

Cache la Poudre Headwaters Greenback Restoration: Corral Creek

State(s): Colorado

Managing Agency/Organization: U.S. Forest Service, Arapahoe and Roosevelt National Forests and Pawnee National Grassland

Type of Organization: Government

Project Status: Ongoing

Project type: WNTI Project

Project action(s): Barrier Removal or Construction, Watershed Connectivity, Monitoring, Education/Outreach. This phase secures 4.5 miles of stream and habitat, removes one barrier removed, and constructs one barrier. Upon completion of all phases of this project, 37 miles and 106 acres of lakes will be restored to support a Greenback Cutthroat Trout metapopulation.

Trout species benefitted: Greenback Cutthroat Trout

Population: Cache la Poudre River/Corral Creek

Project summary: The Poudre Headwaters Restoration Project is a large-scale partnership effort to establish a metapopulation of Greenback Cutthroat Trout in the headwaters of Colorado's only designated Wild & Scenic River, the Cache la Poudre River. Securing an extensive stream network within the broadly protected areas of Rocky Mountain National Park and the Roosevelt National Forest, the project is focused on securing a resilient stronghold as a centerpiece of Greenback Cutthroat Trout recovery. Native cutthroat trout restoration will be phased in over approximately 15-20 years across connected habitat patches that will ultimately provide habitat across 37 miles of stream and 106 acres of lakes/reservoirs. The project is a collaboration among the USDA Forest Service, National Park Service, Colorado Parks and Wildlife, and Trout Unlimited, with major funding support through a mitigation trust established by the Water Supply and Storage Company to address impacts of Long Draw Reservoir, located within the project area. Because of the scale and complexity of this restoration project, it will be implemented in a series of phases with temporary barriers established to secure sub-watersheds in the course of ultimately restoring and connecting the larger project area. This year of funding will support one of those phases: a fish barrier (and aquatic organism passage) structure on Corral Creek.

The Poudre River headwaters are marked by an extensive network of complex habitat well-suited for supporting self-sustaining native cutthroat trout. Much of the watershed is protected as designated Wilderness and is thus secure from potential development impacts. In 2020, however, the Cameron Peak fire burned through a portion of the Poudre Headwaters Project watershed. While post-fire on-the-ground assessment is not yet complete, the wildfire highlighted how even highly protected habitats can be vulnerable to disturbance, but also showed the value of restoring Greenback cutthroat trout at the large scale proposed with this project. The Cameron Peak fire is the largest in Colorado's recorded history, yet while it burned portions of this watershed it left others intact, including the Corral Creek subwatershed. In the wake of large wildfire disturbance, populations distributed across a branched habitat network are far more likely to harbor refuge habitats, which could provide a source of native fish for natural recolonization into other connected, yet fire-affected portions of the watershed.

The Corral Creek phase of the larger project focuses on installation of a combination aquatic organism passage and fish barrier structure where the stream is crossed by the Long Draw Road. The conceptual design for this site involves reconstructing the existing road-stream crossing (a perched culvert) with one that spans the stream channel and provides for fish passage from the cascade reach downstream of the road into the meadow reach upstream of the road. The aquatic organism passage installation will be completed by construction of a temporary low-head, channel-spanning dam immediately upstream of the crossing, allowing for both elements to be installed at one time and under one contract as well as facilitating easy removal of the temporary barrier to connect aquatic habitat once the downstream connected habitats have also been successfully reclaimed. The project will temporarily secure 4.5 miles of habitat for Greenback Cutthroat Trout restoration in Corral Creek, which will later be reconnected as part of the larger 37-mile stream network across the Poudre headwaters.

Following installation of the Corral Creek structure, and evaluation to confirm barrier effectiveness, the USDA Forest Service and Colorado Parks and Wildlife will collaborate on reclamation of the Corral Creek system. That in turn, following evaluation using electrofishing and eDNA sampling to confirm successful removal of non-native fish, will allow for restocking of the habitat with Greenback Cutthroat Trout.

Problem the Project Addresses: The Greenback Cutthroat Trout (*Oncorhynchus clarkii stomias*) (GBCT) is federally listed as a threatened species under the Endangered Species Act. Historically, the GBCT occupied coldwater habitats across the South Platte basin in Colorado and possibly into a small portion of Wyoming. The GBCT lost its foothold within that native range due to habitat loss and fragmentation and hybridization with and competition from non-native salmonids. GBCT had been reduced to one wild, self-sustaining population in Bear Creek near Colorado Springs – outside of its native range.

Since its rediscovery in Bear Creek, Colorado Trout Unlimited and agency partners including the USDA Forest Service and Colorado Parks and Wildlife have worked to secure GBCT with an eye to the three Rs of conservation biology: securing representation of this unique genetic lineage, creating redundancy by establishing new populations (including a wild broodstock) in different locations across its historic range, and promoting resiliency by restoring GBCT in larger connected habitat patches that are less vulnerable to loss in a single localized disturbance such as flood or fire. The Poudre Headwaters Project is at the heart of efforts to address the “resiliency” goals for GBCT. It will provide the largest restoration area for the species, spanning an extensive habitat network including 37 miles of stream and 106 acres of lakes/reservoirs.

With the exception of seasonal (winter) dewatering of La Poudre Pass Creek immediately below Long Draw Reservoir, habitat conditions through the watershed have been excellent offering an extensive network of complex habitat well-suited to native trout restoration. The Cache la Poudre River itself is designated under the Wild and Scenic Rivers Act and much of its watershed is protected as designated Wilderness and is thus secure from potential development impacts. In 2020, however, the Cameron Peak fire burned through a portion of the Poudre Headwaters Project watershed. Post-fire on-the-ground assessment is not yet complete, but the wildfire highlights how even highly protected habitats are vulnerable to disturbance. It also demonstrated the value of restoring GBCT on the large scale proposed with this project. The fire is the largest in Colorado’s recorded history, yet while it burned portions of the watershed it left others intact – including Corral Creek, the subwatershed where this project site is located. In a sense, the fire provided further proof of concept on the need for metapopulation-level restoration; in the wake of large wildfire disturbance, populations distributed across a branched habitat network are far more likely to harbor refuge habitats which can provide a source of native fish for natural recolonization into other connected yet fire-affected portions of the watershed.

At Corral Creek, the site-specific problem to be addressed by this project is two-fold. First, a perched culvert at the current road crossing represents a partial barrier to fish movement during low flows. Installation of a channel-wide aquatic organism passage (AOP) feature will provide consistently available connection of the 4.5 miles of habitat above the road crossing with the larger watershed downstream. Second, to facilitate restoration of GBCT within the watershed, a temporary barrier will be constructed at the top of the AOP installation. This will secure upstream habitat for reclamation to remove existing non-native fish from Corral Creek, after which GBCT will be reintroduced. When similar reclamation and reintroduction can be completed through the other phases of the multi-year 37 mile project, this barrier can then be removed to restore connectivity for the larger native trout metapopulation.

Objectives: This project will directly increase habitat availability for a recovery population of GBCT to be located in the Corral Creek sub-drainage, securing approximately 4.5 miles of total habitat. Just as significantly, the project will provide for future connectivity of the Corral Creek population with other GBCT in the broader Cache la Poudre watershed, thereby improving the resiliency of the population by connecting areas where following disturbances such as fire or flood, fish can naturally recolonize from undisturbed but connected habitats within the larger watershed.

The Corral Creek barrier and passage installation will occur outside of designated wilderness in close proximity to the Corral Creek trailhead, along the Long Draw Road (FSR 156). The existing crossing of Long Draw Road at Corral Creek is a metal pipe culvert with a small one foot perched outlet. The conceptual design for this barrier involves reconstructing the existing crossing for multiple management purposes including: (1) replacing the undersized culvert with one that will span the stream channel and provide ultimately for fish passage from the cascade reach downstream from the road into the meadow reach upstream from the road, and (2) reconstruction of a temporary low-head, channel-spanning dam immediately upstream of the road crossing to serve as a fish barrier to protect GBCT restoration habitat from upstream migration of non-native fish. An advantage of combining the two components is the ability to complete work on a single construction contract, lowering mobilization costs and having a design and location that facilitates relatively easy removal of the temporary barrier for reconnection of aquatic habitat once habitat between the temporary barrier and the downstream permanent barrier (on the Cache la Poudre River) has been successfully secured, reclaimed, and restocked with GBCT.

Partners: Colorado Parks and Wildlife, the US Fish and Wildlife Service, the USDA Forest Service, the National Park Service and Colorado Trout Unlimited have collaborated in the development of the Poudre Headwaters Restoration Project. Each group has contributed cash, in-kind services, or both to the effort. For the Corral Creek fish passage and barrier project, the USDA Forest Service will be the lead implementing agency, while Colorado Parks and Wildlife will play a greater role following successful installation of the barrier as work shifts to reclamation and reintroduction of GBCT. The Corral Creek project is part of the larger collaborative restoration in the Poudre Headwaters which also includes Rocky Mountain National Park (National Park Service) as a key partner for restoration within the park's boundaries on habitat including the Cache la Poudre, Willow Creek, and Hague Creek. The US Fish and Wildlife Service has provided technical guidance and support as well, including with evaluation of habitat in preparation for the restoration efforts within Rocky Mountain National Park.

The project also benefits from the financial contributions of the Water Supply and Storage Company (WSSC). To offset fish and wildlife impacts associated with the company's operation of Long Draw Reservoir within the Poudre headwaters, WSSC established a \$1.25 million trust fund to support implementation of the GBCT restoration project across the Poudre headwaters; Colorado Trout Unlimited serves as the Trustee managing the fund for benefit of the project under direction of the USDA Forest Service as the lead implementing agency. We estimate that the Trust will cover approximately 50% of total project costs over the 10-15 years of phased implementation.

Additional partners in the overall effort include Colorado State University – conducting related fisheries research in the project area as a living laboratory; and Trout Unlimited's Rocky Mountain Flycasters and Alpine Anglers chapters, which provide volunteer support for the agencies

- U.S. Forest Service: Arapahoe and Roosevelt National Forests and Pawnee National Grassland
- Colorado Parks and Wildlife
- Colorado Trout Unlimited
- Long Draw Reservoir Mitigation Trust
- National Park Service: Rocky Mountain National Park
- U.S. Fish and Wildlife Service
- Trout Unlimited Chapters: Rocky Mountain Flycasters, Alpine Anglers
- Western Native Trout Initiative

Project Monitoring: The USDA Forest Service will be responsible for long-term maintenance and monitoring of the project. The temporary barrier installation will be evaluated for at least one monitoring season to ensure its effectiveness in preventing upstream fish movement. Monitoring will use mark-recapture and Passive Integrated Transponder (PIT) Tagging and antenna technology coupled with electro-fishing to monitor the potential for movement past the barrier. Evaluations using fish jump performance modelling will also be applied to determine passage probability for peak flows exceeding those encountered during monitoring seasons. Following reclamation above the barrier, further monitoring will take place to verify successful removal of all non-native fish. Led by the USDA Forest Service, this monitoring will use electrofishing and eDNA sampling throughout habitats to confirm effective non-native fish removal. Once GBCT are reintroduced to the Corral Creek habitat above the temporary barrier, periodic monitoring (with USDA Forest Service and Colorado Parks and Wildlife) will continue through electrofishing to evaluate GBCT population status, including presence of multiple year classes reflecting successful reproduction and recruitment.

Funding Source(s): National Fish Habitat Action Plan

Project cost: \$85,000

Start Date: 06/2022 **Completion Date:** 11/2022

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