

Restoring the Northern Extent of Coastal Cutthroat Trout Habitat in the Copper River Watershed, AK

State(s): Alaska

Managing Agency/Organization: Copper River Watershed Project

Type of Organization: Non-profit

Project Status: Ongoing

Project type: WNTI Project

Project action(s): Barrier Removal or Construction, Watershed Connectivity, Education/Outreach. This project will reconnect or reopen 3.2 miles of stream, remove 1 barrier, and reconnect 12 acres of lake habitat.

Trout species benefitted: Coastal Cutthroat, Dolly Varden

Population: Black Hole Creek, Copper River Watershed

Project summary: The Copper River Watershed Project (CRWP) and partners are addressing one of the highest priority fish passage barriers in the Copper River watershed, located on the South Central coast of Alaska. The primary goal of this proposal is to replace an undersized and failing culvert on Black Hole Creek, a Coastal Cutthroat Trout stream on the Copper River delta. Stream flows at the crossing regularly exceed hydraulic capacity, impeding free migration of fish and causing scouring and sedimentation at the inlet leading to habitat degradation. As the culvert is located near the downstream extent of Black Hole Creek, this crossing impacts connectivity to the entire watershed and an estimated 3.2 stream miles of upstream habitat and 12 acres of lake habitat. Coastal Cutthroat Trout telemetry studies conducted on the Copper River Delta showed a variety of migratory strategies and spawning was most concentrated in the upper portions of the study streams and occurred upstream to the highest available areas (Saiget et al. 2008). According to Stearns (1976) the presence of multiple migratory strategies enables long-term population resiliency, then the persistence of coastal cutthroat trout will require maintenance and connectivity of the critical habitat types located across the delta

Problem the Project Addresses: The Copper River watershed in southcentral Alaska is the northern range for both Coastal Cutthroat Trout and Rainbow Trout. Although the watershed is considered relatively pristine, the drainage has hundreds of stream crossings, an average of roughly one culvert for every two miles of road. Many of these culverts have impaired fish passage and altered the natural hydrology necessary to maintain the overall ecosystem health. Studies have shown that the majority of negative impacts on trout survival are altered habitat and passage issues occurring in the lower reaches of most tributaries. Connectivity within headwater reaches and between headwater and downstream reaches is an important part of their life history. Therefore, efforts to improve aquatic organism passage by replacing undersized culverts in the Copper River watershed will benefit both juvenile and adult trout.

Undersized culverts contribute to fish mortality by delaying movements during seasonal migrations. With weather extremes becoming more frequent, the ability to migrate to areas with more favorable conditions is crucial for survival. Undersized culverts also alter sediment transport thus affecting stream morphology and channel bed stability. Habitat connectivity allows for gene flow resulting in greater genetic diversity, ultimately increasing the ability of populations to persist and adapt to environmental changes. With warmer waters and habitat degradation in the lower 48 threatening western trout populations, investing in habitat connectivity in the still-healthy watershed of the Copper River will help sustain abundant wild trout populations into the future.

The crossing at Black Hole Creek is rated Red by Alaska Department of Fish and Game fish passage criteria and is a partial barrier to upstream fish migration as well as causing disruption to natural hydrology. Black Hole Creek is a rain-driven upland system that flows into the Alaganik Slough, a popular sportfishing and subsistence fishing system on the delta. Black Hole Creek is bedrock controlled and heavily forested along its mainstem and juvenile Cutthroat Trout are known locally to prefer these systems with abundant shade and deep pools. The watershed also contains two lakes and small muskeg channels where both anadromous and potamodromous populations of Cutthroat Trout spawn. The extremely undersized culvert at Black Hole Creek is a velocity barrier to juvenile fish and adults during medium-high to high flows. The culvert impedes access to 3.2 miles of upstream habitat and 12 acres of lake habitat for Cutthroat Trout, Dolly Varden, and Coho Salmon spawning and rearing. Final designs to replace the culvert with a channel-spanning structure that will provide unimpeded access for all aquatic organisms will be completed by fall 2022.

Objectives:

- Replace the undersized culvert on Black Hole Creek on the Copper River Delta by September 2023, improving habitat quality and fish passage for Coastal Cutthroat Trout, Dolly Varden, and Coho

Salmon on the Copper River delta. Removing this barrier will remove and replace a barrier that is currently the second-highest-scoring culvert in the watershed, and the highest priority for removal on the Copper River Highway based on a prioritization tool, developed in cooperation with Alaska Department of Fish & Game, U.S. Fish & Wildlife Service and other partners.

- Help the Chugach National Forest move closer to their goal of being the first barrier-free National Forest in the country

Partners:

- Copper River Watershed Project
- Alaska Department of Fish and Game
- U.S. Forest Service: Chugach National Forest
- U.S. Fish and Wildlife Service
- National Oceanic and Atmospheric Administration (NOAA)
- Alaska Department of Transportation
- Exxon Valdez Oil Spill Trustee Council
- Western Native Trout Initiative

Since 2008, CRWP and their partners have been working to prioritize restoration projects in the Copper River watershed to maximize the benefit of limited restoration dollars to aquatic organisms in the watershed. Initially CRWP worked with partners at the ADFG, USFWS, BLM, USFS, Wrangell-St. Elias National Park, Ecotrust, and ADOT to develop a scoring criterion for fish passage, where scores are given based on accessibility and habitat quality and quantity within the same system. The highest-priority crossings are the highest-scoring culverts in both ecological and fish passage categories. They have identified 233 culverts on potential fish streams in the Copper River watershed. To date, CRWP has conducted and scored 111 culvert surveys, generated scores for an additional 107 culvert surveys conducted by ADFG, and conducted and scored 233 habitat surveys. CRWP worked with partners to develop an online mapper for storing and displaying data. Each culvert is represented by a push-pin marker on an ESRI map. Each pin can display habitat and fish passage scores, survey details, and photos of that individual culvert.

USFS, USFWS, ADFG, NOAA, ADOT, and CRWP received funding from the Exxon Valdez Oil Spill Trustee Council (EVOSTC) to address this crossing along with twelve other barriers on the Copper River Delta. This funding was used to cover the preliminary investigations, including geotechnical investigations, site surveys, and 95% designs. We will use EVOSTC funding in order to fund the final design, construction, construction inspection, and monitoring at this site.

Project Monitoring: Monitoring the effectiveness of the Black Hole Creek project will be conducted through channel surveys, fish use and distribution upstream, and photo point documentation. Longitudinal profiles and cross-sections have been completed at a reference reach to determine the natural stream morphology. Channel profiles of the current structure and adjacent channels were also taken. Post-construction channel surveys will be carried out by USFS two years after the restoration work to allow time for the channel profile to stabilize in the new crossing. Longitudinal stream profile monitoring through the structure will quantify changes in channel profile and function using procedures for channel profile measurement. USFS will use fish surveys to investigate fish presence and distribution pre and post-construction. Capture methods will be appropriate for the habitat unit, and may include baited traps, nets, snorkeling, or electrofishing. Capture methods will be approved in advance by the ADFG and will be conducted in a manner that minimizes stress and disturbance to fish. After capture, fish will be identified, measured, and released into the habitat feature where they were captured. At least two fish surveys will be conducted to capture differences in fish presence associated with life stage and season. CRWP will be responsible for photo point documentation pre- and post-construction..

Funding Source(s): National Fish Habitat Action Plan

Project cost: \$46,750 WNTI Funds, Total project cost \$1,820,489

Start Date: 03/2023 **Completion Date:** 12/2024

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