

Deer Creek Floodplain Enhancement Project Phase II
Grant #: FWS/ F17AP00501-WNTI
McKenzie Watershed Alliance
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Final Report

Project Summary

Deer Creek is a tributary to the McKenzie River, located at river mile 79, approximately 10 miles from the unincorporated community of McKenzie Bridge in Lane County Oregon. Land management practices within the Deer Creek Sub-watershed have disrupted natural processes and negatively affected native habitat for native species. Historic logging practices, stream cleaning, and berm construction reduced wood supply and storage, available spawning gravel, floodplain connectivity, off-channel habitat, the frequency of deep pools, and contributed to increased summer stream temperatures. The Deer Creek Floodplain Enhancement Project Phase II (Project) added sixteen whole streamside trees to a 0.5 miles section of Deer Creek to improve ecological function and biological productivity for native fish. The whole trees provide key pieces of large wood and complete the work begun during Phase I in 2016 when large wood augmentation and streamside berm removal and material redistribution occurred over 1.06 miles and 35 acres. The Project was a collaboration between the US Forest Service (USFS) Willamette National Forest (WNF) and the McKenzie Watershed Alliance (MWA). The MWA is the fiscal sponsor of the McKenzie Watershed Council (MWC). The Oregon Watershed Enhancement Board (OWEB), Western Native Trout Initiative (WNTI) and WNF provided funding.

Background

The Deer Creek Sub-watershed is nearly 15,000 acres in size and ownership is primarily federal lands managed by the USFS. Deer Creek runs approximately 8.2 miles from its headwaters to its confluence with the McKenzie River. Bankfull flows in Deer Creek average about 900cfs. Summer-time base flows can drop to as low as 10-50cfs. The lower 1.4 miles of sub-watershed has a relatively wide valley bottom (up to 600ft), low valley gradient (about 2%), and abundant sediment, wood, and nutrient supply - ingredients for ideal spring Chinook salmon, rainbow trout, and cutthroat trout spawning and rearing habitat. Deer Creek also provides foraging habitat for bull trout and is located within two miles of the core spawning tributaries, Anderson Creek and Olallie Creek, of the McKenzie River population.

Historic land management practices and natural events have impaired watershed processes and contributed to poor habitat for native fish within lower Deer Creek. Historic logging practices included the harvest of conifers from riparian areas and throughout the floodplain. The flood of 1964 scoured the entire floodplain, clearing all vegetation. For many years following the flood, the USFS salvaged most of the remaining in-stream wood. Multiple berms were later built within the lower sections of Deer Creek to straighten the channel and prevent channel migration.

These management practices severely reduced channel and floodplain roughness, increased the transport capacity of the channel, and decreased floodplain connectivity. Seasonal bankfull flow events frequently transported much of the naturally occurring wood, gravel, and fine sediment out of this high-energy system. As a result, the recovery of large wood has been slow (measured at less than 20 pieces of large wood per mile during pre-project surveys), the substrate is too large for spawning, and much of the stream was disconnected from its floodplain. Impaired natural processes were affecting habitat for native fish species. Major limiting factors for all fish species include lack of spawning gravel, lack of off-channel habitat and high flow refuge, lack of deep pools, lack of cover, lack of large wood, and high summer stream temperatures.

Implementation

The Project sought to enhance ecological function and habitat for native fish and wildlife through the addition of large wood, removal of floodplain fill and manual aggradation of incised channels. During Phase I, contractors removed approximately 15,000 cubic yards of sediment from 3 acres of berms and other floodplain surfaces. Sediment was redistributed within nearly one mile of the incised Deer Creek channel. Ground-based equipment was used to argument 35 acres and 0.16 stream miles with 460 pieces of large wood. The Phase II portion of the Project involved the pulling of 16 live streamside trees into Deer Creek to serve as key pieces of large wood over a 0.5-mile section of the 1.31-mile project area (Figure 1. Phase II Project Map). The intent of the key pieces was to influence flow patterns, create pools and complex habitat, and aid in the retention of previously placed large wood and sediment. Phase II project work also included the enhancement treatments of skid trails used during Phase I though the addition of large wood and planting of native conifers.

The MWA awarded Blue Ridge Timber Cutting Inc the contract for streamside tree pulling in October 2017. The WNF obtained an in-water work-period extension from the Oregon Department of Fish and Wildlife (ODFW) and U.S. Fish and Wildlife Service, in early fall 2017, allowing work to take place in November. The contractors took approximately two weeks to pull over 16 streamside trees and place large wood in previously used skid trails. The contractors utilized a truck-mounted yarder specifically designed for this task to pull all streamside trees. The truck-mounted yarder operated from access points along NF Road 2654 approximately 300 to 1,000 feet from the streamside trees. Seven of the trees were located within a steep canyon within the upper quarter of the project area. Rigging the yarder cables and blocks within the steep canyon was physically challenging and required additional time and planning by the contractor. The yarder's ability to operate from roadways at distances up to 2,500 feet limited impact to riparian vegetation and avoided soil compaction. Pulled trees were large conifers, mostly over 150 feet tall. Generally, implementation placement aligned well with the original design. In two cases, pull trees that were further away from the streamside were re-rigged and dragged into the stream channel. Four trees were dropped from the Project due to a combination of budget constraints and placement logistics. The pulled trees immediately provided a range of habitat retaining additional pieces of large wood and while creating a variety of complex pool habitat (Figure 2. Phase II Photo Points).

Monitoring

The Project includes a multi-layered monitoring program focused on physical habitat changes, water quality, and biological response. Physical habitat changes will largely be monitored through an analysis of available LiDAR, drone and aerial imagery, and drone digital elevation models.

The MWA was recently awarded a grant from the OWEB to help analyze this data, and intends to contract with researchers from the University of Washington to evaluate morphological complexity; erosion, deposition, and storage of sediment; and valley bottom wood storage and spatial patterns within the project area.

Physical habitat features and water quality will also be monitored along transects established perpendicular to the center of the valley throughout the Project area. Data collected along transect include temperature, large wood size and quantity, substrate, water velocity and depth, geomorphic feature type and vegetation metrics. WNF staff completed surveys on 16 transects in 2018 and expects to analyze pre- and post-project data in 2019.

In 2018, biological monitoring included rainbow and cutthroat trout spawning surveys in the spring, and spring Chinook salmon spawning surveys in the fall. Rainbow trout spawning surveys documented over 75 redds within the project area. No salmon redds were observed in 2018, possibly because of low-flow conditions during spawning season.

Outreach

Outreach and education activities associated with the Project occurred throughout 2018. The MWC is currently working with students from McKenzie High School to collect and analyze water quality samples from multiple sites in the upper McKenzie River Sub-basin, including Deer Creek. Students presented their results at a public meeting held in the community of Leaburg in June 2018. Additionally, the USFS and MWC sponsored five project tours in 2018 engaging the public, MWC partners, students, and professional colleagues.



Tree 15: Pre-project 2017



Tree 15: Post-project 2018



Tree 17: Pre-project 2017



Tree 17: Post-project 2018



Tree 19: Pre-project 2016



Tree 19: Post-project 2018



Tree 21: Pre-project 2016



Tree 21: Post-project 2018



Tree 25: Pre-project 2017



Tree 25: Post-project 2018



Tree 27: Pre-project 2017



Tree 21: Post-project 2018