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Weber River, Utah Project (Lower Weber Diversion, Gordon Creek, Strawberry Creek)



Overview of the project

This project was funded to protect native fish species and improve water use efficiency for water companies in the Weber River drainage, Utah. It re-connects 17.5 river miles and allows native Bonneville cutthroat trout (*Oncorhynchus clarki utah*) and bluehead sucker (*Catostomus discobolus*) to pass one mainstem diversion and two culvert barriers that had fragmented mainstem and spawning habitats in two tributaries. Both bluehead sucker and Bonneville cutthroat trout have experienced extensive population declines and range contraction. In the Weber River, bluehead sucker occur in three remaining fragmented reaches with the strongest population in the Weber River confined below the diversion structure. Allowing passage around this diversion provides bluehead sucker access to canyon habitat. Large fluvial Bonneville cutthroat trout have been virtually eliminated from river mainstems rangewide, but still persist within isolated mainstem segments of the Weber River, unable to migrate back to spawning grounds in tributary streams. Each reach in the Weber River supporting these two species has been fragmented by mainstem diversions threatening the population resiliency, genetic diversity and long-term persistence of both species.

To facilitate the upstream movement of fish from the lower Weber drainage upstream into the Strawberry Creek and Gordon Creek drainages, project funds were used to design, engineer and re-build the Strawberry Creek

culvert, a step-pool complex and riffle reconstruction in Gordon Creek to facilitate fish passage, and to build a pool/weir fish passage at the mainstem Power Weber River diversion. This was the final phase of an existing project intended to protect native fish and improve the water withdrawal efficiency for the water companies. This project advances a larger scale effort to remove additional barriers located upstream to reconnect an additional 10 miles of mainstem river.



Bluehead Sucker (Courtesy of Zachary Shattuck)



Bluehead Sucker (Sage Lion Media)



Bonneville cutthroat trout (Courtesy of Paul Burnett, Trout Unlimited)

The Weber River, Utah

Over 100 hundred years ago, upon arriving in the Salt Lake Valley, the Mormons literally had to make a place to live; they needed water to survive and thrive. Like many other western rivers, the 125 mile Weber River was developed with irrigation systems and to support farms, housing, churches and schools for the growing human population, creating challenges for survival of native fish like the bluehead sucker and the Bonneville cutthroat trout - Utah's state fish.

History of the project and the partnership

In 2008, Trout Unlimited and many project partners were contacted by the water users on the Weber River at the mouth of Weber Canyon near Ogden, UT. The water users were faced with a challenge of maintaining their failing infrastructure on the Weber River. By engaging the fish community, the water users were able to leverage their resources to reconstruct their diversion while also incorporating critical fish passage and screening elements into the project. Unfortunately the original project, as designed in 2011, had serious flaws, which limited fish passage only to moderate flows, and the screens experienced frequent clogging. In 2012, with funding from the Western Native Trout Initiative, the Desert Fish Habitat Partnership, the Utah Division of Wildlife Resources, the U.S. Fish and Wildlife Service's National Fish Passage Program, and the Utah Department of Transportation, a design was developed to retrofit important high flow passage at this site and to build a pool/weir fish passage at the mainstem Power Weber River diversion.

Two additional projects were also funded in 2012, to facilitate the upstream movement of fish from the lower Weber drainage upstream into the Strawberry Creek and Gordon Creek drainages. These project funds were used to design, engineer and re-build the Strawberry Creek culvert, a step-pool complex and riffle reconstruction in Gordon Creek to facilitate fish passage. This was the final phase of an existing project intended to protect native fish and improve the water withdrawal efficiency for the water companies in the Weber River watershed. These three projects advance a larger scale effort to remove additional barriers located upstream to reconnect an additional 10 miles of mainstem river.

The Western Native Trout Initiative and [Desert Fish Habitat Partnership](#) first nominated the Weber River project in 2012 as a "10 Waters to Watch". The 10 Waters to Watch list, assembled by the nation's leading authorities on aquatic conservation, is a collection of rivers, streams and shores that will be cleaner and healthier habitats for the many fish and wildlife species and people who call these areas home. They are representative of freshwater to marine waters across the country including lakes and reservoirs that are improving through the conservation efforts of the [National Fish Habitat Action Plan](#) — a bold initiative working through 20 Fish Habitat Partnerships to reverse persistent declines in aquatic habitat across the United States. The project was recognized again in 2016 as a legacy project - denoting it as a project that has made a significant impact on fish habitat conservation. Legacy projects are selected from previous years Waters to Watch projects and help to highlight the National Fish Habitat Partnership as it celebrates its 10-year Anniversary in 2016.

The Western Native Trout Initiative and Desert Fish Habitat Partnership represent a philosophy and movement that brings together a blend of public and private funds from a wide and diverse group of organizations. We play an integral role in bringing partners together and providing critical funding. The Weber River is an example of a successful native fish restoration effort that is returning the bluehead suckers and Bonneville cutthroat trout to historical reaches of the river they had been cut off from for 100 years.

These projects were funded with \$79,500 in National Fish Habitat Partnership funds, \$79,500 National Fish Passage Program Funds, and \$115,000 non-federal funds provided by the Utah Division of Wildlife Resources, Trout Unlimited, Utah Department of Transportation for a total project cost of \$274,000.

Lower Weber River Power diversion project



The lower Weber River Diversion after initial construction in 2011: Water velocities at the top end of the fish passage channel were too great to be scaled by all but the strongest swimming fish when flows exceed than about 2500 cfs. In 2011, the strongest bluehead sucker population in the Weber River was confined below this diversion structure. Project goals were to design a fish ladder to be retrofit within the current footprint of the fishway.



Construction of fish ladder: The final concept was a fish ladder that is active only at high flows, which enters back into the top of the existing fishway. The fish passage design elements for this project included the construction of a vertical slot fish ladder with 6 inch drops, to maintain water velocities generally around 4 feet per second.



Completed fish ladder at the mouth of Weber Canyon. Providing passage around this diversion provided bluehead sucker access to canyon habitat critical to their life history. During 2013 over 1,100 fish of all species moved through this fishway around the diversion dam. High flows in May 2015 proved that the fish ladder was operating as planned. Photos courtesy of Trout Unlimited.

Gordon Creek project



The excavator placing rocks for the step-pool complex in Gordon Creek

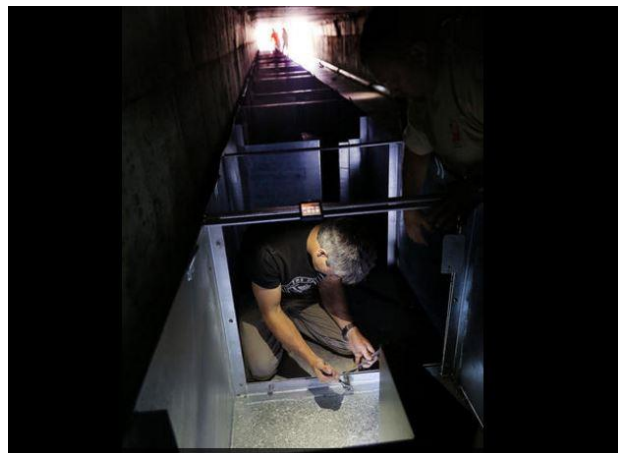
To watch a time-lapse video of the construction at Gordon Creek, click [here](#).



Completed step pools in Gordon Creek. Photos courtesy of Trout Unlimited.

Strawberry Creek project

385 feet may not seem like a long distance to humans, but to a fish fighting a straight uphill slope with no place to rest in surging spring runoff, it can mean the difference between a successful spawn or dried up eggs. In November 2016, a vertical slot fish ladder longer than a football field was installed in a concrete culvert under Interstate 84 to reconnect migratory cutthroat with 2 miles of headwaters on Strawberry Creek. The creek is a tributary to the Weber River at the top of Weber Canyon and it has been cutoff of as potential spawning habitat for more than 40 years. When I-84 was completed in the 1950s and the culvert was put in to allow Strawberry Creek to continue its flow into the Weber River, authorities likely had no idea they were interfering with the native trout's spawning habitat and damaging their ecosystem. Anglers have watched Bonneville Cutthroat Trout gather at the end of the run for years hoping they would find a way up the culvert. For a wonderful story about the installation of the fish ladder, [click here](#):



A section of the fish ladder is maneuvered into place.



A vertical slot fish ladder was chosen for the design because it handles variable flows, passes sediment, and allows non-jumping fish to move through. The ladder gives the fish places to rest as they swim upstream to spawn in Strawberry Creek. Photos courtesy of Utah Division of Wildlife Resources and Trout Unlimited.