



# MIDDLE UPPER GRANDE RONDE RIVER FISH HABITAT ENHANCEMENT PROJECT

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**CONFEDERATED TRIBES  
UMATILLA INDIAN RESERVATION**



**BONNEVILLE POWER  
ADMINISTRATION**

# Middle Upper Grande Ronde River Fish Habitat Enhancement Project

## Overview

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Wallowa-Whitman National Forest (WWNF), La Grande Ranger District, Grande Ronde Model Watershed (GRMW), and Bonneville Power Administration (BPA) partnered on the Middle Upper Grande Ronde River Project Fish Habitat Enhancement Project which was constructed in July 2019.

The project is located in the Upper Grande Ronde Subbasin along the Grande Ronde River between RM 156 and RM 158. The Project reach is located on the Wallowa-Whitman National Forest within the Upper Grande Ronde River Atlas Biological Significant Reach UGR15. The project was designed to increase habitat suitability and capacity for Threatened Snake River Spring Chinook salmon, Summer Steelhead, and Bull trout. Native trout, whitefish and other native species are target fishery resources as well. River Vision of the CTUIR provides linkages to cultural, physical watershed processes and functions, and linkages to natural resource recovery, resiliency, and productivity to address limiting factors and promote watershed health.

The Project is a continuation of habitat restoration actions previously conducted by the WWNF, including large wood placements in the early and mid-2000. Project planning, design, and wood structure types included hydraulic modeling, identification of priority wood placement locations, and selection and design of wood structures and specifications. Priority wood placement locations included locations with potential for floodplain and side channel activation and large pool formation.

The project is part of an 8 mile project reach that was stratified into geomorphic reaches (response/confined), with response reaches prioritized for treatment due to potential for floodplain and side channel reconnection with the main channel. Approximately 4 miles of response reach was identified through the analysis and prioritized for treatment. Due to the length of the planning reach, four treatment reaches were identified and prioritized with the lowermost reach at USFS boundary upstream 2 miles identified for the initial implementation phase



Figure 1 Existing Project Reach Condition



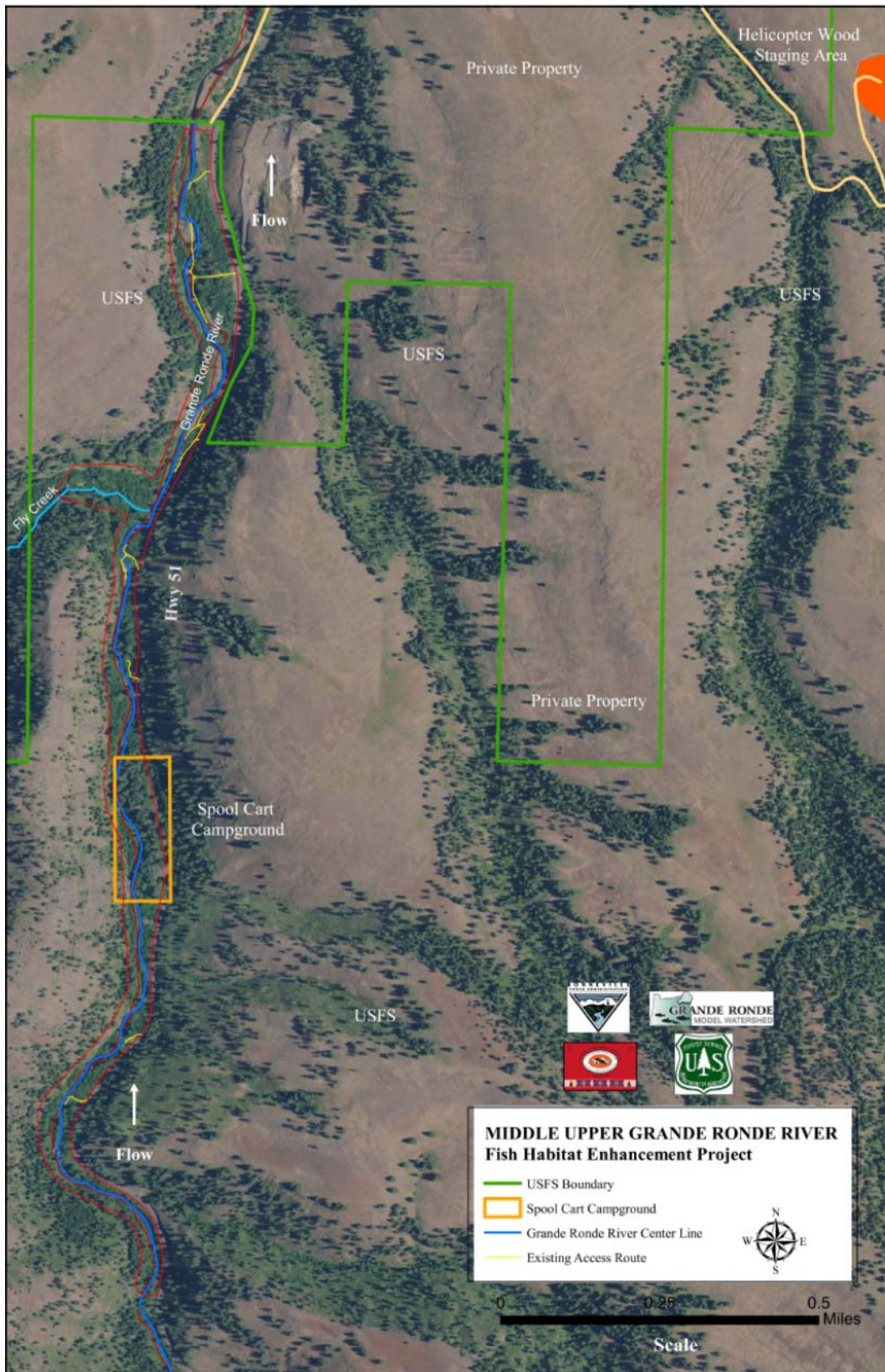


Figure 2 - Project Location

The project included installation of large wood structures at strategic locations as well as floodplain and side channel wood to provide habitat complexity. Structure design objectives and structure types were driven by site condition and potential with large main channel structures focused on providing channel roughness, sediment storage and routing, pool formation and habitat complexity. Small wood assemblages were utilized in conjunction with large wood to provide floodplain roughness as well as racking and habitat complexity. Strategic small wood placement upstream of large wood structures was employed to promote natural racking on these large structures to provide additional cover, complexity, velocity refuges and deposition of sediments (See attached Middle Upper Grande Ronde River, Stream and Floodplain Restoration Project, Construction Drawings, July 2019)..

Sediment routing and deposition will initiate structure sealing and greater potential for effectively promoting backwater and pool habitat. Sediment is known to be limiting along the project reach, and the plan is to monitoring and adaptively manage if necessary to achieve sediment and wood structure effectiveness. Gravel augmentation is a technique under consideration to promote project development and habitat uplift.

Project construction was originally planned with both helicopter and ground based heavy equipment installation. A decision was made to initially implement the project using helicopter placement only due to heritage resource concerns in the project area. Ground based installation would have included entering treatment site following rough placement by helicopter. Large structure construction was originally designed in accessible locations to include trenching and backfilling structures boulder placement using track-mounted excavators to increase structure stability. Following July 2019 installations, plans have been in development to pin large wood structures with bolts with follow up boulder placement in July 2020-2021 by helicopter to further stabilize structures.

## **Watershed Problems**

Fish habitat suitability within the Project reach has been significantly affected and suppressed by physical alterations of the river and its associated floodplain (splash dam logging, mining, and road construction) that have contributed to severely degraded habitat conditions. Problems include homogenous, high energy, plane bed riffle-run channel types with a lack of large pool habitat, channel complexity, peripheral habitat bed armoring and alteration of sediment sorting and coarsening of streambed gravel, altered groundwater and hyporheic function, and degradation of riparian and wetland plant communities.

Natural habitat recovery is limited by current environmental conditions that suppress development of diverse hydrologic and geomorphic processes, including an armored streambed, lack of mature riparian vegetation and associated complexity/wood loading, and lack of significant floodplain activation/connection.

Core habitat suitability limiting factors affecting juvenile summer and winter rearing and adult holding and migration include: water quality (temperature), channel and bed form and complexity (limited low velocity and large pool habitat), riparian conditions, and sediment. In the Project reach, the upper Grande Ronde River historically would have had both unconfined and confined channel reaches with alternating pool-riffle and run bed forms. Beechie et al.

(2006) empirically determined based on regional data that intermediate sized unconfined channels that transport their sediment primarily as bedload and retain wood long enough to establish erosion-resistant points were transitional, and generally favored island-braided patterns in forested mountain systems. Beechie et al. (2006) data also shows that island-braided channels are continually adjusting to intermittent perturbations which sustains a high degree of successional states, resiliency, and habitat diversity. In general, island-braided riverine systems provide abundant peripheral and transitional habitats, and complex channel structure and bed forms resulting in the highest degree of biological diversity that supports both aquatic and terrestrial species during varying life stages.

Channel degradation has occurred in response to floodplain constriction from constructed roads, levees, and railroads, as well historical log transport operations by splash damming through the project reach. The quantity and force of logs moving along the channel are known regionally to have coarsened stream beds and severely truncated pool-riffle sequences.

Railroad grades, road grades, and levees along rivers create artificial channel constrictions and disconnected floodplains that have resulted in a single-thread, enlarged, and incised channel which poor habitat complexity and diversity. Constriction increases flow depths, flow velocities, and shear stresses during high water events. The outcome is a wider, more uniform plane-bed armored channel.

Existing riparian vegetation conditions include scattered patches of woody shrubs and immature trees, and large areas of herbaceous vegetation with shallow rooting depths. Beavers are uncommon and no longer play a major role in wood delivery to the channel or maintaining diverse off-channel habitats and riparian conditions.

The Oregon Department of Environmental Quality (ODEQ) has identified many stream segments within the Upper Grande Ronde Subbasin as water quality limited (ODEQ 2010). Oregon's 1998 303(d) List of Water Quality Limited Waterbodies identifies nine parameters of concern: algae, bacteria, dissolved oxygen, flow modification, habitat modification, nutrients, pH, sedimentation, and temperature. Water quality parameters of concern within the Project reach include: dissolved oxygen, flow modification, habitat modification, nutrients, pH, sedimentation, and temperature. Water quality parameters (and standards) of temperature (64°F/55°F, rearing/spawning), dissolved oxygen (98% sat), habitat modification (pool frequency), and flow modification (flows) directly relate to the beneficial use for fish life. (NPCC 2004).

## **Project Goals**

The long-term rehabilitation vision (CTUIR's River Vision) for the Middle Upper reach of the Grande Ronde River is to improve physical and ecological processes by rehabilitating and restoring the project area to achieve immediate and long-term benefits to chinook, steelhead, and bull trout at all life stages.

- Floodplain connectivity (base flow, shallow groundwater capacity, and capability of functional connection and interaction with the floodplain through hyporheic flow);
- Channel morphology (channel form, sinuosity, complexity, geomorphic and hydrograph stability);
- Fish habitat (the quality and diversity of in-stream habitat for resident and anadromous fish in the Grande Ronde River);
- Restoration of natural channel processes through the addition of large wood to increase channel complexity sediment routing and storage.

Large wood material provides habitat complexity, diversity, pool habitat, velocity refuge, sediment routing and storage, floodplain roughness and stability. Benefits to salmonids will be achieved through restoration and rehabilitation of the whole floodplain ecosystem. Targeting of present and specific limiting factors such as temperature, in-stream habitat conditions, and sediment loads will achieve immediate benefits to salmon. Long term benefits will be realized through a focus on restoring fluvial habitat-forming processes, floodplain and groundwater hyporheic connectivity, riparian and wetland plant communities, and instream complexity and diversity commensurate with the reach's natural potential.

## **Project Objectives**

- Increase the quantity of suitable habitat for all life stages of spring Chinook salmon, summer steelhead, bull trout and other native fish (including pools, side channels, complexity, and physical and hydraulic diversity).
- Promote diverse geomorphic processes, features, and patterns of sediment movement, sorting and deposition in stream channels and floodplain.
- Promote physical, geomorphic, and ecologic conditions that buffer diurnal and seasonal water temperature fluctuations within the project area and allow access to cold water spring sources.
- Re-connect floodplain and side channels to provide off channel habitat and natural flooding,
- Promote riparian vegetation establishment to support overall bank stability, particularly in locations where habitat structures have been installed and along banks with increased hydraulic roughness that are susceptible to erosion from loss of root mass.

## **Monitoring**

Effectiveness monitoring for this project will be conducted post-project and is designed to measure progress toward achieving the project objectives, inform maintenance needs, and provide input into whether the restoration project is trending towards or away from achieving project goals. Based on the project goals, physical and biological parameters will be monitored using standard field techniques that will produce data compatible with various monitoring protocols including:

- Water temperature monitoring.
- Snorkel surveys (White, et al., 2011). Protocol for Snorkel Surveys of Fish Densities. A component of Monitoring Recovery Trends in Key Spring Chinook Habitat Variables and Validation of Population Viability Indicators. Snorkel surveys are carried out pre-project and post project by CTUIR RM&E.
- Chinook spawning surveys (Crump and Van Sickle, 2016). Protocol for monitoring redd distribution spatially and temporally. Protocol describes field methods of redd identification, data recording and reporting. Surveys are carried out yearly by CTUIR RM&E and ODFW Fish Research.
- Channel Cross Sections and Longitudinal Profiles
- Drone Imagery (Ortho Imagery)
- Photo Points

## PROJECT CONSTRUCTION

Project construction included wood material acquisition (logging and hauling) and stockpiling and sorting at helicopter landing located along USFS Road 5110 at the 5110 rock pit. Wood haul and stockpiling at designed landing was completed in November 2018. Helicopter and construction subcontractors mobilized to the project site in late June 2019. Project construction was initiated on July 1 and completed July 5, 2019. Traffic control along Highway 51 and USFS Road 5110 was managed by CTUIR subcontractor during helicopter flight operations.



*Figure 3 - Helicopter Wood Delivery*

CTUIR staff provided all site layout and construction detail for the project. Individual wood sites were staked and flagged. Station stakes along the project reach were staked out to provide reference for the entire project. The project included installation of 39 large wood structures and placement of an additional 574 wood pieces in complexes along the main Grande Ronde River channel, side channels and on the floodplain. The project encompassed approximately 2 miles of the Grande Ronde River and 0.30 miles of lower Fly Creek.

Five types of wood structures were designed to achieve project objectives with 22 Type A, 2 Type B, 10 Type C, 3 Type D, 2 type E, and 574 Type F structures. See Figure 5 below for structure types and wood details. Additional detail is provided in Attachment A, Construction Drawings.

### Project Administration and Construction Subcontracting

The CTUIR solicited competitive bids for logging and tree haul in August 2018 and helicopter and construction subcontractors in May 2019.

Following contractor selection, CTUIR awarded construction subcontracts and processed formal construction subcontract documentation.

Project construction, maintenance of staging area and log deck, and traffic control was administered in an orderly manner and no major issues developed. The helicopter subcontractor was required to check in daily to file flight plans with the Blue Mountain Interagency Fire Center and daily safety meetings were conducted to discuss project issues, any possible threats to property, public and construction staff, and general plans for each day of operation.

CTUIR staff erected signs on the boundaries of the project and on access roads to inform the public of the project and to alert public land users of safety matters related to the helicopter operation and anticipated traffic delays.

Ground crew, including Helicopter subcontract staff and CTUIR/USFS staff directly involved in helicopter construction conducted daily tailgate safety meetings to review protocols for wood structure layout and implementation to insure safety for ground crews. Helicopter and construction contractor communicated regularly during each work day to communicate regarding traffic control and safety consideration during flight operations.



*Figure 4 - Helicopter Large Wood Placement*

<b>SUMMARY OF QUANTITIES</b>		
<b>Large Wood Structures</b>	<b>Quantity</b>	<b>Unit</b>
TYPE A - Habitat Structure		
# Structures	22	each
Key member w/RW, (18" dbh+, 45'+ L	286	each
Racking Logs/tops, 8-14" dbh, 20-30' L	396	each
TYPE B - Existing Structure Augmentation		
# Structures	2	each
Key member w/RW, (18" dbh+, 45'+ L	20	each
Racking Logs/tops, 8-14" dbh, 20-30' L	32	each
TYPE C - Defector		
# Structures	10	each
Key member w/RW, (18" dbh+, 45'+ L	60	each
Racking Logs/tops, 8-14" dbh, 20-30' L	100	each
TYPE D (Apex)		
# Structures	3	each
Key member w/RW, (18" dbh+, 45'+ L	12	each
Racking Logs/tops, 8-14" dbh, 20-30' L	18	each
TYPE E (Bleeder)		
# Structures	2	each
Key member w/RW, (18" dbh+, 45'+ L	14	each
Racking Logs/tops, 8-14" dbh, 20-30' L	20	each
Type F - Floodplain & Misc Wood	574	each
Small-Medium Whole Trees/Logs 6-14" DBH, 20-30" L		
<b>SUMMARY</b>		
Total large Wood Structures (not including FP & Misc Wood)	39	each
Total Key Member Pieces of Wood, 18"+ DBH, 45' L	286	each
Total Racking Material (Logs/Treetops, 8-14" DBH, 20-30' L	566	each
Total Floodplain Augmentation Logs, 8-14" DBH, 20-30' L	574	each

*Figure 5 - Large Wood Structures and Wood Quantities Summary*

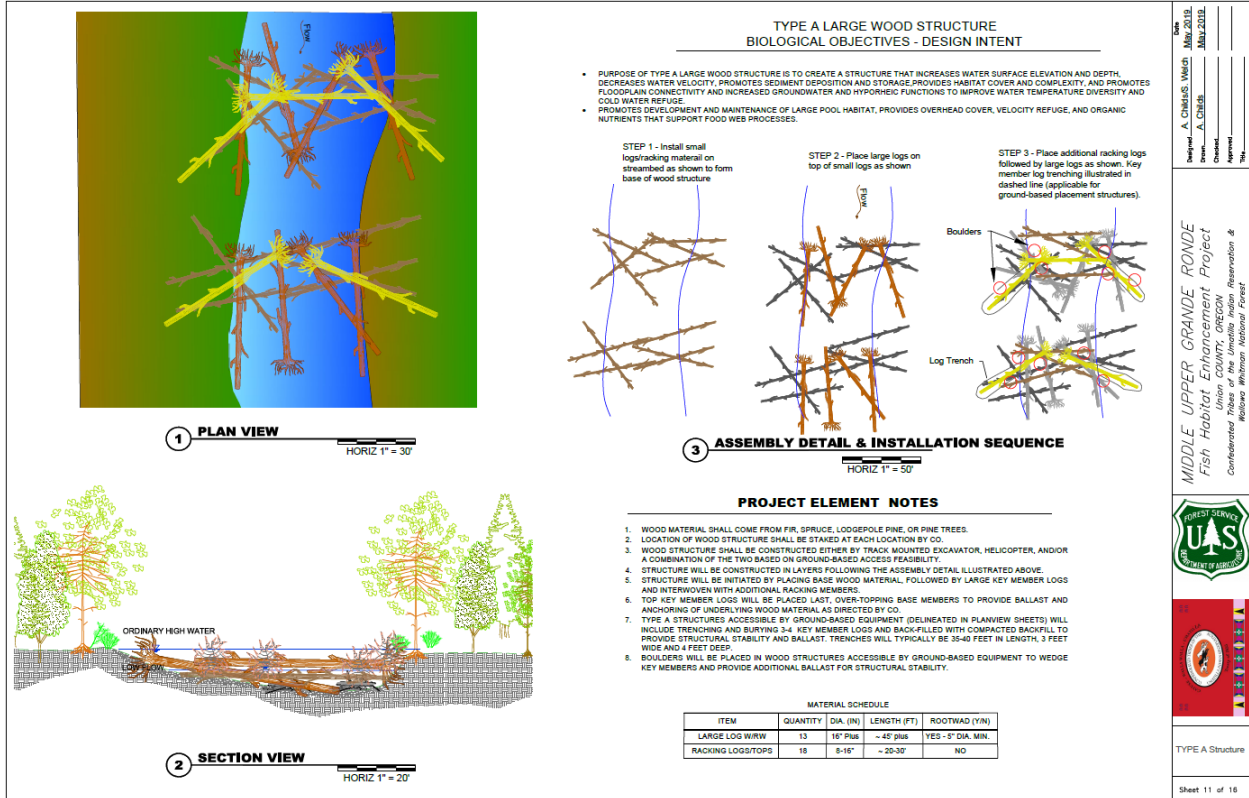


Figure 6 - Large Wood Structure Type A Typical Drawing Detail



Figure 7 - Post Construction Drone Ortho Image

PROJECT EXPENDITURES

<b>MIDDLE UPPER GRANDE RONDE HABITAT ENHANCEMENT PROJECT EXPENDITURES</b>	
	<b>Total</b>
Helicopter Subcontract (BPA #73982 REL 44)	\$289,250
Helicopter Subcontract (BPA #73982 REL 75)	\$51,150
Logging and Wood Delivery Subcontract (BPA #73982 REL 44)	\$220,225
Construction Subcontract (BPA #73982 REL 44)	\$28,920
<b>TOTAL EXPENDITURES</b>	<b>\$589,545</b>

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