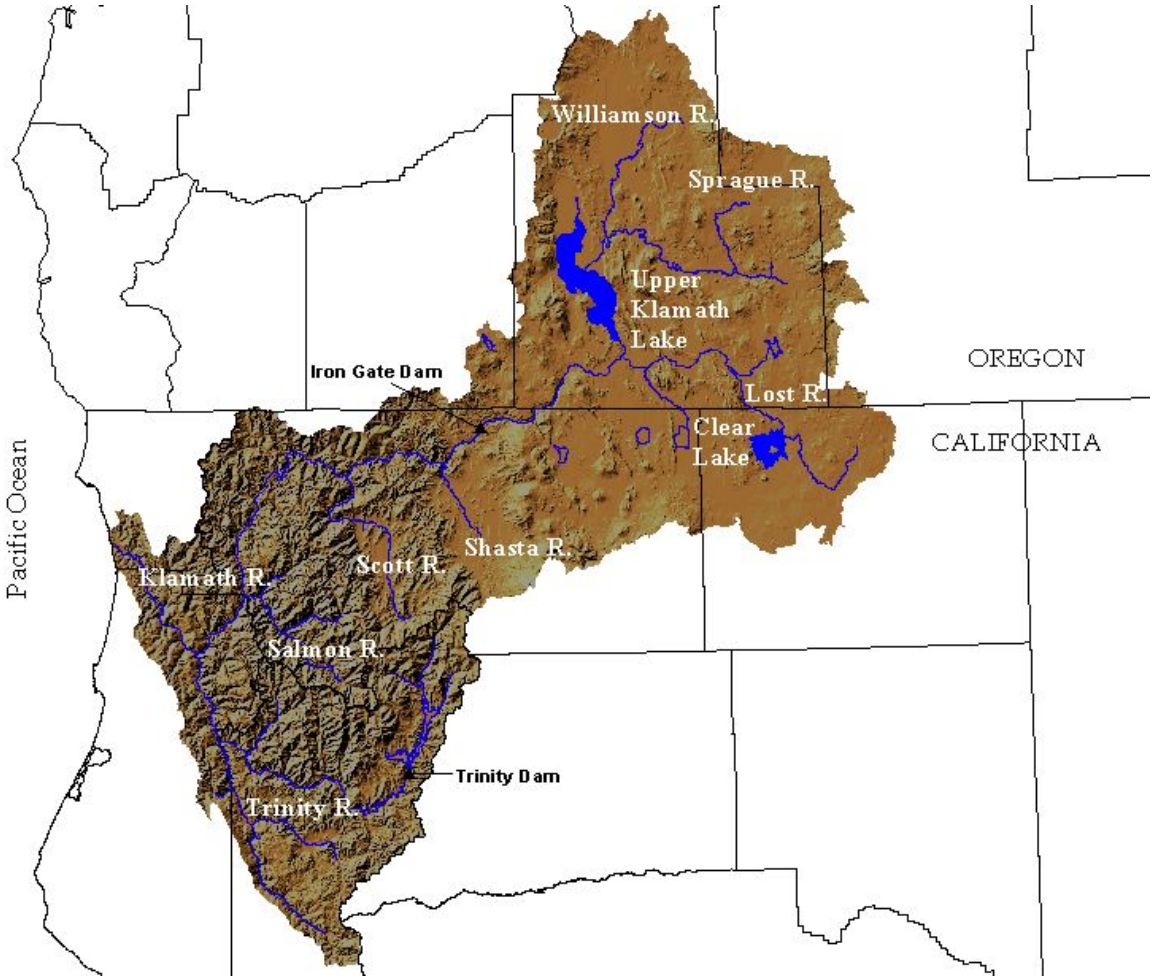
U. S. Fish & Wildlife Service

KLAMATH RIVER BASIN CONSERVATION AREA RESTORATION PROGRAM



Working to Restore Anadromous Fisheries of the Klamath River Basin
FY 2004 Annual Report

Introduction to the Klamath River Basin Conservation Area Restoration Program

The Klamath River Basin Fisheries Task Force (Task Force) was established by the Klamath River Basin Fishery Resources Restoration Act of 1986 (P.L. 99-552) to provide recommendations to the Secretary of the Interior on the formulation, establishment, and implementation of a 20-year program to restore the anadromous fish populations of the Klamath River Basin Conservation Area to optimal levels and to maintain such levels. The Klamath River Basin Conservation Area Restoration Program (Klamath Restoration Program) is administered for the Department of Interior by the U.S. Fish and Wildlife Service office in Yreka, California. Congress authorizes $1 million per year to implement this program until 2006, when authorization will cease.

To administer the Klamath Restoration Program, the Yreka Fish and Wildlife Office performs the following functions: [1] provides staff support to the two Federal advisory committees: the Task Force, which provides guidance on implementation of the Klamath Restoration Program; and the Klamath Fishery Management Council (Council), which provides recommendations on the regulation of harvest; [2] coordinates, funds and assists restoration planning and implementation of restoration projects; [3] monitors and coordinates research evaluating anadromous fish populations; and [4] promotes partnerships that help to leverage additional funding for restoration in the Klamath River Basin.

The Yreka Fish and Wildlife Office provides funds for restoration projects from the Klamath Restoration Program and other programs including the U.S. Fish and Wildlife Service, Jobs-In-The-Woods Program, Partners for Fish and Wildlife Program, and National Fish Passage Programs. See insert below for descriptions of these programs. This Annual Report summarizes restoration projects that were completed in 2004. Full reports of each project are available from the Yreka Fish and Wildlife Office and on our website at http://pacific.fws.gov/yreka/.

The Jobs In The Woods Program is part of the U.S. Fish and Wildlife Service's contribution to the Northwest Forest Plan to participate in watershed restoration activities in northern California, Oregon, and Washington. The goals are to: 1) Support watershed restoration efforts on nonfederal lands, 2) contribute to the recovery of fish, wildlife, plant species, and their habitats, 3) complement ongoing watershed restoration efforts on federal lands, 4) provide employment and training opportunities to timber-dependent community workers, and 5) support a cooperative approach to watershed restoration.

The Partners for Fish and Wildlife Program is a technical and financial assistance program working with private landowners to restore wetlands, streams and river corridors, fish and wildlife habitats. The Program provides advice on the design and location of potential restoration projects, as well as financial assistance to implement the projects.

The Fish Passage Program provides funds to improve fish passage through water ways. Past projects have improved fish passage at culverts, repaired defective screens, and studied remedies to other fish passage problems. These projects have benefited federal trust species (such as salmon, trout, and other species important to Tribal traditions), as well as recreational and commercial fisheries. Recently this program has been greatly expanded, and we expect to be able to help many more people who are ready to help salmon.

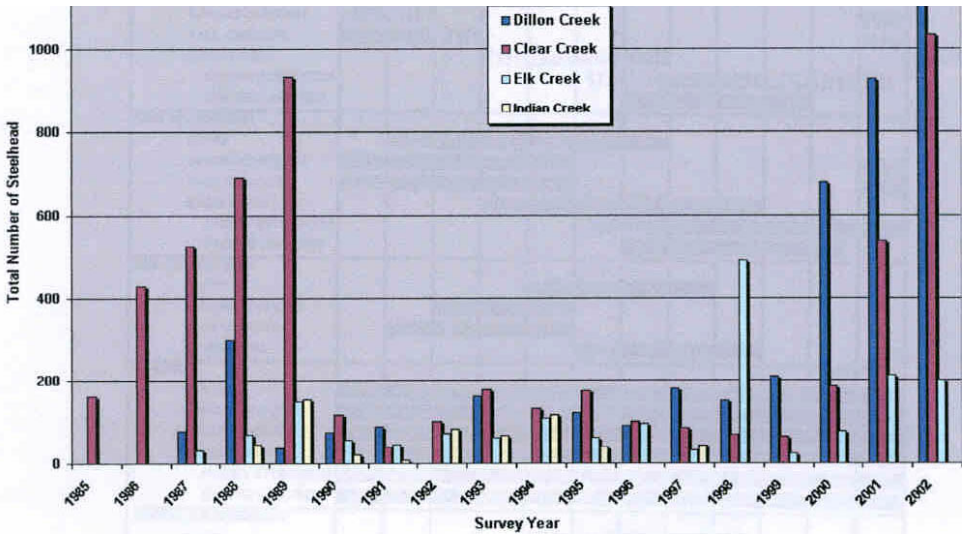
Karuk Tribe of California
Middle Klamath River Subbasin Action Plan
02-PC-02

The Karuk Tribe was funded by the Task Force in 1997 to develop Phase 1 of a Mid-Klamath River Subbasin Plan. In 1999, a draft of that plan was distributed to the Task Force and general public. The plan was revised and submitted for peer review in 2001. This agreement was intended to fund the following additions to the plan: 1) a planning actions matrix, 2) project descriptions with implementation guidelines, 3) project locations on a GIS map, and 4) integration of community members' and reviewers' comments.

The Mid-Klamath subbasin, as defined by the Klamath River Basin Fisheries Task Force, drains an area between Weitchpec (Klamath-Trinity River Confluence) and Bogus Creek (at Iron Gate Dam). This large area is encompasses more than one natural hydrologic unit. The ecosystem of the Mid-Klamath is influenced by several major watersheds outside the subbasin, including the Upper Klamath River, Trinity River, Shasta River, Scott River, and Salmon River. The ecology of the eastern portion of the subbasin is very different from the western portion, and has different restoration needs. Therefore the plan divides the subbasin into eight distinct sub-watersheds: Volcanic Outer Region, Checkerboard, Red Butte, Grider-Elk, Siskiyou, Western Marble Mountain, Orleans, and Red Cap.

Given the complexity of the subbasin, completing a planning actions matrix was much more involved than originally envisioned. Therefore project descriptions and a locations map were not completed under this agreement. The planning actions matrix and the incorporation of community members' and reviewers' comments were completed.

Summer Steelhead Population Census Numbers for Selected Mid-Klamath Tributaries, Data Collected by the USFS



Great Northern Corporation
Shasta River CRMP Coordinator
02-PC-05

The Flow/Temperature model for the Shasta being developed over the last several years for the mainstem Shasta below Dwinnell is now complete and functional. Some bracketing model runs have been done.

Fall chinook spawning in Shasta River. Fall chinook numbers have risen from less than 600 in 1992 to over 12,000 in several recent years.

Our next step is to develop additional scenarios to test and then incorporate the results into overall restoration thinking and planning with regards to efforts to maintain cooler water temperatures in the Shasta. The North Coast Regional Water Quality Control Board may also utilize information from the model in part to develop Total Maximum Daily Load (TMDL) target temperatures for the Shasta, and may be interested in extending its functionality to nutrients and dissolved oxygen predicting.

Urban streams oriented work for Yreka Creek continues. We worked with the Yreka Greenway Committee to examine its goals, with the result that it ultimately expand its scope of interest to the entirety of the Yreka Creek watershed, with that came a change in name to the Yreka Creek Committee. We are working with them now on updating and expanding their watershed plan. Again this year, both steelhead and coho were spawning in Yreka Creek, and steelhead were reported spawning in Humbug Creek, one of its tributaries.

We initiated work that should lead to the remediation of the second flashboard dam to be addressed in the Shasta by looking for opportunities to reduce the amount of water diverted via efficiency improvements to the distribution system and application systems, and also by looking at the pricing structure utilized by the Shasta Water Association. We expect to have that work completed late this summer, with a plan of action in hand by early next year. At this point we believe we can develop reasonable ways to eliminate adult and juvenile passage problems, improve water quality and reduce the quantity of water diverted, while at the same time decreasing operating costs to the district.

We built upon the ramping up of community wide efforts revolving around the state coho listing, involving numerous public and private meetings with agencies and individuals, and ultimately the formation of a team focused on developing a detailed recovery strategy for the Shasta and Scott Rivers. We are providing the majority of effort relating to the Shasta River in terms of identifying problems, opportunities and solutions that are going into that planning effort.

Yurok Tribe
Lower Klamath River Subbasin Planning
02-PC-06

The Lower Klamath River Sub-basin includes all lands downstream of the confluence of the Klamath and Trinity Rivers, encompassing a drainage area of approximately 450 square miles. The main cause of impaired anadromous fishery habitat in the Lower Klamath River Sub-basin is sedimentation resulting from intensive logging and road building on naturally fragile slopes in the 1950'sto 1970's, (Balance Hydrologics Inc., 1995). Hillslope improvements and the decommissioning of forest roads have been determined to be the most important methods of restoring native anadromous Coho Salmon, Chinook Salmon, Steelhead Trout, and Pacific Lamprey Eel populations in the Lower Klamath River Sub-Basin.

Terwer Creek Watershed

To address these hillslope and road decommissioning priorities, the final draft Lower Klamath River Sub-basin Watershed Restoration Plan (Watershed Restoration Plan) was developed in 2000 and submitted to the U.S. Fish and Wildlife Service for review. Following review, the watershed Restoration Plan was finalized during the 2001 fiscal year. In addition, an Operational Plan for watershed assessment and watershed restoration implementation was prepared as a separate document that describes the work completed to date and the proposed locations for future funded projects.

With the assistance of the Klamath Task Force, California State Coastal Conservancy, Simpson Resource Company and other cooperation entities, the Yurok Tribe has completed coastal watershed assessments of four priority watersheds. In addition, four years of watershed restoration has been conducted as part of a long-term watershed restoration effort to restore aquatic habitat conditions within Lower Klamath River tributaries to a level that supports viable, self-sustaining populations of native fish and aquatic resources.

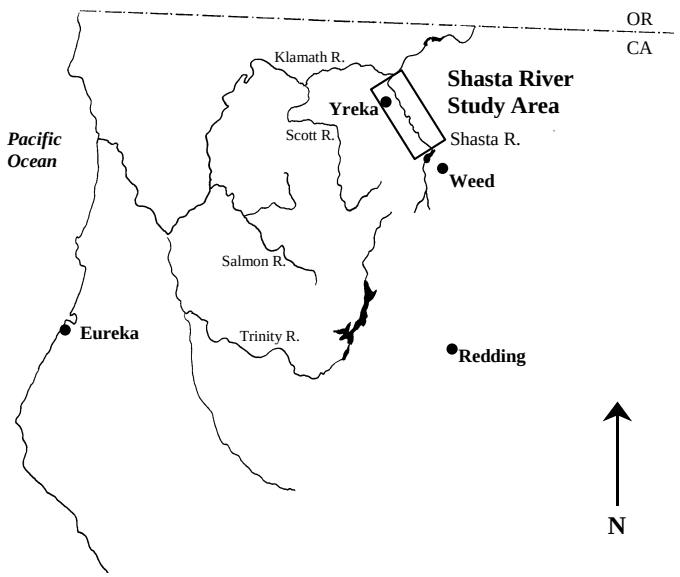
Simpson Resource Company, California Department of Fish and Game, U.S. Fish and Wildlife Service and other agencies work with the Yurok tribe's Watershed Restoration Department to share information and coordinate watershed assessment and restoration efforts throughout the year. The Yurok Tribe has met the terms of the Lower Klamath River Sub-basin Planning and Coordination agreement for the 2002 fiscal year.

Great Northern Corporation/Shasta CRMP
Shasta River Flow and Temperature Study
01-HP-03

The objective of the Shasta River field monitoring project was to complete the necessary fieldwork and develop the requisite data to implement a computer model to characterize and analyze the specific causes of elevated water temperature in relation to stream flow in the Shasta River. The flow and temperature model is a tool that can assist in habitat restoration efforts directed towards abatement of water temperatures deleterious to anadromous salmonids. This monitoring effort is part of a two-part project, wherein the monitoring effort was funded by the Klamath River Basin Fisheries Task Force, administered by the United States Fish and Wildlife Service through cooperative agreement 11333-1-J017 with Great Northern Corporation (Project # 2001-HP-03) while the computer modeling was funded separately through a grant from the California Department of Fish and Game.

The California Department of Fish and Game (DFG) has determined that the Shasta River (Figure 1-1) is the most important spawning nursery area for Chinook salmon in the Upper Klamath basin (DWR, 2001). Historically the Shasta supported fall and spring-run Chinook salmon, coho salmon and steelhead trout. According to annual spawning counts at the Shasta River weir, the 1931 fall run of over 80,000 Chinook salmon had dropped to 553 fish in 1990 (DFG, 1991). The Department of Water Resources (DWR) has identified physical barriers (dams, weirs), flow alterations due to water management practices, and water quality issues such as temperature and contaminant concentration as potential problems associated with the ability of salmon to spawn in this area. The DFG and the United States Fish and Wildlife Service (USFWS) have determined that flow and temperature are the critical water quality parameters for restoration of this system (DWR, 2001). Further, the North Coast Regional Water Quality Control Board has listed water temperature on the 303d list for the Shasta River.

Concern for fish habitat, water temperature and flow has prompted a number of studies in the Shasta River basin. The California Department of Fish and Game (DFG, 1995; DFG, 1996) and the United States Fish and Wildlife Service (USFWS, 1992) have carried out studies to assess the current fish habitat and associated needs. Flow and water temperature studies have been performed by the California Department of Water Resources (DWR, 1964; DWR, 1985). The Department of Civil and Environmental Engineering Modeling Group at the University of California, Davis (CEEMG) conducted a data inventory in 1997. In addition, Deas *et al.* (1996) conducted a woody riparian vegetation inventory. Preliminary modeling of flow and temperature was explored by the CEEMG (1998). These studies provide a basis for continuing work in the Shasta River basin.



Location of the Shasta River

Water temperatures in sections of the 32-mile study reach of the Shasta River, which extends from four miles below Dwinnell Reservoir to the confluence with the Klamath River, are documented to exceed temperatures lethal for Chinook salmon, coho salmon, and steelhead trout (USFWS, 1992; Piper *et al*., 1983). The Shasta River basin is 800 square miles with a mean annual unimpaired runoff of approximately 162,300 acre-feet (DWR, 1985). The Shasta River receives inflow from tributaries, springs, and agricultural return flows while losing water to several dams and irrigation diversions and other losses.

For small streams, such as the Shasta River, riparian shading can play an important role in water temperature response through the direct reduction of incoming solar radiation. Thus, riparian restoration is a potentially beneficial measure to control stream temperature. The factors that make small streams sensitive to riparian shading include shallow depths, low flows, and the ability of the tree canopy to shade significant portions of the stream. Riparian revegetation is not the only viable alternative to control stream temperature. Flow also plays a vital role in the heating capacity of the system. Thus, two main options available to control stream temperatures in the Shasta River are (a) to manage flow and (b) manage riparian vegetation. Thus the field data gathered for the modeling project includes vegetation as well as geometric, flow, and temperature data.

Salmon River Restoration Council
Salmon River Watershed Education Program
03-E-01

The Salmon River Restoration Council (SRRC) continued to enlist students, community members and teachers in a variety of watershed education activities related to anadromous fisheries, water quality, and watershed health.

The SRRC's Watershed Education Program has been operating for more than 8 years. Over the past decade, watershed education has been a strong curricular component of the two Salmon River Elementary Schools and the Salmon River community. Various programs and funding sources have provided the schools and their teachers with training, equipment, field transportation costs, and the technical support necessary to carry out the program each year.

Students of Forks of Salmon School show off their half completed watershed relief map.

This year we performed all of the traditional activities including: the California Department of Fish and Game Fall Chinook Spawning Survey and Carcass Count, stream assessment for macroinvertebrates, Hobo Temp monitoring, the Aquarium Incubator Project, and the Watershed Fair. In addition, the program hosted several other events including Fire Awareness Week, Native Plant Studies, Watershed Geography and more.

Students using the erosion model

There is an ongoing effort to imbed the watershed program within the school system. This year we approached this challenge by documenting in detail, the California State Educational Standards correlation with our activities. The SRRC watershed education coordinator planned all events by first asking the teachers which standards they were focusing on and which they needed help with. The coordinator then facilitated the activities in line with classroom lessons. In this manner we aim to remain a key component of school and classroom programming.

The SRRC solicited ample community volunteers to assist and support the watershed education activities. There were over 12 volunteers who participated in the Salmon Survey training alone. Many more volunteers participated in other events including water quality monitoring and the Aquarium Incubator Project.

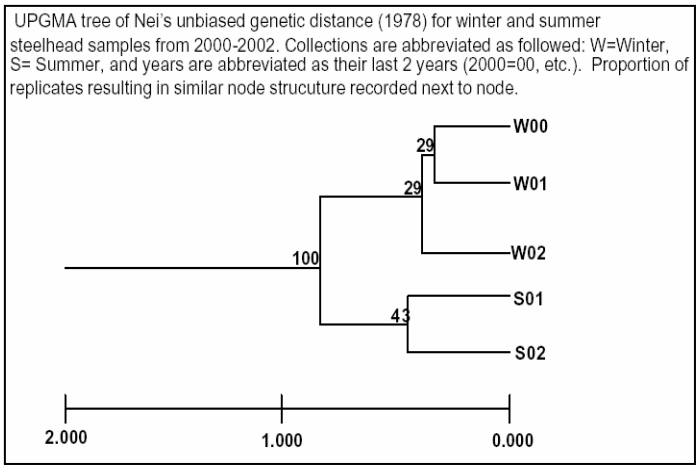
Students learning about data forms from a USFS Fisheries Biologist at the Spawner Survey Training in Somes Bar.

The Watershed Education Program 2003 was very successful and we plan on continuing this service to the Salmon River community. Teachers, students, and community members are all excited for many more years of Watershed Education.

University of California, Davis
Assessment of Genetic Variability in Different Run-Timings of Coastal Steelhead in the Lower Klamath
02-FP-07

Seven microsatellite loci were used to investigate genetic relationships among three winter-run, two summer-run, and one hatchery population of steelhead sampled in the mainstem Klamath River. Multiple classifications for steelhead exist on the Klamath River including different adult run-timings, reproductive ecotypes, and life history characteristics. This study attempted to assess the genetic variation between summer and winter run steelhead to determine if these fish migrating through the Lower Klamath River constituted discrete reproductive populations or a single panmictic population. Samples compared between 2000 and 2001 were taken from both

wild and hatchery fish below Weitchpec, California. Overall, population heterogeneity was high in all samples. All populations were out of Hardy-Weinberg proportions for at least one locus and significant linkage disequilibrium was found, suggesting the existence of multiple independent populations in each collection. Additionally, a majority of pair-wise FST comparisons suggested low, yet significant, genetic variability between run-timings (5 of 6 samples) and also between the hatchery population and putative wild steelhead samples from two of the years.



UPGMA tree of Nei's unbiased genetic distance (1978) for winter and summer steelhead samples from 2000-2002. Collections are abbreviated as followed: W=Winter, S= Summer, and years are abbreviated as their last 2 years (2000=00, etc.). Proportion of replicates resulting in similar node strucuture recorded next to node.

These results contrast with other genetic studies on sympatric steelhead populations, since they supported closer genetic lineage between summer- and winter- run steelhead fish from the same basin than among all summer-run collections. These data are consistent with the last stock identification effort for steelhead in the Klamath River. The techniques and markers used in this study could be used to develop a better understanding for the relationship of steelhead and trout populations in the Klamath Basin.

U.S. Forest Service, Karuk Tribe, Yurok Tribe, & Salmon River Restoration Council
Mid-Klamath River Chinook Spawner Escapement Survey
02-FP-05 and 03-FP-11

The Forest Service (FS), California Department of Fish and Game (CDFG), Karuk Tribe of California, and the Yurok Tribe conducted Chinook salmon (Oncorhyncus tshawytscha) spawning ground surveys within the Salmon River Sub-basin, Scott River Sub-basin, and mid-Klamath River tributaries. Volunteers consisted of the Salmon River Restoration Council and students from local schools. A combination of redd counts and mark-and-recapture carcass counts were completed to assess spawner escapement and habitat utilization on these water bodies. This report summarized the redd count portion of the survey. A separate report will be prepared by CDFG biologists for the carcass count portion of the survey.

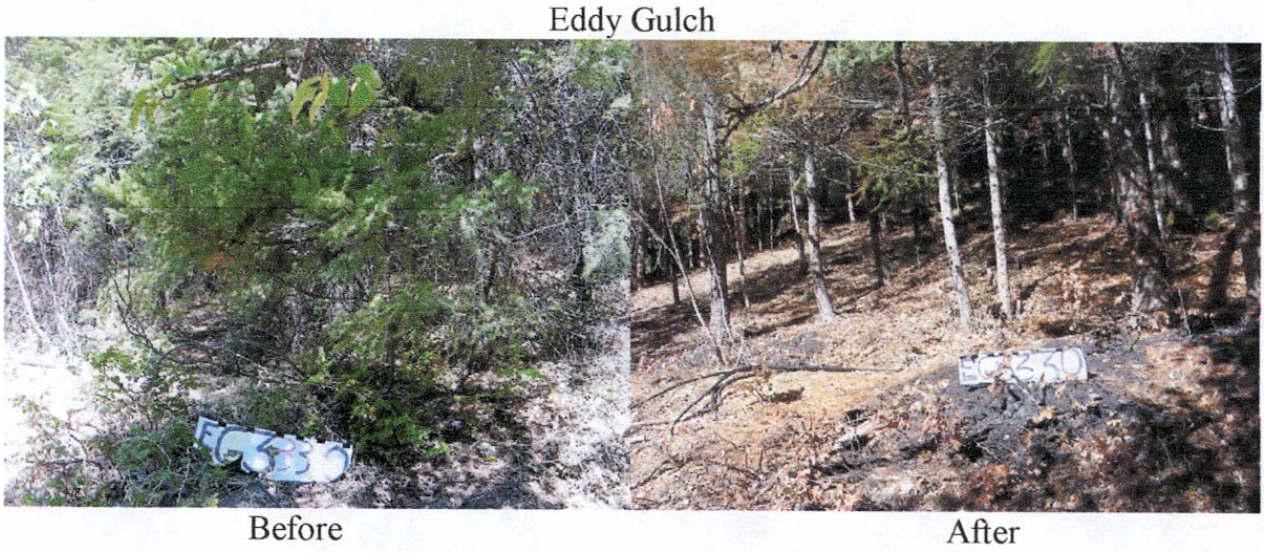
Salmon River Restoration Council
Salmon River Fuels Reduction Project
02-HR-03

This project continued and expanded the fuels reduction work performed in the Jobs-In-The-Woods (JITW) project described above. A crew of displaced timber workers from the community constructed fuel break systems and performed project inventory and monitoring on 15 additional acres of private property and several Forest Service "Special Use Permit" properties on public land in the Salmon River subbasin. The crews also burned and chipped hundreds of brush piles created during the above JITW project. A detailed GIS Report was submitted showing the new locations and activities.

Tasks in this project were performed in consultation with U.S. Fish and Wildlife Service, the U.S. Forest Service, and the Karuk Tribe of California, continuing the collaborative approach of the SRRC.

Salmon River Restoration Council
Salmon River Shaded Fuel Break Construction and Riparian Fuels Reduction
02-JITW-01

This project enlisted private property owners from the community to steward their lands over time in a fashion that is consistent with ecosystem management over the larger landscape. The Salmon River Restoration Council (SRRC) provided a crew of displaced timber workers from the community to construct fuel break systems, reduce road caused erosion problems, and perform project inventory and monitoring tasks on several parcels of private property in the



Salmon River subbasin. Restoration activities took place on approximately 72 acres. A detailed GIS Report was prepared, showing locations and activities.

The tasks in this project were performed in consultation with the U.S. Fish and Wildlife Service, the U. S. Forest Service, and the Karuk Tribe of California. This collaborative approach should be a major component of a comprehensive fuels reduction program on the Salmon River. This project has expanded community and agency support for the SRRC and help in the recovery and protection of the Salmon River subbasin.

This report was prepared for the
Klamath River Basin Fisheries Task Force

U. S. Fish and Wildlife Service
Yreka Fish and Wildlife Office

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