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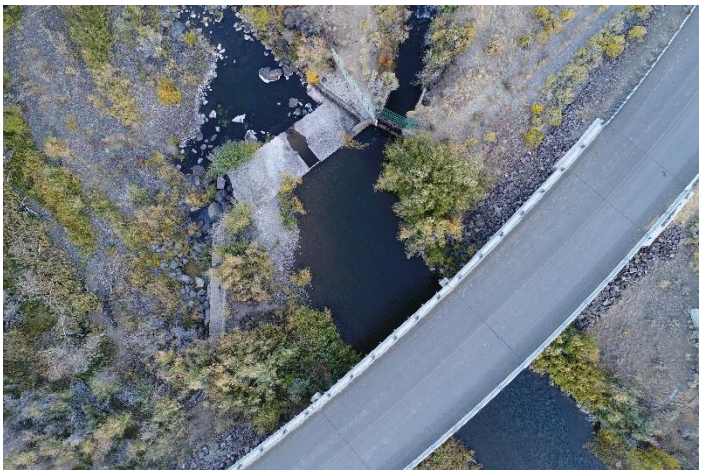
2018 "Waters to Watch" – Deep Creek Town Diversion Fish Passage Project, Oregon



Left: Aerial view Town Diversion. **Right**: Town Diversion.

The Deep Creek - Town Diversion Project will complete a fish passage solution for a diversion dam that has been an upstream fish passage barrier for likely over 100 years. Restoring fish passage for Warner Lakes Redband Trout (state and federal Sensitive Species) and Warner Sucker (Endangered Species Act Threatened species) is the focus of this project.

The primary limiting factor for fish in the Warner Valley Watershed (Oregon) is passage at irrigation diversion structures, especially on Deep and Honey Creeks. Limited water in the eastern Oregon desert means that Warner Basin streams are a critical water source to both irrigators and native fish. Several Warner Basin streams provide both irrigation water critical to local ranches, and spawning, rearing, and migratory habitat for Warner Basin Redband Trout, Warner sucker, and other native fishes. The low-lying portion of the Warner Basin provides the most fertile agricultural land in the area, as well as stream reaches critical to fish migrating from the large lakes in the valley upstream to high quality spawning and rearing habitats. More than 10 diversions exist in the lower basin that provide water to irrigators and have been identified as fish passage barriers. The diversions make it impossible for large fish that rear in the Warner Lakes to access the prime spawning grounds in the upper basin on lands primarily administered by the Lakeview Bureau of Land Management and the Fremont Winema National Forest.

The Deep Creek -Town Diversion Project will address fish passage on Deep Creek. The Town Diversion on Deep Creek is believed to be a complete upstream fish passage barrier due to the vertical height of the irrigation weir relative to the channel elevation downstream from the weir. The diversion will be reconstructed with a rock ramp fishway designed to restore natural streambed conditions and provide passage for all native fish over the irrigation structure. The goal of the Town Diversion Fish Passage Project is to provide volitional passage for these two species, as well as other native fish species inhabiting lower Deep Creek. Passage at the Town Diversion will expand the amount of spawning, rearing, and holding habitat available to the Deep Creek fish community; increase population connectivity; and provide access to

deep cold-water pools that provide summer refuge. Project designs are prepared, project roles have been established, and landowners are on board.

The proposed fish passage solution has been vetted by a multi- agency and water user stakeholder group that has convened over the past five years to discuss fish passage on Deep Creek and the adjacent Warner Sucker tributaries. Replacement of the existing diversion dam and installation of an engineered roughened channel are expected to provide fish passage, restore watershed connectivity, and be a lower maintenance fish passage solution relative to other fish passage alternatives that were reviewed. The replacement dam and rock ramp will also improve the stability of the diversion structure. The existing dam is currently undermined and the concrete skin is no longer supported by underlying fill. Existing boulders will be repositioned and additional boulders will be imported to maximize rock ramp stability.

For the last decade, the Warner Basin Aquatic Habitat Partnership has both independently and collaboratively worked to restore passage and connectivity for aquatic species in the Warner Basin, specifically the Warner Basin Redband Trout, a state and federal species of concern, and the Warner sucker, an ESA listed threatened species. While each organization's role has been slightly different, (i.e., monitoring, planning, outreach, or implementation) the vision was always the same: species recovery. The key to bringing this vision together is building relationships with the local ranching community of Adel and Plush, Oregon. Agriculturally based, the Warner Basin is primarily managed to produce hay and raise beef cattle. Water is critical to both agriculture and fish habitat in the basin. Irrigation diversions and ditches have been identified as a primary threat to fish recovery in the basin.

Left: Town Diversion – Southeast view demonstrating summer low flows. The diversion is a complete fish passage barrier due to vertical drop over the structure**. Center and Right**: In the Spring, high velocities also create a complete barrier to fish passage.

Project Objectives:
1. Volitional fish passage will be provided via roughened channel this project will improve access to three additional miles of habitat for spawning and rearing activities.
2. This project will re-establish opportunities for native fish to reach cold water refuge during warm summer months and holding habitat in Deep Creek.
3. The Deep Creek - Town Diversion Project will increase connectivity for Warner Lakes Redband Trout and Warner Sucker. This project will create stable stream channels that provide fish passage solutions and meet Oregon Department of Fish and Wildlife passage guidelines for Warner Lakes Redband Trout and Warner Sucker passage.

The Deep Creek - Town Diversion Project solution includes a 230 ft. long roughened channel. Fish passage solutions will meet the criteria stated in Oregon Administrative Record 635-412-0035.

Project Timeline: Project designs were completed as of April 2017. In early 2018, fish capture and exclusion will take place at the building sites prior to the removal of the old culverts. In the summer in-stream work window of same year, the new, open-bottomed culverts will be implemented and the road relocation will occur.

Monitoring and evaluation*:* Prior to on-the ground work, baseline data on physical habitat, sediment, flows and fish populations will be established through monitoring efforts by Oregon Department of Fish and Wildlife and River Design Group, Inc. Post-restoration monitoring of fish passage will be conducted by Oregon Department of Fish and Wildlife. Fish passage will be assessed using fixed PIT-tag antennas installed near the downstream and upstream ends of the project. Cross sections will also be established to measure long term stability of the roughened channel. Photo monitoring at permanent points will be conducted annually for three years, and periodically thereafter. Monitoring of riparian vegetation along the roughened channel will also take place through a series of photo-points to visually assess success of plant growth and vigor. Following restoration activities, partners will review monitoring results and assess success of the project.

Economic Calculator results*:*
Jobs: 8.9957 Total Sales: US $858,310.06 Value Added: US $529,099.31 Income: US $366,753.38

Project Partners:
Lake County Umbrella Watershed Council
Bureau of Land Management, Lakeview
Oregon Department of Fish and Wildlife
U.S. Fish and Wildlife Partners Program
U.S. Fish and Wildlife Service
Lakeview Soil and Water Conservation District
Fremont Winema National Forest
Adel Water District
Oregon Watershed Enhancement Board
Western Native Trout Initiative

The lead organization is the Lake County Umbrella Watershed Council.