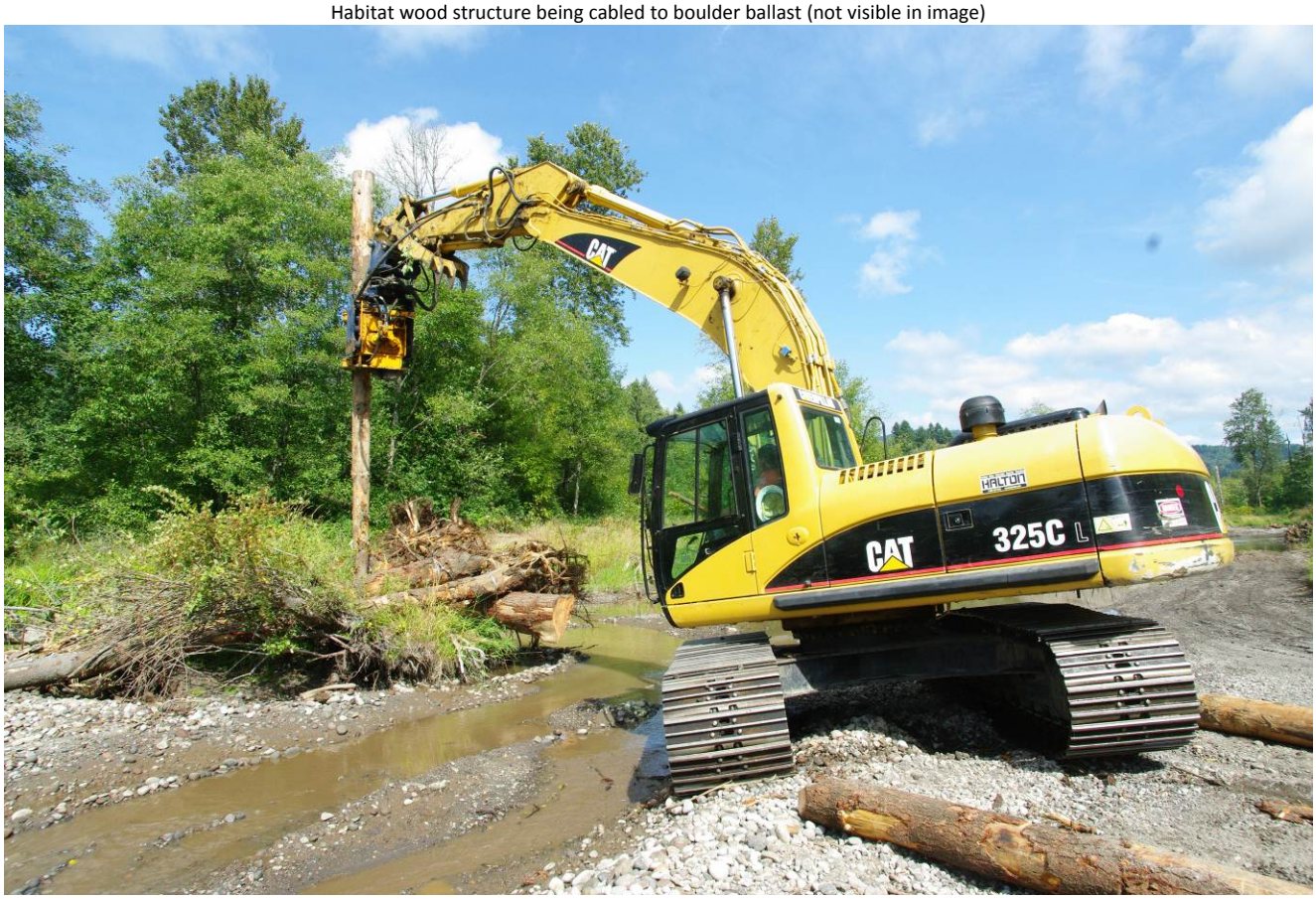
Adding wood pieces to the head end apex jam structure(above), below, looking down at the head end apex jam structure.



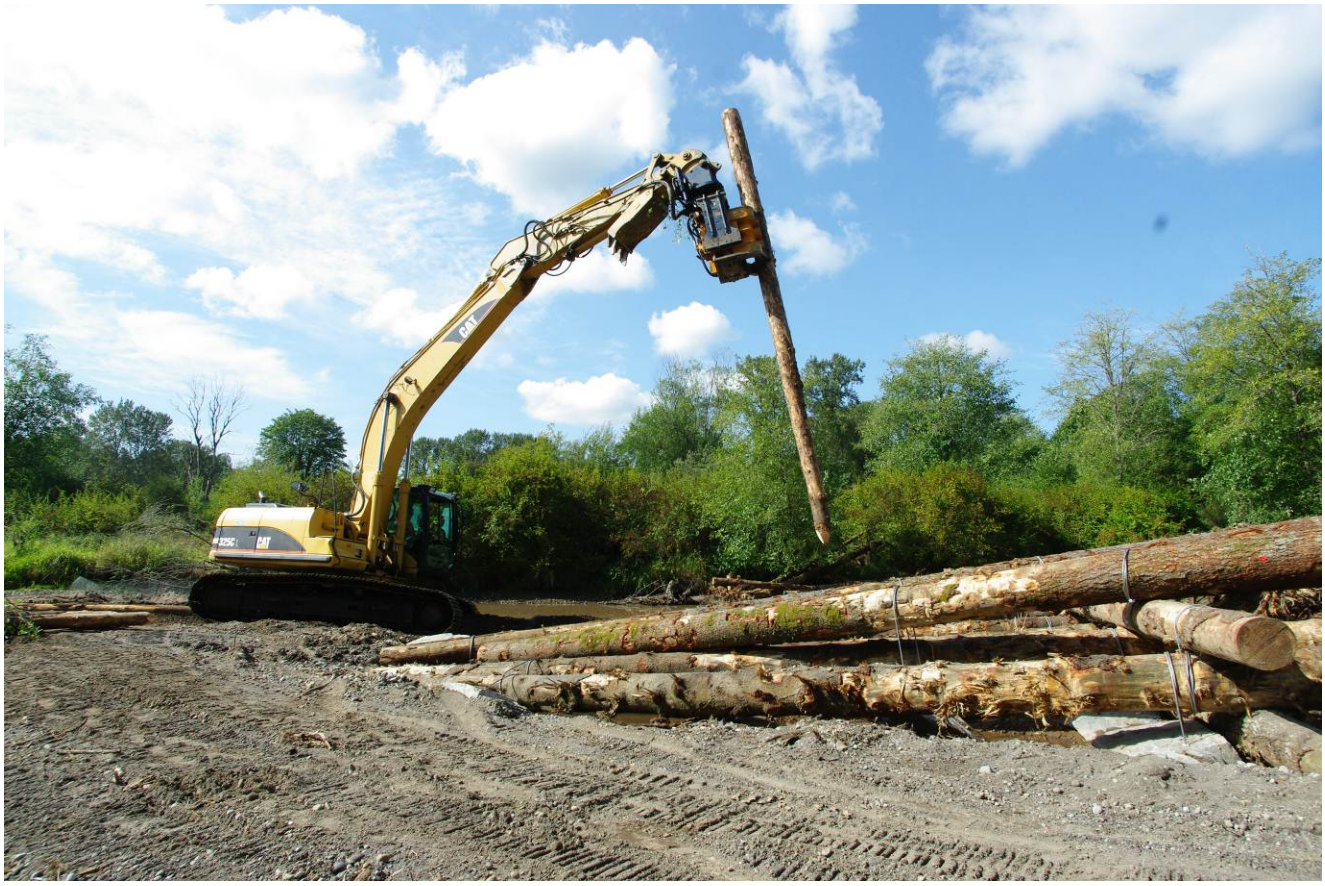
An apex bar jam structure built around an existing alder tree that had fallen

Looking upstream from the south bank of the side channel from the pre-construction photo. Visible on the right are three scour pool structures, in the center a log with rootwad anchored in place, and the head end apex bar jam on the left. Floodplain wood is not yet in place.

Habitat wood structure being cabled to boulder ballast (not visible in image)

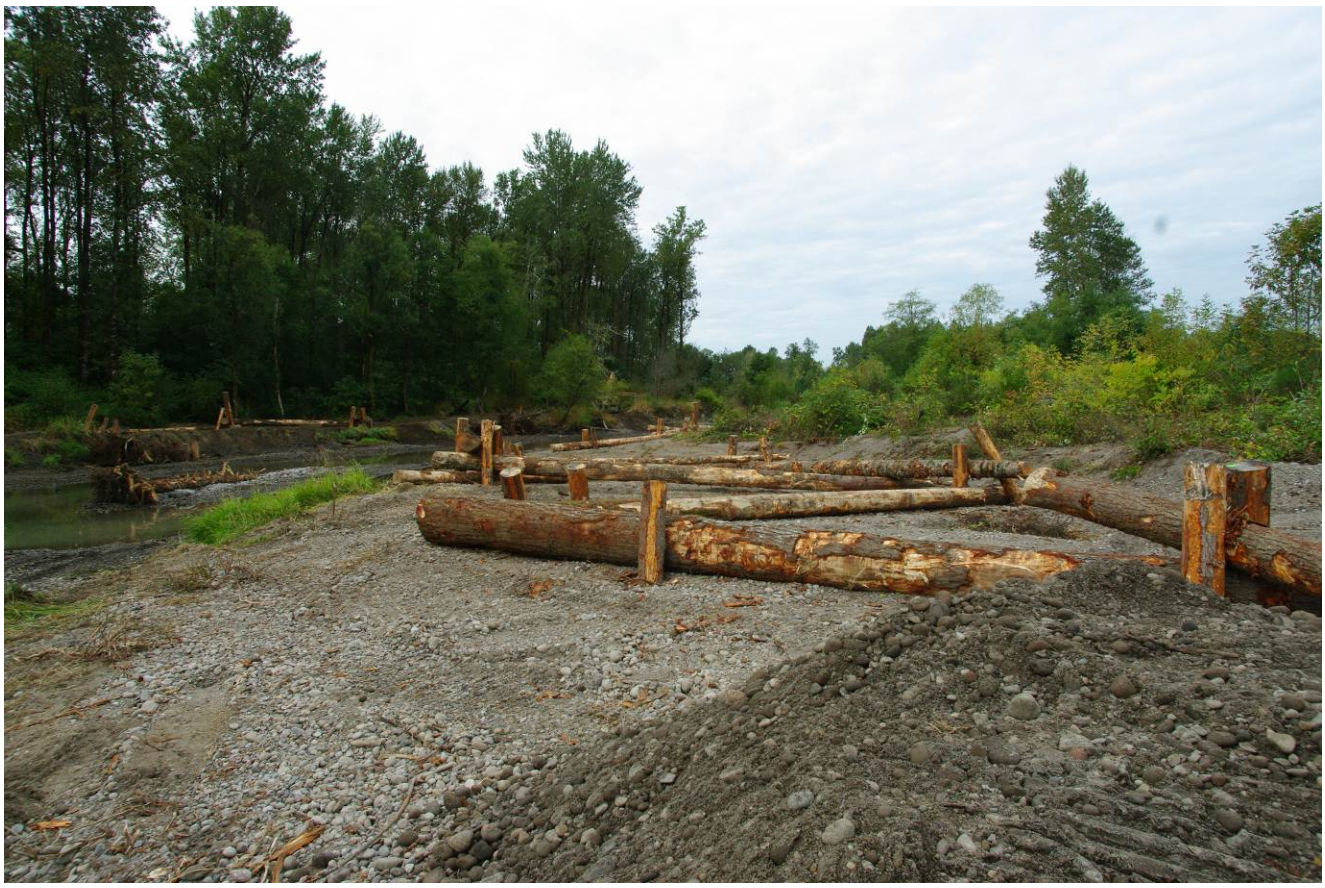


Pile being driven into apex bar jam number three. There were four apex bar jam structures built into the project.



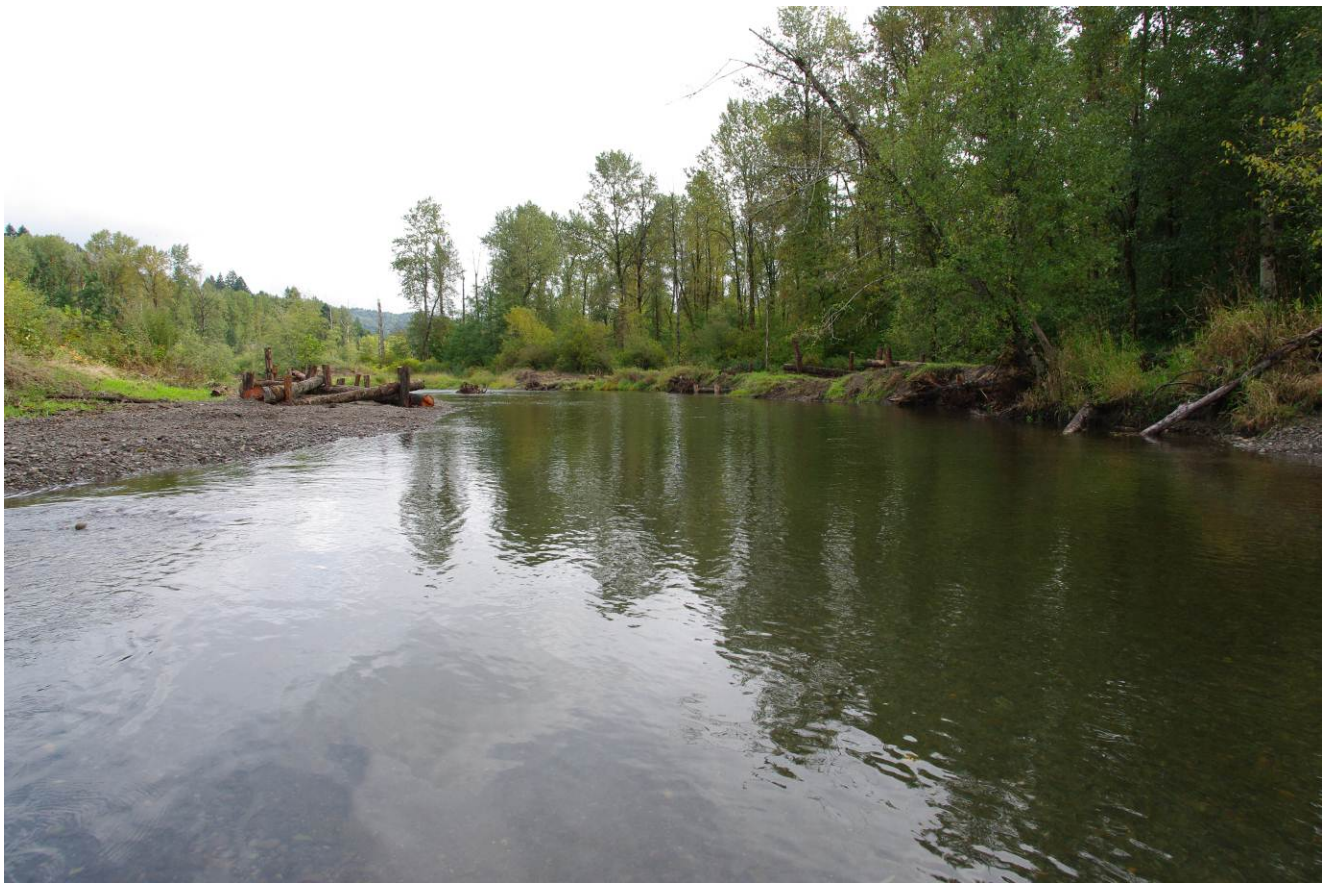
A pile being readied to be driven into apex bar jam #2. This was the typical length and diameter of the logs used as piles

Habitat wood structure



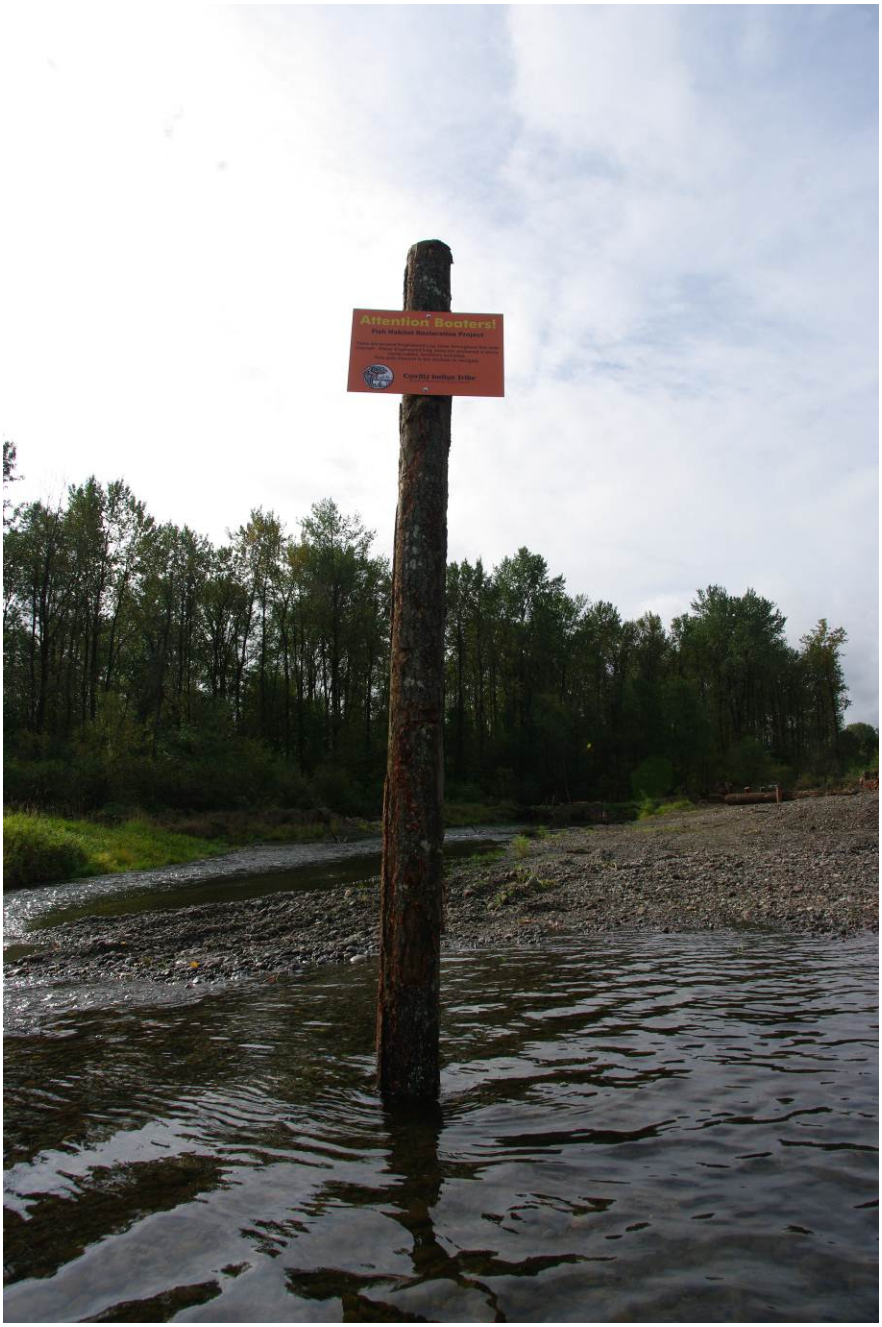
Floodplain wood structures. Consisting of approximately 90 logs, the two floodplain structures (part of the south bank structure is visible here) channel energy into the intended channel at high flows

Scour pool structure after

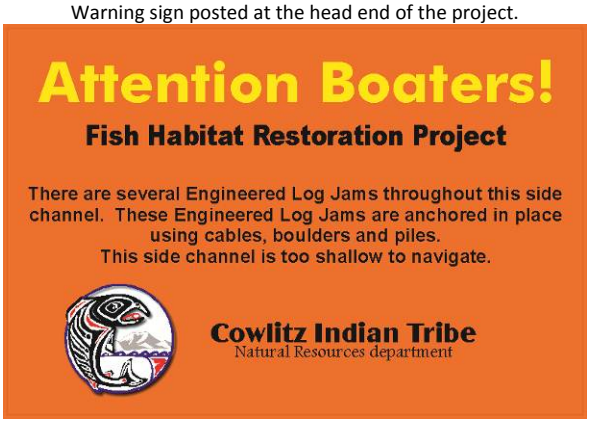


Looking upstream from near the center of the project after construction was completed.

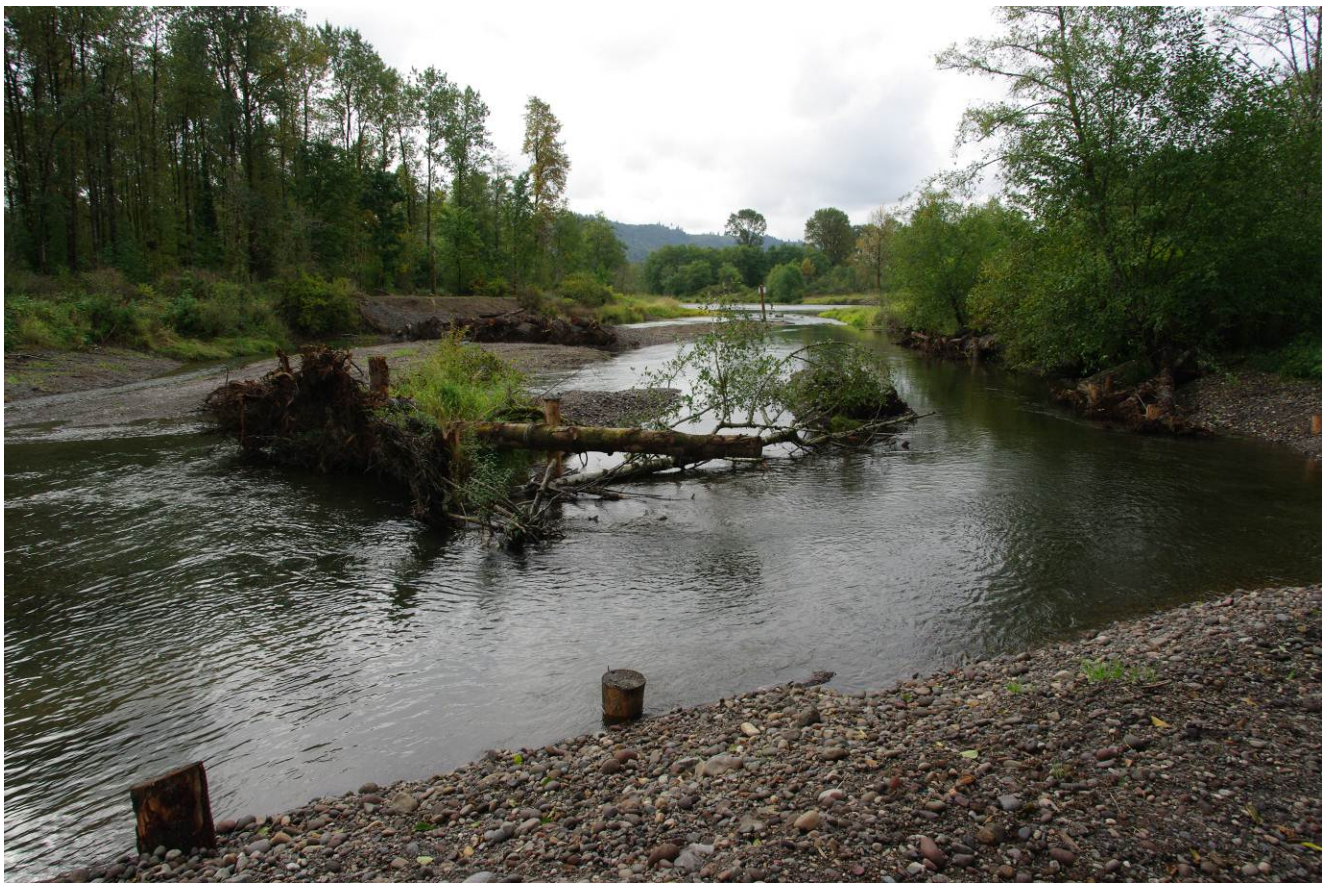
Apex bar jam structure at the head end of the project with warning sign visible. The sign uses 10inch letters and complements the detailed warning sign placed 50 feet out away from the structure.



Warning sign posted at the head end of the project.



Detail of the sign placed at both the head and tail end of the project



Looking downstream to the tail end of the project from near the center of the project after construction was completed.