

Tincup Creek Stream Restoration Project, Phase 3

State(s): Wyoming/Idaho

Managing Agency/Organization: Trout Unlimited

Type of Organization: Nonprofit

Project Status: Underway

Project type: WNTI Project

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

Trout species benefitted: Yellowstone Cutthroat Trout

Population: Salt River/Tincup Creek

Project summary: The Tincup Creek Stream Restoration Project is a large-scale, multi-phased project to improve ecosystem function and habitat for Yellowstone cutthroat trout and other native species by restoring channel and floodplain function on 4 miles of degraded stream. The Tincup Creek Stream Restoration project will improve riparian conditions and habitat for Yellowstone cutthroat trout (YCT), northern leatherside chub, boreal toads, and western pearlshell mussels. These are all native species with special management emphasis. Because of the assemblage of these native species, and the degraded yet recoverable nature of this system, Trout Unlimited (TU) and the Caribou-Targhee National Forest (CTNF) have chosen to focus efforts here. The primary cause for the degraded state of the stream has been linked to aerial spraying of willows in 1956, which precipitated the subsequent unraveling of the stream system. The project will accomplish a long-term vision of restoration for YCT and other native species by focusing on restoring channel and floodplain function and processes. Primary restoration methods will include restoring eroding meander bends using bioengineering techniques, reconnecting old meanders, and raising riffle elevations. This application is for Phase 3 funding. Phase 1 received funding support from DFHP and [WNTI](#); Phase 2 received funding support from [WNTI](#).

Problem the Project Addresses: The ecosystem function and habitat in Tincup Creek within the project area has been impaired and degraded for over 60 years. A review of historical aerial photos and on-the-ground knowledge shows a system that was very much intact in 1953 as primarily a single-thread channel with a high density of willows. In 1956, aerial spraying conducted in the drainage eliminated a majority of the willows. Remnants of the historic channel indicate historic bank full widths of 15 feet, versus bank full widths of up to 30 feet found currently. The 1978 photos show a stream that became a braided, over-widened gravel bed system, while willows gradually returned. Currently, the willow community has greatly recovered. However, there are lingering effects to the system that will take decades to recover without restoration or intervention. The evidence of this degradation is the many outside meander bends that are raw, vertical and eroding, rather than stabilized by willows. Further adding to the impairment is the loss of channel length due to meander cutoffs, the resulting steepening of the gradient, and the 1 to 2 foot downcutting of the channel, leading to an unhealthy, disconnected floodplain and riparian zone.

While habitat is slowly recovering since 1956, recovery is intermittent. Eroding outside meander bends, loss of meander bends due to channel instability, and resultant downcutting are all unlikely to heal within the next 100 years without intervention. At the same time, the system is not so greatly impaired that the native species populations are lost or unrecoverable. Throughout the project area, there are short sections of intact habitat that provide reference reaches and an indication of how the stream formerly functioned. Project partners believe they have identified the reason for the degradation and instability in the system and are therefore confident that they can be successfully addressed, resulting in restored and improved habitat.

The present habitat is extremely lacking in complexity, as it is over-widened and devoid of stabilizing willow cover on many of the outside meanders, which are migrating faster than point bars can develop and vegetate. Multiple-pass electrofishing surveys of 115 meter units averaged 3.7 native YCT >100mm per unit. Mainly larger trout were sampled, indicating poor rearing habitat and recruitment due to a lack of habitat complexity that likely also disproportionately affects smaller native non-game fishes like Northern Leatherside chub. Fine sediment is abundant in the lower reaches of the project. Restoration treatments will address these issues.

This project is not being designed to stabilize the stream in place, but rather to re-elevate it to restore the functions and processes that make for healthy habitat, floodplains and riparian zones. By focusing on restoring floodplain connectivity, proper channel dimensions, and old meanders, using native willows and sod as well as imported wood, habitat for all native species will be improved.

Objectives: The project's goals are to restore stream processes and function, so that all parts of the aquatic system are able to interact with each other. By setting the system up to function properly, habitat complexity will increase through time and will promote a diverse native species assemblage including all life stages of

YCT, northern leatherside chub, boreal toad, western pearlshell mussels and pilose crayfish – all native species with special management emphasis.

- Objective 1: re-elevate the stream so it is reconnected to the floodplain by elevating riffles, narrowing the channel, and decreasing slope by reconnecting meander cutoffs.
- Objective 2: restore eroding banks (80% streambank stability target) by re-sloping them and planting whole willow clumps and sod mats.
- Objective 3: improve habitat complexity for the benefit of YCT and all native species in the project area through the above techniques as well as by incorporating large woody debris into meander cutoff plugs, leaving connected backwater channels when restoring meanders, creating or connecting off-channel ponds, and encouraging beaver dams to achieve more frequent overland flow during runoff.
- Objective 4: engage community volunteers interested in fish conservation and angling in restoration activities to learn about and cultivate a connection to the resource.

Five miles of degraded stream will be restored throughout all phases. Many benefits are expected, including a healthier floodplain and riparian area – with a shift toward more mesic species in the floodplain as overland flow increases, especially in the spring. Beaver activity is expected to increase as runoff forces are better dissipated on the floodplain instead of staying in-channel. Habitat diversity and complexity are expected to increase with more rearing and hiding cover available to all life stages of YCT and other native fishes. The sediment load in the system will decrease due to the treatment of eroding banks. Sediment deposition will also decrease as the channel is narrowed and fines are more easily transported down the system. These improvements should result in higher reproductive success and recruitment, with surges expected in population densities of all native fishes due to a healthy and functioning riparian system that continues to improve through time.

Phase 3 deliverables:

Phase 3 A - 2019

- 4,730 feet of channel to be elevated and treated.
- Reconnect up to 4 historic meander bends, adding 1,600 feet of stream channel.
- 150 large trees to be placed at about 14 locations
- 22 riparian acres improved

Phase 3 B – 2020

- 5,375 feet of channel to be elevated and treated.
- Reconnect 2 historic meander bends, adding 920 feet of stream channel.
- 100 large trees to be placed at 11 locations
- 26 riparian acres improved

Partners:

- Trout Unlimited - National
- U.S. Forest Service – Caribou-Targhee National Forest
- Desert Fish Habitat Partnership
- U.S. Fish and Wildlife Service – Idaho office
- Idaho Department of Fish and Game
- Idaho Department of Environmental Quality
- National Forest Foundation
- Jackson Hole One Fly Foundation
- Trout Unlimited - Jackson Hole chapter
- Trout Unlimited – Snake River Cutthroats Chapter
- Trout Unlimited – Star Valley Chapter

Project Monitoring: Evaluation: The metrics used to evaluate the primary objective of reconnecting the stream to its floodplain will include before-and-after comparisons of channel measurements at predetermined cross-sections and longitudinal profiles. The metrics used to evaluate the second objective of restoring eroding banks will be the successful establishment of willows and sod mats. The third objective of improving habitat complexity will be evaluated by large woody debris counts and native species population surveys outlined in the monitoring plan. The fourth objective will be evaluated by the project's total number of volunteer hours.

Monitoring: The monitoring plan includes the following: USFS and IDFG have conducted pre-project habitat and fish monitoring, with three sampling units established within the Phase 1 and 2 reaches in 2017 and three sampling units within the Phase 3 reach in 2018. Three representative sampling units outside of the project

area were also established – two upstream and one downstream. For Phase 3, additional pre-project sampling will be conducted in 2019 before the start of the project. Repetition of these surveys after completion of the full project will be used to determine species' response. Past population surveys for YCT (2016); northern leatherside chub (2015); and western pearlshell mussel (2018) may also be referenced. Project partners project a 4-fold increase in trout numbers and a doubling of the leatherside chub population estimate.

Aerial photography comparisons were used for project design and planning and will be used again to determine post-project changes in stream length and plan. Cross-sectional and longitudinal stream profiles used in design will also be repeated post-project to measure changes. Photo points will be established prior, during, and post-project implementation to show vegetation and channel changes, including comparison of stream recovery in fenced vs. non-fenced areas. Pre- and post- project drone monitoring will also be used to show vegetation and channel changes. Responsibility for long-term maintenance and monitoring of the project is with the USFS, with in-kind assistance from IDFG and TU.

A study of the western pearlshell mussels was also added in 2018 and will be repeated prior to excavation work each year. The translocated mussels have been tagged so recovery and population estimates can be made. Report will be made available through Xerces Society.

Funding Source(s): National Fish Habitat Action Plan

Project cost: \$40,000

Start Date: 09/01/2019 **Completion Date:** 9/30/2020

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