Deep Creek Floodplain Restoration Project – Phase 2 (2019)

State(s): Oregon
Managing Agency/Organization: USDA Forest Service, Ochoco National Forest, Paulina Ranger District
Type of Organization: Government
Project Status: Underway
Project type: WNTI Project
Project action(s): Riparian or Instream Habitat Restoration, Monitoring, Education/Outreach. Reconnection of 0.62 miles of stream and 32 acres of riparian restored.
Trout species benefitted: Interior Redband Trout
Population: Deep Creek (tributary of the North Fork of the Crooked River).

Project summary: The Lower Deep Creek Floodplain Restoration Project (Phase 2 - 2019) will be a continuation of in-stream and riparian restoration activities that were implemented in the Summer of 2018 (Phase 1). WNTI also contributed funding to Phase 1. The purpose and need for these restoration activities is to enhance and recover habitat for U.S. Forest Service-listed Sensitive aquatic species such as Interior Redband Trout, Columbia Spotted Frog and other riparian dependent aquatic, wildlife, and plant species. Based upon comments the US Forest Service (USFS) and its partners received, an adaptive management hybrid design that created more immediate habitat features, relative to the initial design of 2015, was deemed more desirable. Specifically, the original design approach would result in more gradual and passive scour of channel and pool habitat for Redband Trout over several years, and more immediate and predictable habitat creation was sought to expedite population growth for Redband Trout. This hybrid design was more labor intensive and hence the request for Phase 2 funds. More time was focused on constructing stream habitat features and transplanting riparian vegetation. Currently, unrestored floodplain habitat is deficient in large woody debris, pools, and exceeds standards for bank stability and width/depth ratios. Work activities completed in Phase 1 (2018) and to be continued in Phase 2 (2019) include raising the overall water table elevation by filling/plugging large portions of the existing 5-foot incised Deep Creek channel and subsequently increasing floodplain accessibility. Due to incision of the existing channel, most of the valley width was not accessible as floodplain prior to Phase 1, as is the same in Phase 2. Water table elevation in Phase 1 was observed to quickly respond to the restoration work and was raised 4-6 feet by relocating new stream channel(s) up onto previously abandoned terraces. Phase 1 work (and Phase 2 expected work) also included improving aquatic habitat with construction of multiple low flow channels, while maintaining sufficient base flow for aquatic organism passage in all channels. Other tasks to be continued and completed include transplanting riparian vegetation from the historic channel into the newly constructed channels. Phase 1 yielded favorable initial results in transplant survival. In addition, post-project planting efforts will be/are planned and will be completed in multiple phases. Also, planned in Phase 2, is the development of deep slack water areas for beaver, amphibians and other aquatic organisms, similar to those in Phase 1. Recolonization of beaver has already occurred in response to Phase 1 treatments. Grazing protection measures will include installation of two cattle guards and new fencing to protect the project area.

Problem the Project Addresses: The Deep Creek watershed is a degraded system with important Interior Redband Trout populations surviving in cool, disconnected refuges. Land use practices have contributed to a degraded valley with an incised stream channel, abandoned off channel habitats, xeric terraces and limited riparian development. Despite poor habitat conditions, lower Deep Creek remains the highest value existing Redband Trout spawning habitat and certainly the highest potential overall habitat in the watershed and remains a genetic stronghold for native Redband Trout within the Crooked River Basin. Deep Creek is a USFS area of management emphasis, with designation as a regional Focus watershed and the project occurs within the Crazy-Deep Priority sub-watershed. Oregon Department of Fish and Wildlife (ODFW) has done extensive fish population monitoring in the area over the last 20 years and the area of discussion has been deemed a high priority for restoration. According to the "key findings" in the Management Plan for the Deschutes Sub-basin Plan by the Northwest Power and Conservation Council for the North Fork Crooked River Habitat Complex, Deep Creek hosts a "residual core Redband Trout population", which is supported by findings from ODFW. This restoration effort would treat the lower reach of a larger degraded basin in need of additional restoration. This project is a part of a systematic restoration effort throughout Deep Creek and other key headwater streams in the North Fork Crooked River basin and will support a cold and healthy refuge for a unique population of Redband Trout, until social and financial momentum allows us to leverage additional restoration efforts in the upper basin. Deep Creek is on the State 303(d) list of impaired waters for exceeding stream temperature standards. Summer water temperatures have been measured as high as 80 degrees Fahrenheit during low flow. The current disconnect to the floodplain also produces flashier spring runoff, limiting the amount of recharge to the system and further scouring and increasing stream width. Over time, there has been a shift in floodplain vegetation from a riparian species dominated composition to a dry upland species dominated composition. Phases 1 and 2 are designed to address a substantial increase in floodplain

accessibility and a subsequent increase in groundwater exchange and elevation as well as decrease erosional forces. As previously stated, this will be completed by plugging portions of the existing 5ft-incised Deep Creek channel and relocating smaller base flow channels up onto the abandoned terraces. Low flow channels will incorporate aquatic habitat features such as pools, riffles, gravel spawning areas, logs and trees, backwater areas and riparian vegetation transplants. The proposed restoration of Deep Creek will provide long-term protection of a unique genetic strain of Interior Redband Trout, as well as increases and improves quality fish habitat by reducing width to depth ratios, increasing number of pools per mile, improving quality of pools and reducing stream temperatures. Work has been completed on approximately 0.5 mile of stream. There are already noticeable benefits to the restoration from Phase 1. Preliminary monitoring shows a reduction of water temperature from 12 degrees Celsius above the restoration site to as low as 5 degrees Celsius below the restoration site. This is a dramatic change that occurred relatively quickly in Phase 1 and will have substantial benefits to water quality and subsequent aquatic organism persistence within and adjacent to the project area. In the eye of climate change, projects such as these can have substantial benefits to offsetting the impacts of thermal warming.

Objectives: Actions to be accomplished include plugging/filling portions of the incised Deep Creek channel to allow for more floodplain accessibility, constructing low flow channels on abandoned terraces to increase groundwater exchange/recharge, building habitat features into newly constructed channels, and transplanting riparian vegetation and providing grazing protection of the project. The primary objective of the project is to improve the overall watershed health of Lower Deep Creek by reconnecting surface and subsurface flows to an elevation near the historic floodplain, thus restoring stream function and improving Interior native Redband Trout and other aquatic organism habitat. This addresses water quality issues (off-setting localized effects of climate change), channel restoration and stabilization, and riparian protection and restoration. The project is consistent with INFISH goals and objectives for RHCA's under the Ochoco National Forest Plan. The Forest is also working with the grazing permittee to ensure proper management of livestock and season of use to improve riparian vegetation.

Deep Creek has been identified in both the Watershed Condition Framework (WCF) and the Terrestrial Restoration and Conservation Strategy (TRACS) of the USFS as a Focus and Priority watershed, respectively. Deep Creek contains the best, most interconnected, viable population of genetically pure Redband trout in the Crooked River Basin. This project is consistent with the USFS Region 6 Aquatic Restoration Strategy via the protection and restoration of critical aquatic habitats through a combination of promoting broad scale passive restoration and active restoration of high priority watersheds such as Deep Creek.

The emphasis in TRACS for Deep Creek is for habitat restoration and conservation. TRACS also identifies several priority plant species for the watershed which are also listed as "sensitive" plant species on the USFS Region 6 Special Status Species list and are associated with riparian habitats in the Deep Creek watershed. Of these, Peck's Mariposa Lily is of particular concern because its core populations on the Ochoco National Forest are in the Deep Creek Watershed and are being threatened by changes in hydrology due to stream down cutting. This project is expected to be beneficial to Peck's Mariposa Lily.

Partners:

- U.S. Forest Service – Ochoco National Forest
- Discover Your Forest
- Trout Unlimited
- Oregon Department of Fish and Wildlife
- Oregon Watershed Enhancement Board
- Crooked River Watershed Council

Project Monitoring: The project will be assessed multiple times annually to evaluate the level of success of the project. The US Forest Service will the responsible party for any long-term maintenance needs and all associated monitoring.

Both phases of this project have associated monitoring that includes;

• Photopoint monitoring – 15 photopoints have been established and will be recaptured on an annual basis for the first five years and then reassessed for needs beyond that.

• Stream temperature monitoring – On site Forward Looking Infrared (FLIR) stream temperature monitoring will be conducted at least annually during the low flow season. Longer term daily stream temperature monitoring (via thermistors) will continue to occur upstream and downstream of the project site.

• Vegetation monitoring - a team of US Forest Service resource specialists will annually evaluate the project area to determine the needs for seeding/planting, noxious weed eradication, better grazing management and/or other specific needs as it relates to allowing native plant establishment and persistence.

• Stream channel pattern, profile and dimension monitoring – Annually, for the first 2 years, the US Forest Service will survey and evaluate the stream channels patterns, channel widths, depths, and elevations of the thalweg and low flow channel characteristics.
• Fish Population Monitoring – At least once every two years the US Forest Service, Oregon Department of Fish and Wildlife, Trout Unlimited and other partners will conduct a fish population estimate.

Funding Source(s): National Fish Habitat Action Plan
Project cost: $50,000
Start Date: 10/01/2019 **Completion Date:** 9/30/2020
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