Gulch C Coho Salmon Fish Passage Improvement Project *(amended)*

Recipient: Trout Unlimited, Inc.
Project Period: 10/01/2020 – 10/29/2021
Award Amount: $50,000
Matching Contributions: $61,655
Project Number: #8006.20.070765

Summary of Accomplishments

The project restored access for adult and juvenile Coho Salmon and Steelhead Trout to approximately 1.3 miles of habitat upstream of two salmon migration barriers and improved the geomorphic function of Gulch C a tributary to the Noyo River, in Mendocino County, CA. The purpose of the project was to replace one railroad-stream crossing along the Mendocino Railway (aka Skunk Train) and one road stream crossing on a timber haul-road owned by Soper-Wheeler Company with facilities that meet State and Federal design criteria transportation, fish passage, conveyance of flood flows and debris, and minimize inspection and maintenance needs. The project specifically addresses the National Marine Fisheries Service Recovery Plan for endangered Central California Coast Coho Salmon Action Step #NoR-CCC-6.1.1.1. Funding for this restoration project was provided (in part) by the California Department of Fish and Wildlife, Office of Spill Prevention and Response and the Fisheries Restoration Grants Program as well as by the National Oceanic and Atmospheric Administration's Restoration Center, The Nature Conservancy, the Salmon Restoration Association, and through in-kind contributions from the Mendocino Railway. The funds provided by the CDFW Office of Spill Prevention and Response were provided to support construction expenses for activities that were not originally incorporated into the engineered designs.

Project Activities

Project activities began in May 2019 when the Notice to Proceed was issued by the CDFW Fisheries Restoration Grants Program (primary funder). TU held a project kick-off meeting on January 17, 2020, to coordinate pre-construction activities. Landowner access agreements were executed between TU and Soper-Wheeler Company as well as with Mendocino Railway. Subcontracts were established between TU and its subcontractors, Mendocino Railway, Michael Love and Associates (MLA), Ross Taylor and Associates (RTA), and Humboldt State University's Cultural Resource Facility. The construction contractor was selected through a competitive process led by Mendocino Railway, and Granite Construction was awarded a contract in April 2020. Humboldt State University conducted the cultural, botanical, and paleontological surveys required for the CDFW LSAA permit.

TU staff prepared and submitted the permit application, and the permits were authorized prior to construction which began on June 15, 2020 and was completed by October 31, 2020.

The project implementation included installing a 20-foot diameter structural steel plate (SSP) culvert placed (beneath the rail) at a 2.6% slope with the invert embedded 4 feet below the overall design profile and, a 50-foot span prefabricated bridge with steel girders and concrete decking (at timber road crossing). Additionally, the project restored channel conditions near the confluence with the Noyo River to the existing channel upstream, for a length of 385 feet. The restored channel bed was constructed with large wood that controls the channel profile by creating discrete steps (i.e. log steps in channel) and forcing riffle-pool bed morphology. A total of 13 steps were constructed to serve as forcing features; there were four rock steps nine log steps. The nine log weirs steps were constructed through the project reach, consisting of a top log and a footer log, combined training logs on each side that focus the water toward the center of the channel and reduce risk of flanking. Large, imported boulders were used as ballast and logs were anchored together. Root wads salvaged from large redwood trees removed during construction were used to protect the streambanks in two locations. The first is at the upstream end of the project where a plug was placed into the existing channel as part of the channel reroute. These root wads were placed on the outside of the bend with the bole sticking up and the stem buried into the bank. The second location for root wad placements was downstream of the rail culvert outlet.

Specific activities associated with the NFWF-OSPR award occurred during the last month of construction October 1, 2020 to October31, 2020. In early August 2020, TU was notified by Mendocino Railway subcontractors, AECOM, Inc. and Granite Inc., that additional materials (e.g., rock and concrete) were required to ensure that the rail and road crossing were structural sound and adequately protected. To maintain the construction schedule, TU needed to immediately address the gap in funds required to complete the project. TU identified funds within existing awards to address $60,084 of the costs and secured an additional $10,000 from The Nature Conservancy. This award of $50,000 addressed the final amount required to cover the gap created by the additional expenses.

During the term of this project, the following work activities were completed:

1. Constructing the abutments and erecting the prefabricated bridge and railing on the timber haul road.
2. Replacing native back fill with engineered backfill at the rail crossing.
3. Replacing the track bed (and associated earthwork/sub-ballast) at the rail crossing.
4. Constructing the structural concrete slab with rebar at the rail crossing.
5. Installing Erosion Control and revegetation (entire project site).
6. Engineering Oversight, Inspection, and As-built Surveys

The overall construction activities included removing the old culverts d (2), stream channel was excavated, streambed and bank materials were placed, large wood log step weirs (9) and root wads (4) were installed in the channel, the culvert was erected and the engineered backfill and structural pad were installed, the bridge abutments were constructed, and rock slope protection was added, and the bridge and railing were installed.

Construction oversight was provided by MLA and AECOM. Construction activities were completed

between June 15 and October 31, 2020. TU employees completed willow staking, spreading erosion control materials (e.g., rice straw and native grass mix). Post project monitoring and site inspection occurred following construction (using other funding). MLA conducted as-built surveys of the channels in December 2020. Ross Taylor and Associates completed post-project biological monitoring in June 2021; and AECOM delivered as-builts drawings in July 2021. Over the course of the 2021 winter, the Mendocino Railway observed some surface erosion along the face of the rail embankment and reported the rilling to TU and the project engineers. TU returned to the site and applied additional rice straw in the areas where surface erosion was occurring. TU and Mendocino Railway then worked with Granite Construction to develop a plan to repair the site in the Spring 2021 during dry conditions.

Project Outcomes

The project has restored access for juvenile and adult Coho Salmon and Steelhead Trout to approximately 1.3 miles of rearing habitat and restored geomorphic conditions in the lower reaches of Gulch C near the confluence with the Noyo River. Both barriers have been removed and replaced, and all the channel work is complete. In June 2021, fisheries biologists conducted post project validation surveys to determine if salmon had accessed the newly restored habitat. Despite below average rainfall and low summer baseflow juvenile Steelhead Trout were observed above the barrier sites. The Project Team experienced some discrepancies between what was anticipated to happen and what occurred. During construction there were additional structural materials that needed to be incorporated into the designs that were not originally accounted for and that resulted in this award. Also, it was not anticipated that any surface erosion would occur along the rail embankments following construction and the onset of winter precipitation.

Lessons Learned

Although it was unexpected, modifications to designs are not uncommon. This experience taught the Project Team that additional geotechnical investigations are advisable in this area. If additional boring information had been collected during the design phase, the engineers would have accounted for the need of additional aggregate. Also, advanced coordination with the manufacturer (Contech) of the corrugated culvert proposed for the rail crossing, may have informed the Project Team of the need to install a concrete pad to support the weight of the passenger train, prior to construction rather than mid-way through. The Project Team has completed designs on an additional barrier location along the Mendocino Railway (Duffy Gulch) and the lessons learned from the completion of this project will be conveyed to that site.

The surface erosion that occurred following construction and the onset of winter rainfall was not anticipated and was not related to the engineered designs. What the Project Team learned was that the construction contractor Granite had only conducted compaction tests along the center of the rail bed instead of testing the compaction along the center and shoulders. If the compaction tests had occurred along the shoulders the engineers and inspectors would have instructed Granite to compact these areas as designed. The reduced compaction of the rail bed and embankments resulted in the unexpected surface erosion and the need for Granite to return to the site to repair these areas. Granite returned during the Spring 2021 and compacted the rail bed and added appropriately sized aggregate in some areas as armor.

Dissemination

Although TU has developed some outreach materials related to the project results, these materials did not directly address lessons learned. If you would like a copy of the outreach materials developed for this project, please contact CDFW-OSPR.

POSTING OF FINAL REPORT: *This report and attached project documents may be shared by the Foundation and any Funding Source for the Project via their respective websites. In the event that the Recipient intends to claim that its final report or project documents contains material that does not have to be posted on such websites because it is protected from disclosure by statutory or regulatory provisions, the Recipient shall clearly mark all such potentially protected materials as "PROTECTED" and provide an explanation and complete citation to the statutory or regulatory source for such protection.*

Project Photos

Image 1: Rail Culvert before construction. View is from downstream looking upstream.

Image 2: Timber Road culvert before construction. View is culvert inlet, looking downstream.

Image 3: Rail culvert during construction.

Image 4: Rail culvert during construction.

Image 5: Concrete pad placed as structural support on rail bed.

Image 6: Timber Road after construction. View of bridge is from upstream project extant looking downstream.

Image 7: Log steps, photo taken at downstream project end, looking upstream.

Image 8: Rail culvert looking downstream, from bridge.

Image 9: Aerial view of upstream channel, during construction.

Image 10: Restored channel with winter base flow. View taken from bridge, looking upstream.