

DEADWOOD CREEK FISH PASSAGE IMPROVEMENT PROJECT



Coho Salmon in Deadwood Creek Project Area - November 2, 2004

FINAL REPORT

National Fish and Wildlife Foundation Project #2002-0368-014

CA Department of Fish and Game Fisheries Restoration Grant Program #P0210426

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Project Summary

The purpose of this project was to provide for passage of all life stages of coho salmon, steelhead, and other anadromous salmonid species to the natural limits of anadromy (waterfalls) of Deadwood Creek, and to increase flood flow capacity through the road crossing at Deadwood Road.

This project was done through the cooperation of the Five Counties Salmonid Conservation Program (5C); the Trinity County Department of Transportation in consultation with National Oceanic and Atmospheric Administration (NOAA) Fisheries Branch staff, especially Jon Mann and Margaret Tauzer, and Jim Thompson of the CA Department of Fish and Game; and, the Trinity County Resource Conservation District.

The project was divided into three phases: Phase 1 included the design, engineering and permitting for the project and was completed in 2003-2004. Phase 2 included the purchase of materials and supplies for baffle construction, overflow culvert installation, placement of rock slope protection, revegetation, and the pre-fabrication of six steel plate baffles. Phase 2 work was completed in the fall of 2004. Phase 3 included the stream diversion installation, fish relocation, and the baffle and weir installation. This Phase was completed from August through October, 2005. Phase 3 was postponed until the 2005 construction season to allow for weld design changes and to extend the period to complete construction, both of which contributed to keeping project costs within the budgeted amount.

This project utilized a variety of funding sources including: the National Fish and Wildlife Foundation; the California Department of Fish and Game's Fisheries Restoration Grant Program; the State Coastal Conservancy; and the Trinity County Department of Transportation (Tables 1 and Figure 1).

The design for the Deadwood project was completed in consultation with National Oceanic and Atmospheric Administration (NOAA) Fisheries Branch staff, especially Jon Mann and Margaret Tauzer, and Jim Thompson of the CA Department of Fish and Game. Subsequent to the original design, further engineering and biological review determined that the baffles could be placed approximately twenty feet apart within the culvert, rather than the originally planned ten foot spacing. This modification reduced the number of baffles required from twelve to six. It was also determined that the roughened riffle concept, proposed in the original project description, to be constructed downstream of the outlet pool may not be necessary. Overflow culverts were designed to compensate for the reduced capacity of the 96-inch culvert with the baffles installed. The original design only required one 48-inch diameter HDPE culvert, however, additional overflow capacity was provided with the placement of a second 48-inch diameter HPDE culvert. These design modifications were consistent with the available funding for the project.

Purpose and Need

This project is a portion of a much larger effort of the counties of Del Norte, Humboldt, Mendocino, Siskiyou, and Trinity to develop land use conservation standards and to implement changes in practices to reduce erosion and restore anadromous salmonid fisheries habitat within the Southern Oregon-Northern California Coho Evolutionarily Significant Unit (ESU). The implementation of the migration barrier component of the

5C Program is an essential step towards the delisting of the Coho salmon as a Federal and State listed Threatened species.

This project has also continued the series of 5C projects to maintain and restore steelhead habitat to avoid listing of this species as Threatened or Endangered. The continued need to implement restoration was noted by the National Marine Fisheries Service in 2000 as follows:

" NMFS intends to capitalize on the significant efforts being made by all entities, from the large-scale trans-boundary actions adopted via the Northwest Forest Plan and the Klamath and Trinity Rivers Restoration Acts to more localized efforts like those implemented under the Five Counties Salmon Conservation Program and the Scott River Watershed Council. These efforts, coupled with ESA protective regulations for listed coho salmon, will likely improve conditions for KMP steelhead as well." (Federal Register/Vol. 66, No. 65/Wednesday, April 4, 2001/Proposed Rules)

The Deadwood Creek culvert site was ranked as the 3rd highest priority migration barrier removal project in Trinity County and the 17th highest in all five counties, using the 5C priority ranking process (refer to the 5C website for the prioritization process and rankings: www.5counties.org). The high ranking was due to the quantity and quality of habitat available upstream, the consistent presence of these species in the stream system, and the undersized culvert. The California Coho Recovery Strategy (2004) indicates that the Deadwood Creek watershed is a high priority watershed for coho salmon based on population, habitat condition and at risk factors.

Project Location, Analysis of Barrier and Treatment

The existing Deadwood Creek culvert is a 120-foot, 96-inch (8-foot) diameter, corrugated metal pipe installed at a 0.05% grade. It is located 200-feet upstream of the confluence with the Trinity River. The project site is located on Deadwood Road (County Road #211) approximately 100 feet north of its intersection with Trinity Dam Boulevard in the Lewiston area of Trinity County. The project is located in Section 17, T33N, R8W, MDBM and is within the county road right-of-way. The property ownership adjacent the project area is private, Bureau of Land Management and US Forest Service. Due to the proximity of the project area to a residence, 5C staff mailed notification of construction timing and activities in 2004 and 2005 to the landowner.

The culvert was identified as a migration barrier to anadromous salmonids due to the length and inner flow velocity (Fish Xing Software analysis and on-site measurements; Ross Taylor, 2002). The FishXing software estimated that the crossing met passage criteria for all species of adult salmonids over approximately 12% of the range of migration flows and on less than 5% of migration flows for all age classes of juveniles. It was also identified as significantly undersized for flood capacity, including debris and bedload materials. A partial rock weir, located approximately 25 feet downstream of the crossing, backwatered the culvert outlet to some extent but the need for a newly constructed roughened riffle, composed of large boulders in the downstream reaches, was proposed as part of the original design. This roughened channel would have created pool and riffle areas during low water flow. The concept was re-evaluated in August 2005 by Jim Thompson and Tim Viel (NRCS fishery biologist). Given that the downstream channel already has significant boulders that create pool/riffle habitat, the

need to construct an improved “channel” was deemed unnecessary. The existing rock weir, located approximately 25 feet downstream of the outlet, was reconstructed by the Trinity County Resource Conservation District upon baffle installation and will be continually monitored to insure an adequate backwater effect at the culvert outlet.

The cost to replace the crossing with a natural stream simulation structure (bridge or arch) that would pass the 100-year storm flows and allow full fish passage was estimated to cost \$750,000.00 or more. This option also would have required significant stream disturbance associated with new road construction for the temporary crossing. Based on the moderate extent of the barrier, a modified crossing consisting of baffles every twenty feet, construction of a downstream weir, and installation of two four-foot diameter HDPE overflow culverts would significantly improve adult and juvenile passage in an economical fashion.

Project Implementation

Prior to construction additional engineering and biological review resulted in design modifications to the original design (see above **Project Summary**).

The project was completed in three phases. Phase 1 included the engineering and design. This phase consisted of Carolyn Rourke and Darius Damonte (5C) conducting long profile and topographical surveys of the crossing. The work was completed under supervision of and training by Steve Roberts, a Trinity County Building and Development Services civil engineer. The overall design of the baffles and sizing of the overflow culverts was coordinated by Jon Mann and Margaret Tauzer of NOAA and Jim Thompson of CDFG. Janet Clements, Christine Jordan and Mark Lancaster (5C) completed the CEQA analysis with additional consultant fisheries and archaeological review. Jan Smith of the Trinity County Department of Transportation facilitated the Fish and Game permitting with 5C staff.

Phase 2 consisted of the overflow culvert installation and rock slope protection placement at their outlets and the revegetation of the disturbed fill slopes. The HDPE culverts were supplied by Groeniger & Co., located in Redding, California. The Trinity County Department of Transportation installed the overflow culverts and resurfaced the county road. The Trinity County Resource Conservation District completed the revegetation of the fill areas. Concrete Aggregates of Weaverville, California supplied the rock slope protection for the outlet of the overflow culverts as well as the Phase 3 concrete associated with baffle placement. Phase 3 included installation of the stream diversion in accordance with the CDFG Stream Alteration Agreement, installation of the steel corner baffles using rebar and concrete, and re-construction of the downstream weir to backwater the culvert outlet. Baffle materials were provided by Gerlinger Steel & Supply Co., also of Redding, California. The Trinity County Resource Conservation District was contracted to install the diversion structure, pre-fabricate and install the baffles, and re-construct the rock weir. They utilized spot welding with a stud gun to install the diversion structure and the welds for the baffles. This technique significantly reduced the time and complexity of welding rebar to the culvert floor.

Phase 1 was completed in 2003, Phase 2 in October 2004 and Phase 3 in October 2005. The total person hours expended on this project are documented in Attachment 1 – *Deadwood Fish Passage Improvement Project Grant Funding Allocation*. Maps of the

Project Area and photos of before and after conditions are included in Attachment 2 - *Deadwood Fish Passage Improvement Project Photo Log*.

Project Results

Completion of the project provided the following benefits:

- Provided juvenile access, and improved adult access, during low and high flows when velocities are high and depth is limited;
- Provided resting areas within the culvert for juveniles and adults;
- Increased culvert cross-sectional area by approximately 50% and capacity by approximately 40%, allowing flood flows to pass more safely through the stream crossing and reducing the potential for future culvert failures and flooding;
- Prevented or minimized a potential 3,500 yd³ of sediment delivery into Deadwood Creek and the Trinity River by increasing the crossing's capability to convey flood flows.

Acknowledgements

The Five Counties Salmonid Conservation Program succeeds because so many people believe in the effort and the collaborative restoration for which it stands. The 5C has worked hard to build a bridge between restoration and local communities, often emphasizing the economic and regulatory benefit of effective restoration. This project is no exception.

Two people that stand out in making this, and many other projects happen, are Janet Clements and Christine Jordan. Janet put in late hours and long days toward preparing contracts, writing grants, getting permits, wading in creeks, measuring temperatures and every task it takes to get the job done. Christine joined the 5C program after Janet left and quickly learned the aspects of project implementation, making a seamless transition to complete the job. Dan Westermeyer and his crew at the Trinity County RCD, whose ingenuity and adaptability gets work done, contributed a wealth of information and hard work toward the final phase of the project. Jon Mann and Margaret Tauzer of NOAA devoted the time and effort for design and review that was above and beyond the call of duty. They often had to juggle priority work to help this project meet deadlines. Jim Thompson of the CA Department of Fish and Game has contributed tremendous hours, experience, labor and equipment that was not required of him. Michael Bowen and the CA Coastal Conservancy provided the financial support needed to get from concept to contract.

The Trinity County Department of Transportation, Weaverville and Lewiston crews stand out for their commitment to restoration. Ron Martin, Turner Jones, John Hammett, Dave Wellock, Steve Rhodes, Susie Yingling, Don Bickle, Josh Blanchard, Dale Taylor and the rest of the crew seldom get the recognition they deserve.