

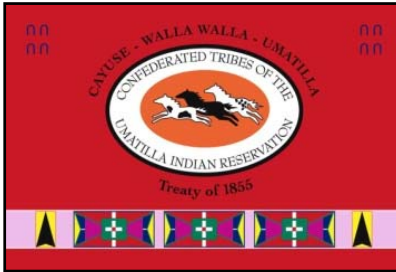
CTUIR GRANDE RONDE SUBBASIN RESTORATION PROJECT

ROCK CREEK FISH HABITAT AND FLOODPLAIN RESTORATION PROJECT

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**CONFEDERATED TRIBES UMATILLA
INDIAN RESERVATION**

Upper Grande Ronde, Rock Creek Habitat and Floodplain Restoration

The Rock Creek Project encompasses nearly 16 miles of fish habitat on Rock, Little Rock, Sheep, Graves and Little Graves Creek. The project is located within the Snake River Spring-Summer Chinook Salmon and Summer Steelhead Recovery Plan assessment units UGC-2 and UGS-16, respectively. UGS-16 has been identified by the BiOp Expert Panel as one of the highest priority geographic units to protect and restore summer steelhead habitat. UGC-2 is identified as having high intrinsic potential for Chinook in the lower reaches of Rock Creek. . The project area is located 6.8 miles west of La Grande, Oregon in Township 3 South, Range 37 East, all or portions of Sections 5 and 6 on private land. The Rock Creek watershed encompasses 52.9 square miles (33,856 acres) and flows southeast to northwest. Elevations range from 6,070 feet to 2,930 feet with an average annual precipitation of 25 inches. The project area is characterized as a typical mid-elevation Blue Mountain forested watershed interspersed with open dry meadows in the uplands and typically narrow floodplains.

Lower Rock Creek Project Reach



Approximately 3 miles of lower Rock Creek has been channelized by historic draw bottom road construction, installation of levees and utilities (power lines, gas pipelines, fiber optics), and agriculture. Channel and floodplain alterations contributed to channel incision, increased channel slope, coarsening sediment and streambed armoring, and streambank erosion. The project area has experienced a significant loss of riparian and wetland vegetation due to floodplain alterations and overgrazing by livestock.

Phase 1 and 2 of the project were constructed in 2013 to 2015 along Graves Creek, Upper Rock Creek, Little Rock Creek, and Sheep Creek. These phases consisted primarily of large wood additions to increase habitat complexity and riparian fencing to protect habitat. Work along Graves Creek included large wood, riffle construction and –re-activation of a 1945 pre-channelization stream channel.

Phase 3 of the project was constructed July 30 to November 9, 2018. This project phase included the lower 1 mile reach of Rock Creek, beginning approximately 0.25 miles upstream from the confluence with the Grande Ronde River. The project included new channel construction (re-alignment), draw bottom road and levee decommissioning, floodplain grading, alcove construction and re-activation of historic channel swales, installation of large wood material, removal of an undersized bridge, riparian planting and seeding, and habitat protection.



Overall project objectives include diversifying existing homogenous, plane bed aquatic and riverine habitat observed in the existing channelized condition to a diverse plan form with appropriate dimension, pattern, profile, and floodplain connectivity naturally exhibited in unconfined alluvial floodplains, including increased groundwater and hyporheic functions. Targeted life requisites for salmonid spawning and rearing habitat include: summer water temperature/cold water refuge, depth, velocity, cover, sediment, and riparian/wetland. Habitat and geomorphic features and processes enhanced to improve spawning and rearing suitability include: decreased channel slope, velocity, and width to depth ratio, increased diversity of pool, riffle, run habitat types, large pools, off channel habitat, including side channels and alcoves, and improved diversity of sediment size and storage/sorting of suitable spawning gravel.

Project Objectives:

- **Protect Habitat:** Maintain/expand current CTUIR/BPA riparian easement fence to encompass widened channel meander alignment and adjacent floodplain.
- **Enhance Riparian Habitat:** Broadcast seed and mulch riparian with native plant mix to rehab disturbed areas in floodplain and decommissioned levee and road grade. Install in-stream willow bank treatments. Protect plantings until vegetation has established and is providing bank stability and shade.
- **Enhance Floodplain Connectivity:** Remove channel confinement structures (obliterate draw bottom road and remove levees and one bridge along Rock Creek) and activate side channels and alcoves.
- **Enhance in-stream structural diversity, complexity, and geomorphic stability:** Install large wood and riffle boulder complexes to provide roughness, overhead cover, and velocity diversity. Main channel construction including the development and creation of new meander bends that

will increase channel sinuosity, decrease channel slope and assist in floodplain reconnection and the development of more diverse channel structure and hydraulic variability.

- **Reduce streambank erosion rates:** Use bioengineering techniques, planting/seeding, activation of floodplain, and protection (fencing) of riparian area to facilitate bank stability. Visual assessments indicated that the bulk of the sediment supply is from localized stream bank erosion. Stream bank stabilization may be achieved using several techniques including rest from grazing, or adding native material such as large woody debris (LWD), sedge/rush mats, trenching willow cuttings and brushy debris into stream banks.
- **Decrease peak summer temperatures:** Improve/increase channel and floodplain interactions to diversify hyporheic exchange, including facilitating preferential flow from hillside cold water spring seeps into alcoves, side channels, and main channel. Promote vegetative cover/shade, and decrease channel width to depth ratio to lower summer stream temperatures and increase winter temperatures.

Project Metrics:

SUMMARY OF QUANTITIES		
Project Feature	Quantity	Unit
Main Channel Construction		
New Channel Length	4308	feet
Channel Excavation Volume	8197	CY
Existing Channel Fill	6301	CY
Side Channel Construction		
Side Channel Length	462	feet
Side Channel Cut	10	CY
Side Channel Fill (existing channel)	579	CY
Alcove Construction		
Alcove Length	1389	feet
Alcove Excavation Volume	487	CY
Riffle Construction		
Riffle Quantity	28	each
Riffle Construction Material	3401	CY
Riffle Boulders (Sm. 10-18 in. dia.)	465	each
Riffle Boulders (Lg. 18-24 in. dia.)	214	each
Road Obliteration	5248	feet
Levee Removal		
Levee removal length	1833	feet
Levee removal volume	1599	CY

Large Wood Habitat Features		
Type 1 - Large Wood Pool Structure		
# Structures	36	each
Key member w/RW, 16-18" dbh+, 35' L	108	each
Whole Tree w/RW, 16" dbh, 45' L	36	each
Large Log, 16" dbh, 25' L	36	each
Racking Logs/tops, 8-12" dbh, 20" L	360	each
Type 2 - Large Wood Whole Tree Pool Structure		
# Structures	11	each
Key member w/T with RW, 16" dbh+, 45" L	55	each
Large Log, 16" dbh+, 30' L	22	each
Racking Logs/tops, 8-12" dbh, 20" L	110	each
Type 3 - Large Wood Deflector Structure		
# Structures	2	each
Key member w/T with RW, 16" dbh+, 45" L	8	each
Racking Logs/tops, 8-12" dbh, 20" L	20	each
Type 4 - Large Wood Apex Structure		
# Structures	4	each
Key member w/T with RW, 16" dbh+, 35" L	12	each
Racking Logs/tops, 8-12" dbh, 20" L	20	each
Type 5 - Floodplain Wood, Whole Tree		
# Structures	115	each
Whole tree with RW, 16" dbh+, 45' L	115	each
Type 6 - Floodplain Roughness (2 pc structure),		
# Structures	124	each
Tree top, 12" dbh, 30" L, w/ or w/o RW	124	each
Pinning Log, 8-12" dbh, 20' L	124	each
Willow/Brush Mattress		
Streambank Length treated	1928	feet
# Live Willow Cuttings	1928	each

- **Constructed Rock Creek Main Channel, Side Channels, Alcoves, and Riffles –**
Approximately 4,308 feet of new Rock Creek main channel and 462 feet of side channel were constructed that will allow the confined and straightened channel to once again meander the valley bottom width, increasing channel sinuosity, decrease channel slope, and assist in floodplain reconnection and the development of more diverse channel structure and hydraulic variability.

Construction of secondary channels, alcoves, and other periphery habitats was focused in areas where low swales or historic channels currently existed. These channel forms will principally be dependent on stream hydraulics for development.

A total of 28 riffles were constructed and will aid in maintaining floodplain connection and preventing potential headcuts or channel degradation. Boulder clusters were embedded in each of the riffle locations to increase channel bottom roughness, provide habitat diversity and velocity refuge, and assist in maintaining vertical grades. Pools will be located in natural areas of scour to increase persistence of depth, while providing velocity refuge for adult and juvenile salmonids. Glides occur in transitions between pools and riffles and will be zones of depositional features where gravels are deposited to increase spawning potential through the reach.



Riffle Construction and Boulder Placement

Large Wood Structures and Habitat Complexity

A total of 54 large wood structures and complexes were installed along the main channel and side channels to provide complex and diverse habitat components within the project reach. Purposes of large wood structures included creating hydraulic conditions that maintain deep pool habitat, complexity and diversity, providing temporary streambank protection by redirecting flow and shear stress from near bank and stable bank conditions for establishing riparian vegetation, and providing overhead cover, velocity refuge, and organic nutrients that support food web process and complex rearing and holding habitat.



Type 2 Large Wood Structure



Additionally large wood material was placed throughout the floodplain and along the decommissioned floodplain road to provide roughness, decrease overland flow velocities, and promote sediment storage and revegetation.

Fine sediment in suspension during these high flow events will settle out around floodplain wood, providing excellent growth medium for cottonwood and willow seeds as floodwaters recede. Additionally, floodplain wood will provide nurse logs that help retain soil moisture, shade, and potential protection from herbivory.

Streambank Treatments and Revegetation

Approximately 1,900 feet of brush mattress was installed along the banks of newly constructed Rock Creek main and side channels. These features are composed of trenched dead branches, salvaged shrub material, and live willow cuttings. Brushy material will increase roughness along banks, and willow growth will shade the channel and provide bank protection as robust root mass establish.



Streambank Bio-Engineering (Willow Brush Mattress)

- **Removal of Floodplain Levees and Road Decommission on Rock Creek** – Approximately 1599 cubic yards (3,000 feet) of levee material were removed from the lower one mile of Rock Creek floodplain allowing the re-connection of the stream with its floodplain. Some of the material was salvaged to be used as a base lift during riffle construction, some disposed of in channel fill areas and off-site disposal areas.

Approximately 5,248 feet of draw bottom road that ran parallel to Rock Creek on the southwest side (river left) of the channel was decommissioned. Once vehicles and equipment no longer needed access, the road was de-compacted and fractured to a depth of 24 inches. This will result in the rehabilitation of floodplain vegetation, and hydraulic reconnection of cold water hillside springs with Rock Creek.



Draw-bottom road decommissioning

Meeting the Terms and Conditions of HIP III

Fish screen criteria

By the time in-water construction commenced on Rock Creek in 2018 there was no flow connecting the remaining small intermittent and isolated pools. This resulted in no need to pump water from fish-bearing segments of the creek. Water management and pumping was limited to dewatering isolated, de-fished pools within the new channel, fed only by groundwater. Discharge of pumped water was managed by utilizing adjacent floodplain to filter turbid discharge water, eliminating the need to discharge turbid water to active streamflow. As follows, there were no days during project construction in which work needed to be put on hold due to high flows.

Erosion, pollution and contaminant control

As mentioned above, turbidity exceedance was not encountered due to summer base flows dropping below riverbed substrate, leaving only small disconnected pools. No spills or contaminate release, and no erosion control failures occurred.

Post-project condition

Before start of excavating new Rock Creek channel segments, ground surface material in the proposed channel alignment was salvaged, which included grubbing riparian vegetation (primarily willows, sedges and rush mats) and storing in cool/wet conditions. Salvaged plant material was re-planted along completed new channel segments. Additionally, topsoil in new channel excavation limits was also salvaged and set aside for installation along banks of the new channel alignment to promote riparian recovery.

Site restoration

As described above, attention was made to salvage and replant much of the native plant material that would be within the limits of new channel excavation. Slight adjustments were made to field fit project design elements to minimally disturb established robust plant communities. One project objective was to decommission 5,248 feet long draw-bottom road that runs along valley left of Rock Creek. Due to years of vehicle compaction a D6 dozer was utilized to scarify and fracture the roadbed to a depth of at least 24 inches. Doing so allows post-construction riparian plantings to better establish roots within the old road prism. In addition, 6 acres of Rock Creek floodplain (including decommissioned road and access routes) were planted with native grass seed and straw mulched overtop to help retain moisture and reduce amount of seed relocated by wind and rain.

Sedge mat and topsoil salvage along new channel alignment.



Photo Points and Aerial Imagery



Pre-project-- road grade collecting hillside cold seeps. Pre-project channel segment converted into alcove with hillside spring connected.



Pre-project-- channelized with little to no large wood

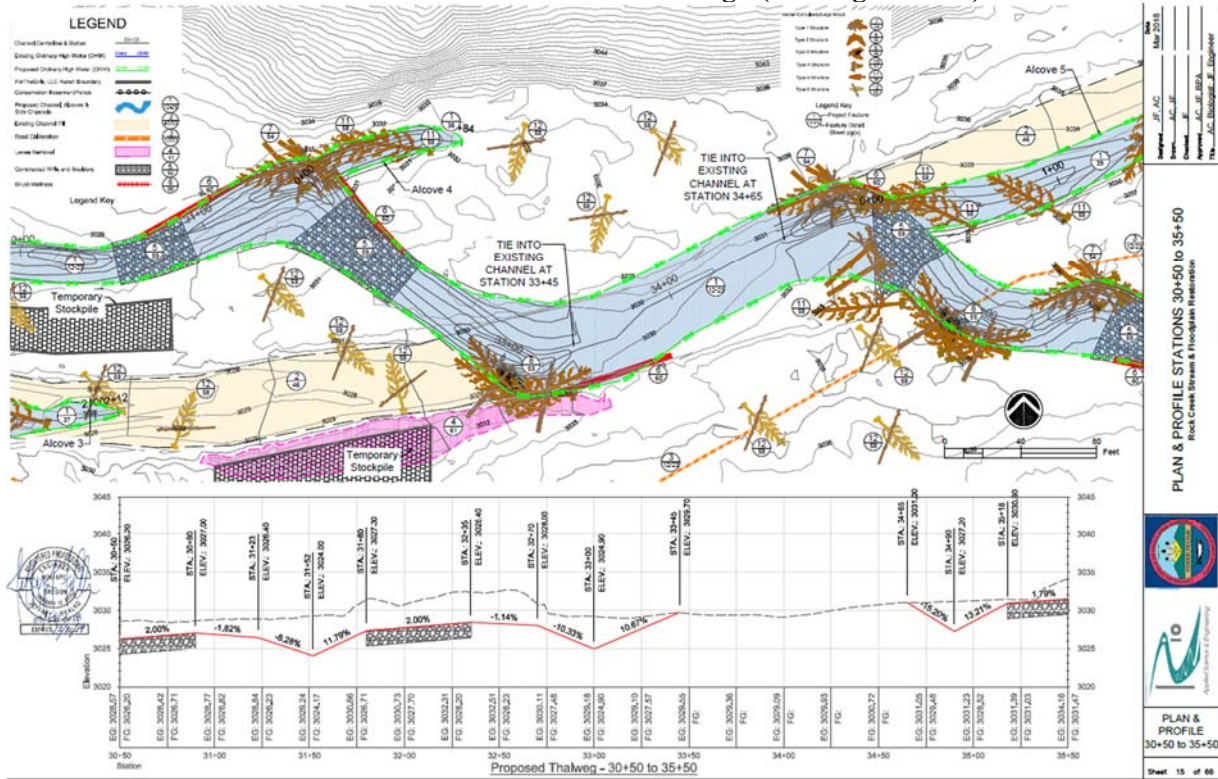


During project construction-- new channel alignment with added large wood.

Middle Rock Creek Project Reach Post Construction (viewing downstream)



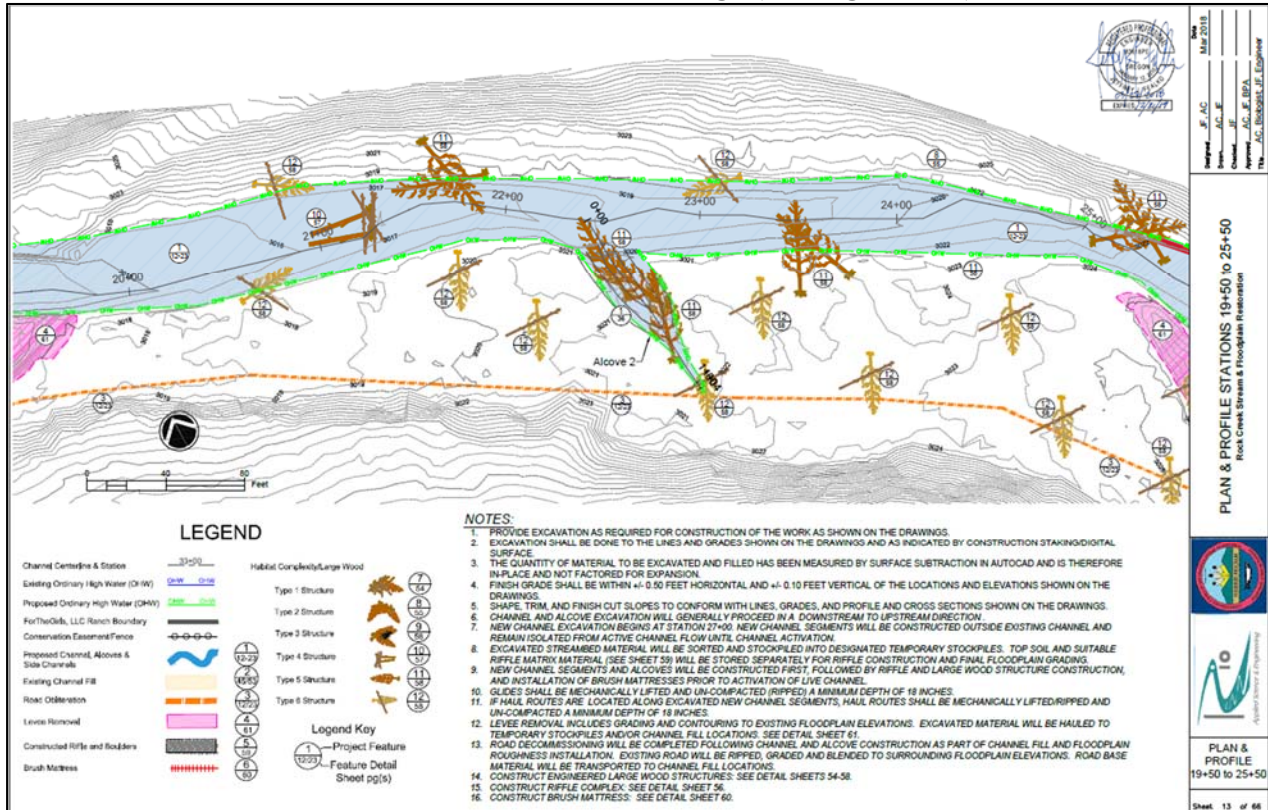
Middle Rock Creek Plan View Design (flow right to left)



Lower Rock Creek Project Reach Post Construction (viewing downstream)



Lower Rock Creek Plan View Design (flow right to left)





Rock Creek, Upper Project Reach, Before -After





Rock Creek, Mid Project Reach, Before -After

