Upper Grande Ronde-Bowman Fish Habitat Enhancement Project

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A. Introduction/Background Information:

1. History of the project.

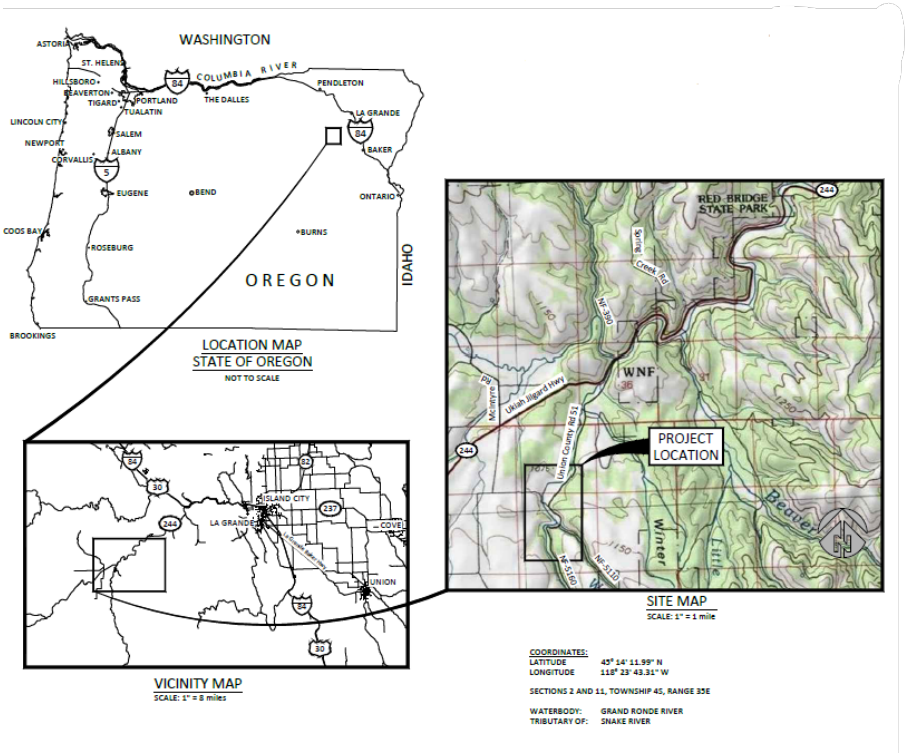
The Bowman Fish Habitat Restoration Project is located between RM 153.8 and 155.2 of the Upper Grande Ronde River, tributary to the Snake River, in Union County, Oregon. The project reach is in UGR Atlas Tier 1 habitat and this opportunity ranked 6th overall in the UGR basin. This section of the Grande Ronde River provides important spawning and rearing habitat for ESA listed spring Chinook salmon and summer steelhead. Chinook and steelhead spawning and rearing occurs in the project reach. It is also used by ESA listed bull trout, Oregon Sensitive Species redband trout, and other important native fish species.

Throughout the project reach, the Grande Ronde River is over-widened and shallow. Pool habitat and wood recruitment is poor. High water temperatures impact adult Chinook salmon during migration and holding and juvenile rearing. Salmonid winter and summer rearing, adult immigration, adult holding, and spawning/incubation/emergence have been identified by the Upper Grande Ronde science and technical advisory committee as critical life stage uses in need of immediate action for population abundance, productivity, and sustainability. Riparian condition, water temperature, side channel and wetland conditions, and floodplain condition are identified as priority limiting factors that are critical to address.

Restoration actions for this project target critical salmonid life stages and limiting factors, and include: pool development, floodplain reconnection, side channel and off-channel habitat restoration, riparian fencing, LWD placement, and channel reconstruction. This project will provide immediate benefits to ESA listed salmon and steelhead by improving and expanding migration, spawning, incubation and emergence, and summer and overwinter rearing habitats. This project will increase abundance and productivity of salmon, steelhead, and multiple native fish species.

Project partners include the landowners, Oregon Department of Fish & Wildlife (ODFW), Grande Ronde Model Watershed (GRMW), Oregon Watershed Enhancement Board, and Bonneville Power Administration (BPA).

2. Project location map.



B. Discussion of Completed Work:

This project was implemented as designed in June through November of 2023 by a hired contractor to address identified limiting factors that affect ESA listed salmonids in the Upper Grande Ronde River. Restoration actions for this project target critical salmonid life stages and limiting factors, and included: pool development, floodplain reconnection, side channel and off-channel habitat restoration, LWD placement, channel reconstruction, and riparian revegetation. The primary project features implemented include side channel creation, large wood placement within the main channel and floodplain areas, riverine wetland enhancement, gravel redistribution within the main channel, and riparian vegetation planting:

Large wood accumulations

"Large wood accumulations" are complex interwoven large wood structures composed mainly of whole trees with minimum lengths of ~ 80 ft. These structures are intended to mimic the deposits of an event which delivers of a large pulse of wood and sediment to the channel, such as landslides or debris flows following a large fire. Analog large wood accumulations were identified in the Chewuch River in northern Washington, in a reach with low flow wetted widths similar to the project reach. Lower layers of the structures were placed strategically to re-direct flow laterally and to concentrate baseflow. Upper layers were placed with the design intent of interacting with higher flows as well as to provide lateral bracing and resistance to buoyant forces. Each large wood accumulation terminates in a channel spanning structure at the downstream end. The channel spanning structure was anchored with burial of individual whole trees, the installation of pinning logs that are buried in place, and threadbar connections to vertical snags and angled deadman snags buried into the bed. Alluvial fill material was

placed within the accumulations after the placement of wood. Adjustments to the footprint of alluvial fill placements was dictated by accessibility with construction equipment.

Levee Removal, High Flow Swale Creation and Floodplain Activation

High ground areas adjacent to the existing channel were lowered in select locations, targeted at reconnecting segments of the existing floodplain that are currently disconnected or less frequently connected due to the high ground adjacent to the channel. These reconnected segments of the floodplain will function as high flow swales. Large wood structures were constructed to help maintain flow splits at higher flows. In some locations, material excavated from the levee removal zones was placed locally within the main channel to narrow the existing channel and accentuate the flow split at higher flows. A small amount of fill (175 CY) was placed along the bank near the existing homesite to slightly reduce overbank flows at the 100-year flood event. The constructed upstream high flow swale, which splits from the main channel at station 79+00 and reconnects at approximately station 70+00, takes advantage of a historical channel scar feature for a significant portion of its length.

Side Channel and High Flow Swale complex

In the downstream half of the meadow, one side channel was constructed diverges from the main channel near station 25+00 and reconnects near 11+50. The design intent for this channel is that it is not activated at baseflow, such that already limited baseflows are not spread across more surface area in this temperature limited reach. The side channel is designed to be fully activated at ~ 30 cfs, a flow rate which will keep the side channel active a minimum of 6 months per year. A series of high flow swales were constructed to connect with the side channel, to form a multi-threaded channel complex that is activated annually. Channel spanning large wood structures were placed at the entrance of the side channel and each high flow inlet to maintain flows in the constructed channels.

Warms Springs Creek Outlet

The existing culvert through which Warm Springs Creek crosses under county Highway 51 was slightly perched (~1ft) at the downstream end. The channel between the culvert outlet and the river had been straightened through a fan deposit, and a significant headcut approximately 30 ft from the outlet is currently a passage barrier and exacerbated the existing discontinuity at the culvert outlet. The baffled culvert has a slope of about 5%, and the creek above has a slope of ~ 7%. Roughened channel rock was placed to meet the downstream culvert elevation, and a small low-flow channel was constructed to the north to re-enter the mainstem within a proposed pool. The constructed roughened channel segment has a slope of 4.9%. The existing levees in this location were re-shaped into contours suggesting an alluvial fan deposit.

Spring Channel

A spring channel connected linking the existing spring outlet to the main channel. On the opposite site of County Road 51, the existing cattle crossing was removed, and re-constructed at the toe of the hillslope to the north. This now allows the spring pond direct connection to the existing CMP culvert. Fencing now excludes cattle improving water quality within the spring pond.

Large Wood Treatments

Large wood structures were constructed throughout the project reach to provide roughness, habitat cover and complexity, to help maintain constructed pools and to guide flows.

Native riparian vegetation was planted in disturbed areas and areas identified for vegetation enhancement.

These implemented project elements were guided by the Upper Grande Ronde Atlas prioritization document, the Northwest Power and Conservation Council's (NPCC) 2014/2020 Columbian River Basin Fish and Wildlife Program, the Recovery Plan for Northeast Oregon Snake River Spring and Summer Chinook Salmon, and Snake River Steelhead Populations, and the Grande Ronde Subbasin plan. Riparian condition, water temperature, side channel and wetland conditions, and floodplain condition are identified as priority limiting factors that were addressed with the project implementation.

Figures 1 and 2. Installation of Large Wood Accumulations using a Vertol 107 and view upstream of placed wood before substrate augmentation.

Figures 3 and 4. ODFW staff directing large wood placement in the recently constructed side channel.

Figures 5 and 6. Construction of the Warm Springs Creek alluvial fan and channel.

C. Lessons Learned & Adaptive Management

There were three primary lessons learned from this project. Two related to techniques for treatment and one related to cultural resources.

The first is the utilization of a helicopter to place large whole trees. While this technique is not new, it was a first for us. Using the helicopter allowed for whole trees, important for short term stability and habitat complexity to be used as a critical component in channel restoration. No longer are habitat structures limited to 50' stems and rootwads that don't often achieve desired effects. This proved to be highly cost effective as well. The quality of the end product was equal or better that any ground based wood structure that we have built in the past. All future work will consider using whole trees and a helicopter if feasible.

The second technique, substrate augmentation, was completed in concert with the large wood accumulations. With the channel overwiden and shallow, and recent research confirming that the Grande Ronde River is sediment limited, adding substrate was a logical and novel treatment. With the construction of the side channels, swale complexes, and levee removal, the excavated material was placed within the active channel in select locations. This was completed in a way in that it is expected to become mobile and naturally sort leading to aggradation of the channel bed.

The final thing to note related to the implementation of this project was the discovery of a post-settlement trash pit where we were constructing a side channel. While hopefully not something that those in restoration have to deal with on a regular basis, it is important for practitioners to realize that it may occur and to have some sort of contingency plan in place. While our permitting process utilizes protocols to deal with such instances, solutions most likely will cost money and time. It was also beneficial to learn that our county transfer station would take such material for disposal as it included a lot of soil and couldn't be completely sorted.

While just completed, the sponsors recognize the need for adaptive management as it relates to projects. As implementors, we have related lessons learned from this project to our regional Implementation Team partners and have presented this at the annual State of the Science meeting facilited by our umbrella organization GRMW. It is anticipated that regional monitoring efforts may also inform the partnership of this projects response to treatment and will guide implementation into the future.