

Spread Creek Fish Passage Project Phase 2

State(s): Wyoming

Managing Agency/Organization: Trout Unlimited

Type of Organization: Nonprofit

Project Status: Ongoing

Project type: WNTI Project

Project action(s): Riparian or Instream Habitat Restoration, Barrier Removal, Watershed Connectivity, Monitoring, Education/Outreach

Trout species benefitted: Yellowstone Cutthroat Trout

Population: Spread Creek, Snake River Watershed, WY

Project summary: In 2010, the Spread Creek dam, an obsolete, crumbling diversion dam for irrigation located just outside of Grand Teton National Park on Bridger-Teton National Forest lands was removed by a partnership effort led by Trout Unlimited's Wyoming Water Project, opening up over 50 miles of Spread Creek to migratory Snake River Yellowstone Cutthroat Trout for the first time in over 50 years. Since the dam was removed and replaced with a fish passage-friendly diversion structure and new water delivery system, project partners have documented successful fish movement through the project area – but have also discovered that native fish, including migratory cutthroat trout and bluehead suckers (a Wyoming Species of Greatest Conservation Need) are being entrained in the Spread Creek irrigation system. In addition, the Spread Creek channel in the project area has been highly unstable following dam removal, both laterally and vertically, which has caused continued damage and issues with maintaining water delivery during high flow events in the 2011, 2017 and 2018 irrigation seasons (and associated sedimentation, bank instability, and scouring). Phase 2 of the Spread Creek Fish Passage project is a large-scale collaborative effort that will prevent future losses of migratory cutthroat trout and other native fish by installing a fish screen on the Spread Creek irrigation system. It will also make much-needed improvements to stabilize the diversion structure and channel within the project area. The project's completion will represent the culmination of over 10 years of effort by project partners, and water users to implement a win-win-win solution for fish, land management agencies, and irrigators.

Problem the Project Addresses: Spread Creek, located outside of Jackson Hole, Wyoming, traverses through relatively pristine National Forest and National Park lands before joining the Upper Snake River approximately 15 miles below Jackson Dam. Spread Creek showcases a diversity of life histories for native Snake River cutthroat (Yellowstone Cutthroat Trout subspecies) trout important to the resilience of the population and species into the future. The lower section serves as a migration corridor for large, fluvial fish, while the upper portion of Spread Creek serves as important spawning and rearing habitat for fluvial fish and year-round habitat for resident fish.

Prior to 2010, the Spread Creek dam, located just outside of Grand Teton National Park (GTNP) on Bridger-Teton National Forest (BTNF) lands, prevented native fish migration to the upper reaches of the drainage. In 2010, the obsolete diversion dam used for irrigation was removed by Trout Unlimited, GTNP, and numerous other partners, opening up over 50 miles of Spread Creek to migratory cutthroat trout for the first time in over 50 years. This structure had been a complete barrier to the upstream movement of native fish attempting to move from the mainstem Snake River to historical spawning and rearing grounds in Spread Creek. The modernized diversion structure that was installed in its place for water users gradually elevates the water to be diverted over a series of weirs and pools and allows for fish passage throughout the year and at varying flows.

Post-dam removal project monitoring by project partners has demonstrated that the project has been highly successful in reconnecting upper and lower Spread Creek and the Snake River. However, it has also confirmed that a fish screen is warranted on the Spread Creek irrigation system's ditches. With the increased use of upstream habitat for spawning and rearing, many juvenile and adult Yellowstone Cutthroat Trout and other native nongame fish like bluehead suckers are being swept into the Spread Creek irrigation system's ditches when trying to out-migrate throughout the year. Once entrained, these fish are not able to escape back into Spread Creek.

Concurrent with the fish salvage sampling in the Spread Creek irrigation system, project partners have been monitoring stream stability following dam removal and have noted that Spread Creek is a highly unstable, high bedload, high sediment channel. This was evidenced by flooding in 2011, which damaged the diversion structure's rock weirs and led to issues with water delivery and channel scouring, necessitating emergency bank stabilization work and other repairs in 2016. However, continued damage and issues with maintaining water delivery during high flow events in 2017 and 2018 (requiring heavy equipment instream on multiple

occasions to clear debris and build a low-flow intake channel), and associated sedimentation and bank instability, have indicated that a more stable, long-term solution is needed to establish consistent design flows for the fish screen, re-establish optimal hydraulics for fish passage (currently, there is an 18" drop between structures, which is much greater than the WGFD's recommendation of 4"), and provide reliable water delivery to irrigators. The washout of the Park's access road to the site in 2018, which resulted in 1,200 cubic yards of land loss and erosion, and the observation of a headcut moving upstream in the direction of the diversion by project engineers, further demonstrates Spread Creek's extreme instability and risk to fish habitat, water quality, and irrigation infrastructure.

Phase 2 of the Spread Creek Fish Passage Project will eliminate the entrainment of native cutthroat trout and improve migration conditions through the project reach. It is highly aligned with WNTI's strategic priorities focused on providing long-term protection of intact and healthy aquatic ecosystems that support priority populations, including actions that protect or enhance multiple populations (SRC and bluehead suckers); actions that provide immediate benefits to enhancing the viability of priority populations (restoring habitat connectivity for future population resiliency); and actions that support conservation of unique and rare functioning habitat, habitat diversity, life histories and genetic attributes (supporting connectivity for genetically pure, fluvial and resident SRC to thermal refugia on public lands).

Objectives: The second and final phase of the Spread Creek Fish Passage Project will ensure unimpeded migration between the Snake River and Spread Creek by installing a fish screen that prevents losses of native fish and by stabilizing, improving, and protecting the diversion and irrigation infrastructure. It will accomplish this by 1) installing a fish screen that is designed to eliminate fish entrainment in ditches while continuing to deliver water even if clogged; 2) rehabilitating the diversion structure and changing it from a series of rock weirs to a rock ramp, for long-term stability and improved fish passage; and 3) adding instream structures such as rock barbs, toe rock, and engineered log jams to protect banks, channel, and irrigation infrastructure within the project area and improve local habitat and water quality conditions for native fish. These actions will ensure future water delivery to the irrigation system and fish screen and maintain and improve fish passage for all life stages of native fish to the 50 miles of upper Spread Creek opened up by the dam removal phase of the project. It will be true win-win for native fish, water users, land managers, and the public.

From a conservation and management perspective for Yellowstone Cutthroat Trout and other native fish, these activities are high priorities for several reasons. SRC are one of two cutthroat trout subspecies native to the Upper Snake River watershed in Wyoming and Idaho (thought to have evolved from Yellowstone Cutthroat Trout). The Wyoming Game and Fish Department manages Snake River Cutthroat Trout as a distinct subspecies and population, however, federal agencies do not. Today, genetically pure Yellowstone Cutthroat Trout are found in less than half of their historic range. Despite an earlier petition, the species is not Federally listed under the ESA, but is widely characterized as a "sensitive species" or "species of special concern" by agencies.

A multi-agency group of researchers and managers recently developed a framework for assessing Yellowstone Cutthroat Trout populations (including Snake River Cutthroat) to prioritize range-wide conservation and management actions that focus on maintaining life history diversity, genetic purity, population resilience, and climate resilience (Al-Chokachy et al. 2018), that identified much of the Upper Snake River and its tributaries, including Spread Creek, as among the highest priority areas. Since the Spread Creek project addresses the only remaining anthropogenic barrier to fish passage on Spread Creek, it is a very high priority project that will improve and maintain connectivity for fish to access cold water habitat and a diversity of habitat types from the Snake River mainstem to its headwaters.

Partners:

- Trout Unlimited
- Grand Teton National Park
- Bridger-Teton National Forest
- Jason Hole Trout Unlimited
- National Fish and Wildlife Foundation
- Teton Conservation District
- Snake River Fund
- U.S. Fish and Wildlife Service
- Vail Resorts Epic promise
- Wyoming Game and Fish Department
- WorldCast Anglers
- Wyoming Water Development Commission
- Western Native Trout Initiative

Project Monitoring: A project monitoring plan will be developed by Grand Teton National Park and Trout Unlimited to assess the success of the project. Daily operations and maintenance of the fish screen and diversion will be primarily conducted by GTNP and private water users. Follow-up sampling on the irrigation ditches will be conducted by Grand Teton National Park, Wyoming Game and Fish Department, U.S. Forest Service, and Trout Unlimited to quantify the success of the fish screening component of the project, with an expectation that no native fish will be captured in the ditch after the installation of the fish screen. This will demonstrate that the 1 identified passage barrier, the Spread Creek irrigation system, has been addressed, and the 5 miles of stream between the fish screen and the Snake River confluence have been opened to out-migrating native fish. Pre- and post-construction longitudinal profile and channel cross-section measurements, bank erosion rates, photo points, and aerial video comparisons by drone will be incorporated into the monitoring plan to verify that the diversion, bank, and channel stabilization work have been built according to specifications and are maintaining over time. The number of community presentations, educational outreach, and volunteers involved in the project will be tracked by Trout Unlimited. An operations and maintenance plan for the fish screen and diversion will be completed by design consultants and will be adopted by Grand Teton National Park for long-term maintenance and monitoring.

Funding Source(s): National Fish Passage Program

Project cost: \$50,000

Start Date: 08/04/2019 **Completion Date:** 03/31/2021

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