Rainey Creek Restoration, Bridge-to-Bridge Phase 2

State(s): Idaho
Managing Agency/Organization: Henry's Fork Foundation
Type of Organization: Nonprofit
Project Status: Ongoing
Project type: WNTI Project
Project action(s): Riparian or Instream Habitat Restoration, Watershed or Population Assessment, Monitoring, Education/Outreach. Project assesses one population and restores or enhances 0.34 stream miles of Rainey Creek directly adjacent to a reach previously restored in 2020. A total of 0.6 miles of continuous, high quality habitat will be restored between the two project phases, in a highly visible and publicly accessible reach of Rainy Creek in Swan Valley, Idaho.
Trout species benefitted: Yellowstone Cutthroat Trout
Population: South Fork Snake River watershed and Rainey Creek sub-watershed

Project summary: Since the 1970's, native populations of Yellowstone Cutthroat Trout (YCT) have declined due to habitat degradation, and competition and introgression from non-native species. The South Fork Snake River (SFSR) from Palisades Dam to the confluence of the Henry's Fork River is home to the largest population of native YCT in the state of Idaho. Tributaries of the SFSR provide critical spawning and rearing habitat for a significant portion of the SFSR YCT population. There are four primary tributaries to the SFSR that are utilized by YCT for spawning and juvenile rearing. Long-term Idaho Department of Fish and Game (IDFG) spawning run data from weirs and traps operated on the four tributaries show that Rainey Creek, the largest of the tributaries, supports a fraction of YCT relative to the three smaller SFSR tributaries. On average, the three smaller SFSR tributaries support 1500, 2000, and 900 adult YCT annually while Rainey Creek supports an average of 30 adult YCT annually.

Prior management efforts, including limiting Rainbow Trout invasion and screening of irrigation diversions, have not yielded increases in YCT production in Rainey Creek. Unlike the three smaller SFSR tributaries, the lower reach of Rainey Creek has been heavily impacted by historic farming and ranching practices, and it is likely that poor habitat quality in the lower five miles of Rainey Creek is limiting YCT production. Additionally, this theory is supported by IDFG telemetry research that indicates Cutthroat Trout regularly try to use this heavily degraded reach for spawning habitat. A recently completed watershed assessment of lower Rainey Creek identified significant groundwater returns that would likely provide consistent inputs of clean, cold, water if it were not for the widening, impounding, and siltation in the reach. It is expected that restoring the ecological processes and habitat in lower Rainey Creek would greatly increase YCT production to abundances similar to or greater than other SFSR tributaries.

Restoration strategies for this project will focus on addressing the mechanisms that make this reach unsuitable for YCT and other coldwater aquatic species. In particular, this reach has been heavily impacted by historic agricultural and ranching practices that have resulted in an over-widened channel, slow water velocity, shallow depth, sparse riparian vegetation, and very little habitat complexity. The accumulation of these impacts exposes the reach to solar loading, and consequently, high water temperatures during late summer and early fall. Idaho Department of Environmental Quality has identified lower Rainey Creek, including the restoration reach included in this restoration project, as "impaired" due to water temperatures that are unsuitable for cold water aquatic life and salmonid spawning. Objectives for the restoration include increasing water velocity, habitat complexity, stream cover, and reducing fine sediments in the channel. Restoration work will narrow shallow channels, remove fine sediment from the streambed, introduce gravels and cobbles into the system, and restructure the reach to incorporate deep pools, spawning-pool tail outs, riffles, and glides. Additionally, large woody debris and riparian vegetation will be placed and planted throughout restoration reach to provide cover and decrease solar loading, effectively decreasing water temperatures within, and below, the reach.

Not only will this project provide ecological benefits to Rainey Creek and the South Fork Snake River watershed, the visibility of the reach (adjacent to a new urban development and public pond, and visible from two highways) along with the collaborative nature of the project, will provide excellent outreach and educational opportunities. Involving the local community in restoration projects is a fantastic opportunity to foster appreciation for local natural resources and increase awareness about general native species conservation and restoration work.

Problem the Project Addresses: Prior management efforts, including limiting Rainbow Trout invasion and screening of irrigation diversions, have not yielded increases in Yellowstone Cutthroat Trout (YCT) production in Rainey Creek. Unlike the three smaller SFSR tributaries, the lower reach of Rainey Creek has been heavily impacted by historic farming and ranching practices, and it is likely that poor habitat quality in the lower five

miles of Rainey Creek is limiting YCT production. Additionally, this theory is supported by IDFG telemetry research that indicates YCT regularly try to use this heavily degraded reach for spawning habitat. A recently completed watershed assessment of lower Rainey Creek identified significant groundwater returns that would likely provide consistent inputs of clean, cold, water if it were not for the widening, impounding, and siltation in the reach. It is expected that restoring the ecological processes and habitat in lower Rainey Creek would greatly increase YCT production to abundances similar, or greater than, other SFSR tributaries.

Since 2018, Rainbow Trout and Rainbow/Cutthroat hybrid trout (hereafter referred jointly as RHT) have increased substantially in the SFSR and threaten to negatively impact YCT through increased interspecies competition and hybridization. The rapid increase in RHT abundances has put an emphasis on thwarting this trend by encouraging angler harvest of RHT through monetary incentives and active RHT removal by IDFG. Restoring lower Rainey Creek will compliment these management efforts by improving spawning and rearing habitat, increasing YCT production from the tributary, and helping protect genetically pure YCT. The proposed restoration project addresses the mechanisms that make the habitat unsuitable for native trout and other coldwater species, and the lasting effects of this project, as well as past and future restoration projects on Rainey Creek, will provide substantial benefits to the largest population of native YCT in Idaho.

Objectives: The objective of this project is to restore natural stream function and improve habitat quality for a 0.34 mile reach of lower Rainey Creek to benefit native fluvial Yellowstone Cutthroat Trout spawning and rearing, as well as improve habitat for other native, cold-water aquatic species. Specific action items include:

• Restore natural stream function by narrowing and restructuring 1,840 feet of stream channel.
• Introduce habitat complexity by decreasing channel width, increasing channel depth, increasing water velocity, and introducing riffle, run, pool complexes.
• Plant willows and cottonwood trees along the riparian zone to reduce solar loading, increase bank stability, and provide cover for aquatic species.
• Utilize large woody debris to help stabilize banks and increase available cover for aquatic species.

These actions will help address the mechanistic drivers that result in poor quality cold-water aquatic habitat. Additionally, this multi-year, multi-agency effort will be a key component for achieving Yellowstone Cutthroat Trout objectives outlined in IDFG species management plan with regards to increasing Yellowstone Cutthroat Trout abundance and protecting the genetic integrity of the population.

Partners:

- Henry's Fork Foundation
- Idaho Department of Fish and Game
- U.S. Fish and Wildlife Service
- USDA Forest Service: Caribou-Targhee National Forest
- Landowner
- Western Native Trout Initiative

Project Monitoring: The success of this project will be evaluated by an increase in annual spawning run counts of Yellowstone Cutthroat Trout at the Rainey Creek weir, visual monitoring of adult Yellowstone Cutthroat Trout using the restored habitat during spawning, and index counts of juvenile Cutthroat Trout occupying the reach in August obtained through single-pass electrofishing surveys. The success of this project may not be realized until 2-4 years after the completion of the restoration but Idaho Department of Fish and Game intends to operate the fish weir on Rainey Creek for the foreseeable future and monitoring of adult and juvenile Yellowstone Cutthroat Trout would occur for a minimum of four years after the restoration by Henry's Fork Foundation and Idaho Department of Fish and Game.

Funding Source(s): National Fish Habitat Action Plan
Project cost: $40,000
Start Date: 10/2022 **Completion Date:** 11/2024
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