

Implementing Actions to Recover Native Lahontan Cutthroat Trout in the Upper Walker Basin

State(s): California

Managing Agency/Organization: California Trout (AKA CalTrout)

Type of Organization: Non-profit

Project Status: Ongoing

Project type: WNTI Project

Project action(s): Removal of Non-Native Species, Monitoring, Education/Outreach. This Project phase dewater 3 miles of stream to remove Brook Trout, and restores 11.5 miles of stream and habitat for Lahontan Cutthroat Trout.

Trout species benefitted: Lahontan Cutthroat Trout

Population: Upper Walker Basin/Lahontan Basin

Project summary: Federally threatened Lahontan Cutthroat Trout (*Oncorhynchus clarkii henshawi*; LCT) are native to the Lahontan Basin, which in California includes the Truckee, Carson, and Walker River drainages. Silver Creek, a snow-fed tributary to the West Walker River on the east side of the Sierra Nevada Mountains in the Humboldt-Toiyabe National Forest, contains a refuge population of LCT upstream of a natural fish passage barrier. However, Silver Creek also contains non-native Brook Trout (*Salvelinus fontinalis*) which negatively impacts native LCT due to their high population density, aggressive feeding behavior, rapid growth rate, and high fecundity. Extensive efforts to remove these non-native trout over the past three decades with rotenone, traps, exclusion fences, and electrofishing have not been effective. Recent pilot efforts by California Department of Fish and Wildlife (CDFW) biologists have successfully implemented a methodology of dewatering small reaches of the 11.5 miles of LCT habitat, followed by electrofishing to extirpate Brook Trout from treated areas. Based on preliminary data, this method improves removal efficiency by over 300%, making this the only feasible option remaining for Brook Trout removal. This approach is modified from one successfully used for Owens Pupfish restoration at River Springs.

This project is timely in protecting these at-risk fragmented populations from the impacts of climate change, which have become an increasing threat to LCT, forcing rescue operations to prevent LCT extirpation from smaller streams. Silver Creek is a third-order stream, with a drought-resistant flow regime fed by both snowmelt and spring discharge. This makes Silver Creek an excellent option for native trout restoration. Refuge populations in drought-resistant, larger streams - such as Silver Creek- are necessary to build resilience to climate change and ensure the long-term survival of LCT. The method proposed here is an important pilot for other medium to large streams where native trout are threatened by invasive species. It provides a reproducible approach for mechanical removal projects on larger streams that will provide more resiliency to the increasing threats of climate change.

Problem the Project Addresses: Federally Threatened LCT have been extirpated from most of their range due to dam construction, habitat fragmentation, and the introduction of nonnative species (Behnke 1992). Walker River basin LCT are isolated to a few small headwater tributaries that are vulnerable to drought, wildfire, and nonnative species. Silver Creek, a tributary to the West Walker River in Mono County, within the Humboldt-Toiyabe National Forest, contains a refuge population of LCT upstream of a fish barrier. Silver Creek currently holds both LCT and non-native Brook Trout which were introduced into Silver Creek to provide a sport fishery. Brook Trout negatively affect stream-resident populations of LCT due to their comparatively high population density, aggressive feeding behavior, rapid growth rate, and high fecundity.

This project implements native LCT habitat restoration, population surveys, water quality enhancement, and public outreach as a multi-pronged approach to restore and protect LCT populations within their native range. It will provide training and standardized methodology for agency biologists and planners to learn field techniques, apply the approach more broadly in the Sierra streams, and integrate this non-native trout management approach into natural resource management planning documents

Apart from Brook Trout, the habitat in Silver Creek is in excellent condition. It contains a mix of habitat types including high-gradient boulder cascades and several large low-gradient meadows with excellent spawning habitat. Depending on the water year, as many as eight small tributaries have been observed holding fish, and some have been observed to provide important spawning habitat. A Forest Service road runs parallel to the lower half of the section and an unmaintained trail provides access to the headwaters. This area is used by the United States Marine Corps Mountain Warfare Training Center and as a result, can have heavy foot traffic. The area is also actively grazed by sheep during the summer. There is likely some erosion and pollution

from these sources; however, the impact on the stream habitat and the resident trout population appears to be minimal. Brook Trout are currently the primary threat to LCT in Silver Creek.

Periodic electrofishing efforts at Silver Creek since 2004 have reduced the Brook Trout population and allowed the LCT population to persist. However, without the complete eradication of Brook Trout, long-term survival of LCT is unlikely in Silver Creek. Previous efforts in 2012-2015 utilized electrofishing as the primary method for mechanical removal. Two Alaskan-style weirs were also constructed to help divide the creek and facilitate eradication. In 2016 and 2017 a more comprehensive effort examined the feasibility of successful eradication using electrofishing alone. It was determined that the size and flows of Silver Creek were too great for electrofishing to be successful for complete eradication and other methods should be developed.

In 2020 a new project was initiated that applies dewatering methods similar to those used in the successful Owens Pupfish restoration at River Spring Lake Ecological Reserve in Mono County, CA. This proposal is a one-year segment of a multi-year program with the goal of complete eradication from the upper section of Silver Creek.

Climate change has become an increasing threat to LCT, forcing rescue operations to prevent LCT extirpation from smaller streams. Refuge populations in larger streams are necessary to build resiliency to climate change and ensure the long-term survival of LCT. Electrofishing is less effective in larger streams and rarely leads to the complete eradication of nonnative trout. This method is an important pilot for other medium to large streams where native trout are threatened by invasive species and provides a reproducible approach for mechanical removal projects on large streams that will provide more resiliency to the increasing impacts of climate change.

Objectives: This project is part of a watershed-scale effort to eradicate non-native Brook Trout from Silver Creek to protect the native Lahontan Cutthroat Trout (LCT) population. Five SMART Objectives are the foundation of the proposed project. 1) dewater 3 miles of Silver Creek and remove all Brook Trout over one year; 2) conduct follow-up monitoring to determine the effectiveness of Brook Trout removal; 3) evaluate the transferability of the dewatering protocol to other regional LCT streams and restoration sites by conducting feasibility studies in two other streams; 4) build partnerships with other non-profit organizations and agencies and provide training for dewatering, removal, and monitoring; 5) perform public outreach in the Eastern Sierra and statewide about watershed health and native trout.

Partners:

- California Trout
- U.S. Forest Service: Humboldt-Toiyabe National Forest
- California Department of Fish and Wildlife
- Trout Unlimited
- Western Native Trout Initiative

Project Monitoring: A Smith-Root backpack electrofishing unit will be used to complete a minimum of three electrofishing passes through any remaining water in the dewatered channel following stream diversion to assess project efficiency. Block nets may be installed where appropriate to isolate rewatered habitats and enhance capture efficiency. Based on previous work in 2020/2021, multi-pass electrofishing within the dewatered channel yields an average detection probability of 0.96 (96%. range:0.88-1.0). A threshold of 99.9% reduction in Brook Trout catch/unit effort will be used as the success criteria to determine when to proceed to the next section. Repeat electrofishing in the treated reaches will be performed two weeks following the rewatering to assess the durability of the effort. The presence of LCT and Brook Trout will be assessed via environmental DNA, performed at stretches of Silver Creek, in which 15 eDNA sites, spaced out 400-800m along the channel will be sampled.

Funding Source(s): National Fish Habitat Action Plan

Project cost: \$55,666 WNTI Funds, Total project cost \$155,059

Start Date: 07/2023 **Completion Date:** 6/2024

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