

For: Western Native Trout Initiative From: Trout Unlimited, Upper Deschutes Initiative, Oregon

Final Completion Report for Crazy Creek and Deep Creek Restoration Project, June 2015:

Background on the problem that generated the project and recent supplemental work

The Deep Creek watershed is a degraded system with important redband trout populations surviving in cool, disconnected refuges. The basin and key tributaries have been impacted from past grazing practices, dispersed recreation, roads in riparian areas, and other management activities common throughout the Ochoco Mountains. One of the key cold water tributaries is Crazy Creek, which provides over seven miles of suitable spawning habitat and meets Deep Creek approximately three and a half miles above the Wild and Scenic North Fork of the Crooked River. Unfortunately, Crazy Creek has been disconnected from Deep Creek due to a perched culvert that was a fish passage barrier. Redband trout populations in Crazy Creek and Deep Creek were isolated from each other for the past 30-40 years due to this impassable culvert and a two-mile section of degraded habitat in the middle of the basin. Deep Creek has been identified on the 303 (d) list for stream temperature, and Crazy Creek can be a cold and healthy refuge in this degraded basin.

Crazy Creek is a diverse drainage, with the upper 4 miles providing a wide meadow, with main channel and relic side channels, and the lower 3 miles protected in a steep, walled canyon with dense riparian vegetation, high bank stability, high habitat complexity, which provides cool water to Deep Creek and the upper meadow with the capacity to store even more water. After seeing positive early results from our wood placement work, we worked with the Forest Service to secure additional funding, and implement a second phase for our channel work to expand the stream miles treated and expand the positive improvements to the floodplain and riparian community.

With the additional stream miles rested and protected in the riparian pasture, the Forest Service has leveraged funding to expand our riparian plantings and wood placement work to improve additional stream miles. As partners, we increased our fundraising effort and matching funds for this effort, providing for us additional resources to improve the additional stream miles. The additional work with the Forest Service was completed in fall 2014, and we were successful in doubling our placement of wood debris complexes, planting an additional 50 acres of the stream corridor, and resting the site from grazing and monitoring the response from our work.

A description of work completed since our 2013 Report:

Background: This project helps restore desired ecological conditions by reconnecting the seven miles of spawning and rearing habitat for a reduced, but important Deep Creek redband trout population. The culvert has been functioning well, providing access into Crazy Creek and Deep Creek, and allowing migration when the water flow allows. With early results from the road decommissioning and channel work, we strongly believe we have significantly improved floodplain health and habitat complexity that will benefit aquatic life for years to come. Here are the key elements that were accomplished recently through this project:

- Large woody debris has been added to increase the roughness of the structures, provide more cover for the fish population and other aquatic life, and slowing stream flow to encourage water to spread out onto the floodplain and feed riparian vegetation. The woody debris complexes consist of 1-5 pieces, properly sized based on ODFW and USFS guidelines, with root wads attached when they were available. Work was completed in October, 2014.
- After phase I of the wood and rock complexes, planting was carried out in fall 2012 and spring 2013. After our initial plant monitoring was conducted, we expanded our caging effort to make sure browsing by wildlife was limited and plants were properly establishing and growing. The additional planting was targeted for the new sediment deposits collected upstream of our log structures.
- Approximately 50 acres in the riparian corridor was planted with willows, alder and other native tree and shrub species. Spacing and species diversity have mimicked reference sites. Larger material has and will be protected unless site conditions do not warrant such (see photos of the cottonwood added to the site and early growth and establishment).
- We carried out phase II of the wood and rock complexes, working from funding from the Forest Service, and increasing the stream miles which were improved. We placed an additional 10 structures upstream and downstream of our riparian pasture fence. Similar to Phase I, our structures placed during Phase II have been added to increase the roughness of the structures, provide more cover for the fish population and other aquatic life, and slowing stream flow to encourage water to spread out

- **Continue from previous page:** onto the floodplain and feed riparian vegetation. The woody debris complexes were larger for the second phase, with some plug and fill methods incorporated to bring up the water table and activate relic side channels. Structures consist of 5-15 pieces, properly sized based on ODFW and USFS guidelines, with root wads attached when they were available. To enhance our structures from Phase I, we added some additional pieces of wood to increase roughness and cover. Work was completed in October, 2014.

By fixing a diversity of problems found in the Crazy Creek drainage, we restored a connection between Deep Creek and Crazy Creek, and ensured that water remains cool in Crazy Creek and habitat is functional for returning fish. The restored stream channel at the culvert and in the middle basin has increased the density of pool habitat and instream wood, and allowed the stream to access its floodplain (improved water storage) for a greater distance; this will in turn allow the riparian vegetation (existing and planted) to expand farther from the stream creating more forage and habitat for wildlife. By resting the riparian pasture, more actively managing livestock, and planting the stream corridor with native species, our actions will significantly improve floodplain health for the long term. Limiting grazing along the stream will allow native vegetation to repopulate the riparian area which will increase runoff filtration, lower water temperatures, decrease nutrient overloading and other water quality degradation, and increase desirable wildlife forage. Replacement of the undersized culvert at the mouth of Crazy Creek has greatly increased available fish habitat. We will be working during the summer of 2015 to sample fish populations in Crazy Creek and Deep Creek to see if we can quantify increases and improvements in the fish population.

A summary of any recent public awareness or educational activities related to the project

Public awareness and education outreach are big focus areas for Trout Unlimited, and engaging the public with this project has been very important during the last 2 years. Our outreach has included three elements: 1. Reaching out to our community in our towns through evening presentations and orientations, 2. Offering field trips and tours into Deep Creek and Crazy Creek for hands on learning and volunteer support, and 3. Engaging interns and volunteers in our monitoring efforts to deepen our organization's connection to the drainage and results from the project. All three elements have been important and successful. To help us reach interested adults and volunteers, we have integrated our Deep Creek and Crazy Creek work into the Deschutes Restoration Outreach Program (DROP), which allows us to reach college students and adults that might be unfamiliar with the Ochocos and Deep Creek system. DROP is an adult service learning framework to recruit, educate and train members of the community to engage in restoration work. Working with a mix of college students, local members, and interested adults, DROP connects restoration projects in need with skilled and passionate stewards. The DROP framework dovetails perfectly with our on-the-ground restoration and outreach projects — both of which encourage more voices and actions for our streams and rivers.

We have provided yearly reports and presentations about the Crazy Creek project for our regional membership and local Chapter of Trout Unlimited. During the fall months, we have presented each year to Trout Unlimited's annual meetings, where we have been able to share results and volunteer opportunities which are coming up. We have reached an additional 100 people through the past two annual meetings, including the Chapter's Board of Directors. During the last two years, we have also offered spring planting trips and restoration tours, which have engaged an additional 20 people. During the summer and fall periods, we have offered educational field trips which are focused on riparian and stream monitoring, working directly with a diversity of Forest Service staff from range, fisheries, wildlife and hydrology, engaging an additional 6 volunteers and interns from TU.

Lessons learned, if any, from the project

Since we have just completed our first and second wood placement phases, we have captured positive results thus far, with an increase in pool habitat, dramatic increase in cover and connection with the floodplain, and successful establishment of riparian vegetation. To help bring the water table up in the stream system, we have increased the size and complexity of our log structures, adding some fill to help plug the channel and activate relic side channels. With these larger structures, we are seeing an increase in water storage, as more of the floodplain is reconnected, saturating a larger area to help slow the water flow and providing water to more riparian vegetation.

Photographs of the Project, Images Capturing Post Project Changes and Updates, May 2015

Background and Content in this Document

For our project, we have established set photo points which are connected to our wood placement sites, planting around those sites, and improvements to the channel and riparian vegetation. To share our photos, we will start with these images below showing a collection and sorting of fine sediment and health of our planted vegetation. We then share our 3 photo monitoring points, with images before work, after wood placement (Phase I), and after maintenance needed and caging of plants (Phase II). Finally our last images show the new bottom arch culvert and riparian pasture fence.



Image 1 of the conditions which have changed, showing fine sediment collection and vegetation growth/recovery.



Image 2 of the conditions which have changed, showing fine sediment collection upstream of new structure.



Image 1 of one of our larger potted cottonwoods growing in the floodplain of the improved channel.



Image 2 of the same cottonwood, showing one year of growth, with 2 feet added, and caging functioning well.



Photo of Photo Monitoring Site 3, Before Restoration



Photo of Photo Monitoring Site 4, Before Restoration



Photo of Photo Monitoring Site 3, After Work Phase I



Photo of Photo Monitoring Site 4, After Work Phase I



Photo of Photo Monitoring Site 3, After Work Phase II



Photo of Photo Monitoring Site 4, After Work Phase II



Photo of Photo Monitoring Site 5, Before Restoration Work



Photo of Photo Monitoring Site 5, After Work Phase I



Photo of Photo Monitoring Site 5, After Work Phase II



Photo of Perched Culvert before replacement



Photo of new bottom arch culvert and sediment



Photo of improved Crazy Creek channel into culvert