

## 2020 “Waters to Watch” – Deep Creek Town Diversion, Oregon (retrospective nomination)

### “Before” photos



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

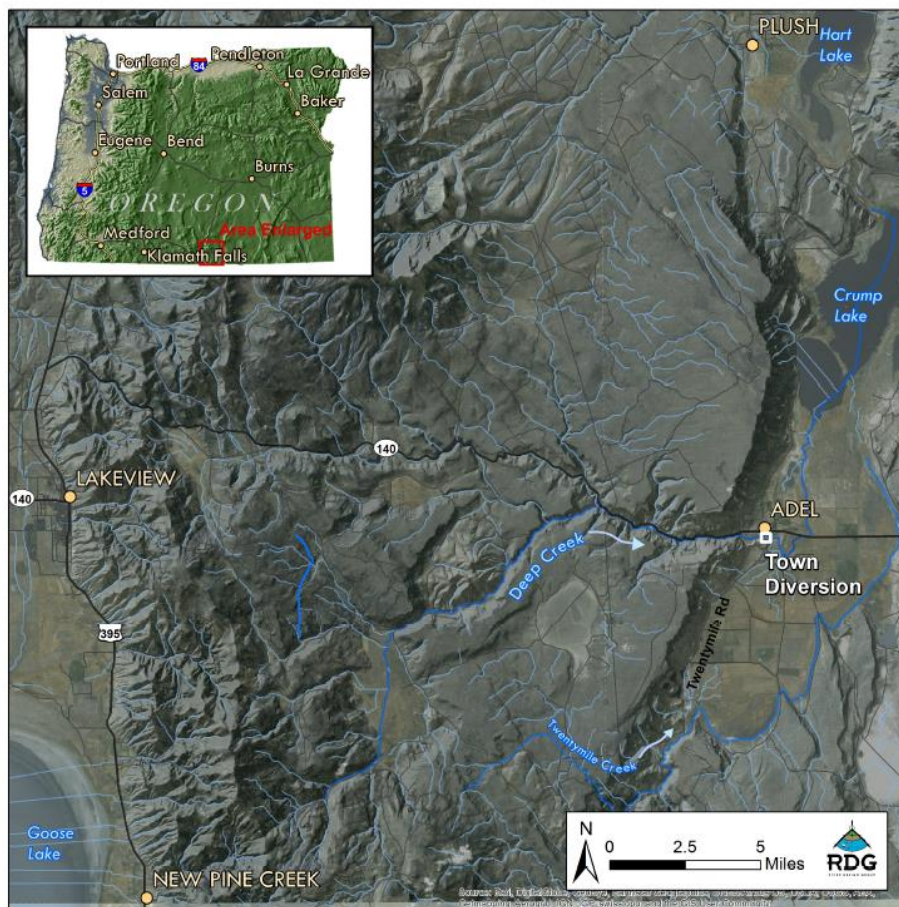


**Left:** Town Diversion – Southeast view demonstrating summer low flows. The diversion is a complete fish passage barrier due to vertical drop over the structure. **Center and Right:** In the Spring, high velocities also create a complete barrier to fish passage.

This retrospective nomination follows the original nomination of this project as a [Water To Watch project in 2018](#).

**Purpose of the project:** 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 addressed fish passage on Deep Creek. The Town Diversion on Deep Creek was 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 was 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.





**Community Benefit:** For the last decade, the Warner Basin Aquatic Habitat Partnership (WBAHP) has both independently and collaboratively worked to restore passage and connectivity for aquatic species in the Warner Basin, specifically the Warner Lakes Redband Trout (state sensitive, federal species of concern) and the Warner sucker (ESA Threatened species). While each organization's role has been slightly different, (for instance, monitoring, planning, outreach, or implementation) the vision was always the same: species recovery. The key to bringing this vision together is building and maintaining 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. In the past five years, the Lake County Umbrella Watershed Council, Soil and Water Conservation District, and their partners have tirelessly worked to improve these relationships by attending monthly water meetings and collaborating on ideas to put restoration actions on the ground.

The goal of the Warner Basin projects is to execute a watershed scale restoration program over seven years that will lead to the delisting of Warner Lakes Redband Trout and Warner sucker populations in the Warner Basin in eastern Oregon. Objectives to achieve the project goal include implementing fish passage solutions at irrigation diversions, screening irrigation diversion intakes, enhancing stream corridor habitats in Deep Creek and Honey Creek and developing a watershed scale restoration approach in collaboration with landowners and diverse interest groups. Within Deep Creek there are 25 water users and landowners that this project will directly benefit.

Deep Creek Town Diversion implementation begins this larger watershed scale approach to implement fish passage projects at 10 water diversions to open 90 stream miles in the Warner Basin by 2025. In 2019, a Focused Investment Partnership grant through the Oregon Watershed Enhancement Board was awarded to the WBAHP to address the remaining 10 fish passage barriers found in Deep and Honey Creeks. The Deep Creek Town Diversion project led the way for these remaining barriers to be addressed. The project includes 10 high priority structures to be re-designed/replaced over a six year period for a total cost of \$10.2 million, that will start from the lower stream basin and work upstream until all barriers have been re-designed for fish passage, screening, and efficient water diversion for irrigators.

### **Project Timeline:**

Survey, concept designs, a project alternatives analysis and final design was completed by River Design Group, Inc. in 2018.

Bid document preparation and bid tours were conducted to select a construction contractor to install the rock ramp fish way for passage of focal species, Warner sucker and Warner Lakes Redband Trout.

Project construction was completed in two phases.

Phase I: In February of 2019, the existing concrete headwall and associated diversion headgates and forebay (i.e., headworks) to the diversion canal was replaced. The existing headworks was degraded due to concrete spalling. The existing weir was enhanced with a 250 ft-long rock ramp that joined the existing northern diversion weir crest. The modified weir forms a defined vertical boundary which joins the rock ramp allowing for the goal of fish passage and connectivity to upstream habitat. Replacing this headworks has provided safety and efficiency to the diversion operation. The irrigation structure required design modifications and retrofitting to accommodate the new rock ramp fishway.

Phase 2: In November of 2019, the existing weir was enhanced with a 250 ft-long rock ramp that joined the existing northern diversion weir crest. The modified weir forms a defined vertical boundary which joins the rock

ramp allowing for the goal of fish passage upstream. At this time, a 100 ft concrete sluiceway was also constructed for sediment and debris flushing that occurs during high flow events.

Exhibit 1: Rock Ramp Fish Way



Exhibit 1: Headwall

Exhibit 2: Concrete Sluiceway



Exhibit 2: Headworks, Safety Rails, Headwall

**218-4018-16051 Before and After Photos**



Photo Point: Before #1  
File Name: Deep Creek Pre Project Weir and Headgates.jpg  
Photo Description: Pre Project Wier and Headgates  
Photo Date: 10/10/2017



Photo Point: After #1  
File Name: Post Project Downstream View.JPG  
Photo Description: Post Project Wier and Headgates  
Photo Date: 12/18/2019



**218-4018-16051 Before and After Photos**



Photo Point: Before #2  
File Name: Pre Project Looking South.jpg  
Photo Description: Across the Creek Looking South  
Pre Project  
Photo Date: 10/10/2017



Photo Point: After #2  
File Name: Looking South Across Creek.JPG  
Photo Description: Post Project Looking South  
Photo Date: 12/18/2019

**218-4018-16051 Before and After Photos**



Photo Point: Before #3  
File Name: Upstream View Town Diversion.jpg  
Photo Description: Pre Project Upstream View  
Photo Date: 10/10/2017



Photo Point: After #3





Deep Creek - Town Diversion, February 1, 2020.



Deep Creek - Town Diversion, February 1, 2020.

**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 (the lead organization)  
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  
Resources Legacy Fund  
Western Native Trout Initiative