

State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME

FINAL REPORT
SHASTA RACKS MODIFICATION/REPAIR
(NO. 91-FP-193)
COOPERATIVE AGREEMENT 14-16-0001-91517

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Inland Fisheries
1992

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FOR
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A. ABSTRACT

Personnel assigned to the California Department of Fish and Game, Yreka Habitat Shop effected repairs to the Shasta River Fish Counting Facility in August 1991. The modifications were designed to correct conditions which were allowing immigrating salmon and steelhead to pass uncounted through the structure. This report describes modifications made to the facility in 1991, and makes recommendations for needed additional work on the structure.

B. INTRODUCTION

The Shasta River Fish Counting Facility (SRFCF) was built by the California Department of Fish and Game (Department) in 1957, in order to obtain complete annual counts of fall-run chinook salmon in the Shasta River. However, in the falls of 1988 and 1989, Department employees operating the facility noticed that some fish were bypassing the weir. Close examination of the weir panels revealed that high flows had damaged the weir panels so that they did not fit together properly, thus allowing fish to get through. High flows had eroded the streambed immediately below the facility also creating a jump pool enabling fish to jump over the structure. In addition, the configuration of the weir panels, perpendicular to the stream flow, did not appear to be effectively guiding fish to the trap opening. In addition to allowing fish to pass uncounted, these factors were significantly impeding upstream migration and resulting in large numbers of fish spawning below the weir.

C. DESCRIPTION OF PROJECT AREA

The SRFCF is located on the Shasta River, approximately 0.25 miles upstream from its confluence with the Klamath River. Prior to reconstruction, the facility was located at the top end of a pool, approximately forty feet in length, with a maximum depth of five feet.

D. METHODS AND MATERIALS

The contract called for modifications to the SRFCF to be designed and constructed by personnel assigned to the Department's Yreka Habitat Shop. Plans called for

construction of a coffer dam designed to dewater the work area on the west side of the existing structure. Once the area was dewatered, a fresh cement slab and a diagonal footing were to be poured, and the original rack panels removed, repaired and reinstalled on the new footing. Equipment and materials needed for the project were to be brought to the worksite on existing roads. Precautions were to be taken to ensure that no fresh concrete would come in contact with flowing water. The pool located immediately downstream of the facility was to be filled with large rock.

E. RESULTS AND DISCUSSION

In August 1991, Yreka Habitat Shop personnel repaired and reinstalled the racks on the existing concrete apron so that they are essentially fishproof. They fabricated and installed a new trap, and filled the pool that had developed below the racks over the years with approximately 75 yards of large rock. The rock was placed in a manner which formed a natural fyke so that immigrating fish are better guided to the trap.

Original project plans called for pouring a cement slab and diagonal footing in order to realign the panels to form a fyke. However, due to fluctuations in Shasta River flows resulting from upstream irrigation activities, personnel working on the project were unable to dry up the channel for the necessary concrete work with the equipment on hand. The U. S. Fish and Wildlife Service, when notified of the problem, approved a change in the project design, and an interim structure was operated during the 1991 season. This instream structure utilized both the old and new traps, and relied on the newly placed rock fill material, rather than sloping panels, to guide fish into the traps.

Water flows during the 1991 trapping season were typical. Flows were low prior to October 15, when the irrigation pumps were shut off. After that date, water levels rose. Without the fyke in place to guide the fish, the new trap was ineffective. As installed, it sits well out of the stream thalweg, and there was not enough water to operate it until after October 15. When water depths did increase, or when boards are used to back water up behind the weir, there is a problem with high water velocities through the new trap. It was designed after the successful Bogus Creek trap, but does not appear to be suitable for the Shasta River.

The performance of the old trap was much improved, with the filling of the pool below with rock. Placement of

rocks below the weir so as to form a fast-flowing channel helped to guide fish into the old trap. At higher flows, the rocks placed below the weir were less effective in guiding fish into the trap, because water spilled across the entire area below the weir, making it more difficult for fish to locate the trap entrance.

F. SUMMARY AND CONCLUSIONS

After the 1991 season, it is clear that an effective weir must include a trap located in the thalweg. The design should also include a riffle area below the weir. Both of these features are present in the existing structure when utilizing the old trap. The feasibility of adding additional rock below the weir to serve as a fyke during higher flows should be evaluated. Maintenance of the fill areas below the weir may be required, if high flows remove the materials which have been added.

An alternative to using rock as a fyke would be to install weir panels on a diagonal to the stream channel, as called for in the original reconstruction plan, but with the trap located in the center of the thalweg rather than off to one side.

G. ESTIMATED FUNDS EXPENDED

Salaries and Wages	\$ 8,356
Staff Benefits	2,390
Expendable Materials and Supplies	4,602
Administrative Overhead	2,429

Total	\$17,777

H. SUPPLEMENTAL DATA

Not applicable to this project.

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