1991-HR-65

FINAL REPORT

PINE CREEK WATERSHED EROSION CONTROL AND PREVENTION

COOPERATIVE AGREEMENT #14-16-0001-91543

Submitted by

Hoopa Valley Tribal Fisheries Department

14 June 1996

ABSTRACT

To address fish habitat restoration needs in Pine Creek watershed on the lower Klamath River, high priority erosion control projects identified by Pacific Watershed Associates in 1990 were targeted for treatment by teams comprised of heavy equipment operators and erosion control specialists. Starting in 1991 sites with a total sediment yield potential of nearly 9,000 cubic yards were treated. Work was completed in 1995 with road segments, stream crossings and log landings having been treated at an average cost of $6.20 per cubic yard. Additional erosion prevention work, funded through Tribal sources and the President's Forest Plan - Option Nine, was accomplished during the same period.

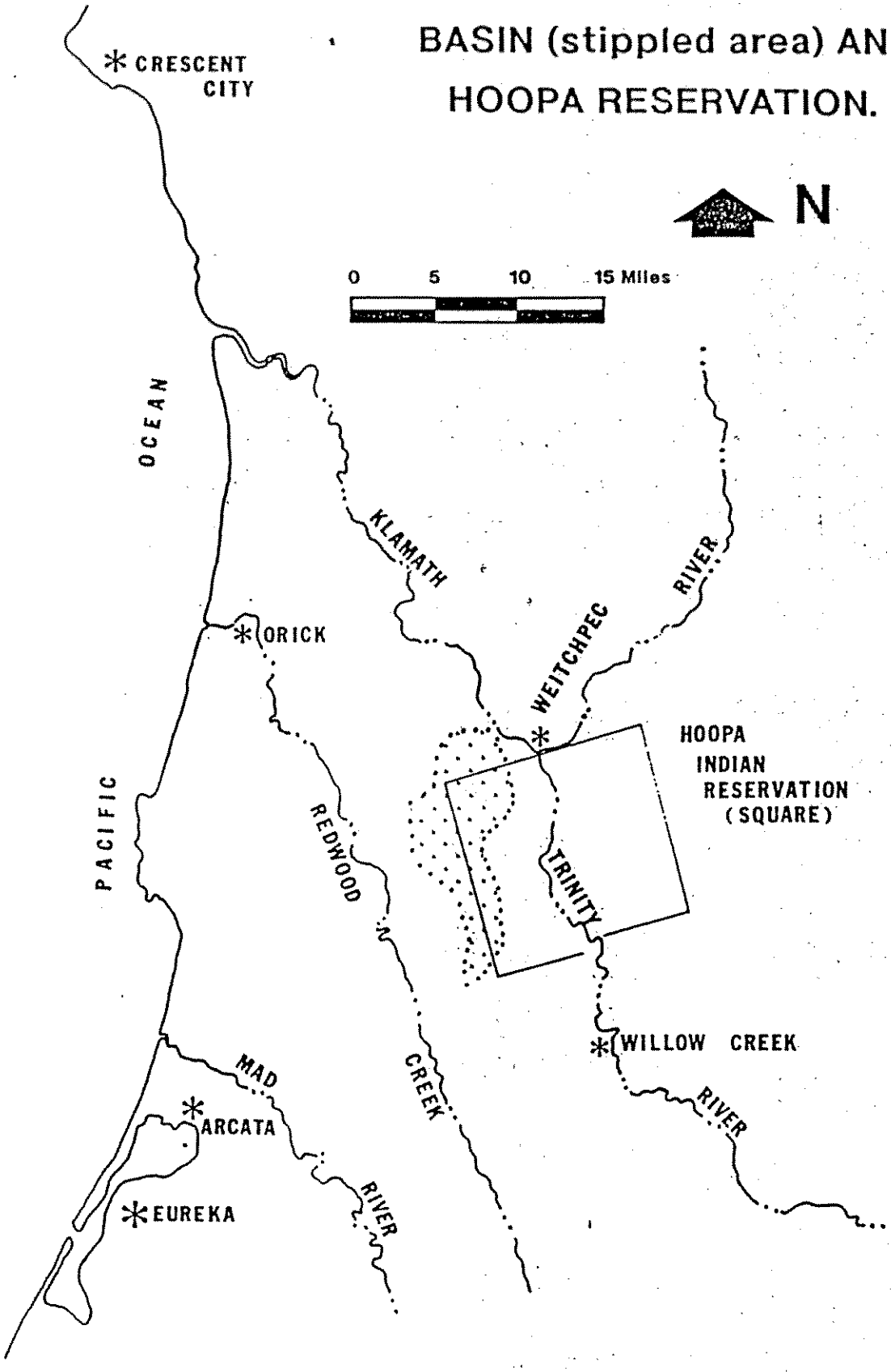
INTRODUCTION

The Pine Creek watershed assessment project was undertaken in 1990 to develop both a sediment source inventory and a practical, action-oriented plan for erosion prevention and erosion control on Hoopa Valley Tribal lands in the Pine Creek watershed. The objective of the work was to rehabilitate the condition of the watershed in order to improve habitat conditions in Pine Creek, which is an important producer of Pacific salmon species depended upon by the Tribe. The inventory and plan were completed in December 1990. The Project was funded by the Klamath River Task Force, administered by the Hoopa Valley Tribal Fisheries Department, and supervised through the Tribal Fisheries Department. On the basis of findings from the 1990 report, the Hoopa Valley Tribe has utilized funding from multiple sources to implement projects throughout Pine Creek watershed.

The Pine Creek watershed is a 49 square mile basin draining the Coast Range of northern California and discharges into the Klamath River approximately at the town of Weitchpec. The eastern portion of the basin, including the main stem of Pine Creek, lies within the boundaries of the Hoopa Valley Indian Reservation. Much of the western side of the basin, as well as the lower portion near the Klamath River, lies outside the Reservation boundaries and is privately owned and managed by industrial timber companies. Approximately 21 square miles (43%) of the basin is included within the Reservation and formed the land base for the watershed assessment and analysis (Figure 1).

Selected stream channels, hillslopes and over 100 miles of active and abandoned logging roads on tribal lands were mapped and/or inventoried for existing and potential erosion problems threatening fish habitat. A database of 445 sites was developed, with each site described in detail. This process identified over 120,000 cubic yards of erosion and sediment yield to stream channels in the Pine Creek watershed. Most of this erosion was closely associated with past land management activities, including the construction and maintenance of road systems and the harvest of timber.

Figure 1. LOCATION OF PINE CREEK DRAINAGE BASIN (stippled area) AND HOOPA RESERVATION.



Detailed watershed assessment work lead to the development of recommended projects at 150 sites in nine large treatment areas comprising portions of the Pine Creek watershed. Recommendations for these work sites include descriptions of appropriate erosion prevention techniques, cost estimates for completing the projects, and a prioritization of the immediacy of need for each treatment. Skilled heavy equipment operators and erosion control specialists began implementing the projects with the highest priorities.

In addition to work funded under Cooperative Agreement #14-16-0001-91543 (Cooperative Agreement), erosion prevention work in Pine Creek watershed has been accomplished with financial support from other sources including: the President's Forest Plan - Option Nine; and Tribal funds generated through receipts on timber sales. Table 1 contains information on several Pine Creek Erosion prevention projects completed in 1995. Additional work is presently scheduled for completion over the next several years as additional funding becomes available.

WORK ACCOMPLISHED

Work executed under the Cooperative Agreement includes that completed in 1990 and 1992 and

Table 1.
Watershed Restoration Projects completed in 1995 on the Hoopa Valley Reservation.

Funding Source	Treatment Group	Road #	Road Name	Miles of Road	Type of Work
Option 9	Mill Creek 5	802B	Hostler B spur	0.28	Decommissioning
Option 9	Mill Creek 6	801E	Two-Mile spur	2.51	Decommissioning
Option 9	Mill Creek 8	802G	Hostler B spur	1.12	Decommissioning
Option 9	Mill Creek 8	803P	Long Ridge	0.31	Decommissioning
Option 9	Mill Creek 8	803Q	Long Ridge	0.62	Decommissioning
Klamath Restoration Program	Pine Creek 5	3	West Side Pine	5.68	Upgrade
Klamath Restoration Program	Pine Creek 5	3I	West Side Pine spur	2.38	Decommissioning
Klamath Restoration Program	Pine Creek 5	3J	West Side Pine spur	0.67	Decommissioning

reported by the Tribal Fisheries Department under separate cover (see Little Pine Creek Pilot Erosion Prevention Project - March 1993). Work in 1990 and 1992 resulted in total costs of $33,578 and a cost per cubic yard of sediment of $5.95. The work accomplished in 1995 exhausted the balance of funding in the Cooperative Agreement ($21,794), at a cost per cubic yard of $6.70. Each of the sites treated as part of this project was of very high priority as identified through our earlier work. As a result of these projects, potential sediment yield to Pine Creek has been reduced by a total of nearly 9,000 cubic yards, at an average cost of $6.20 per cubic yard.

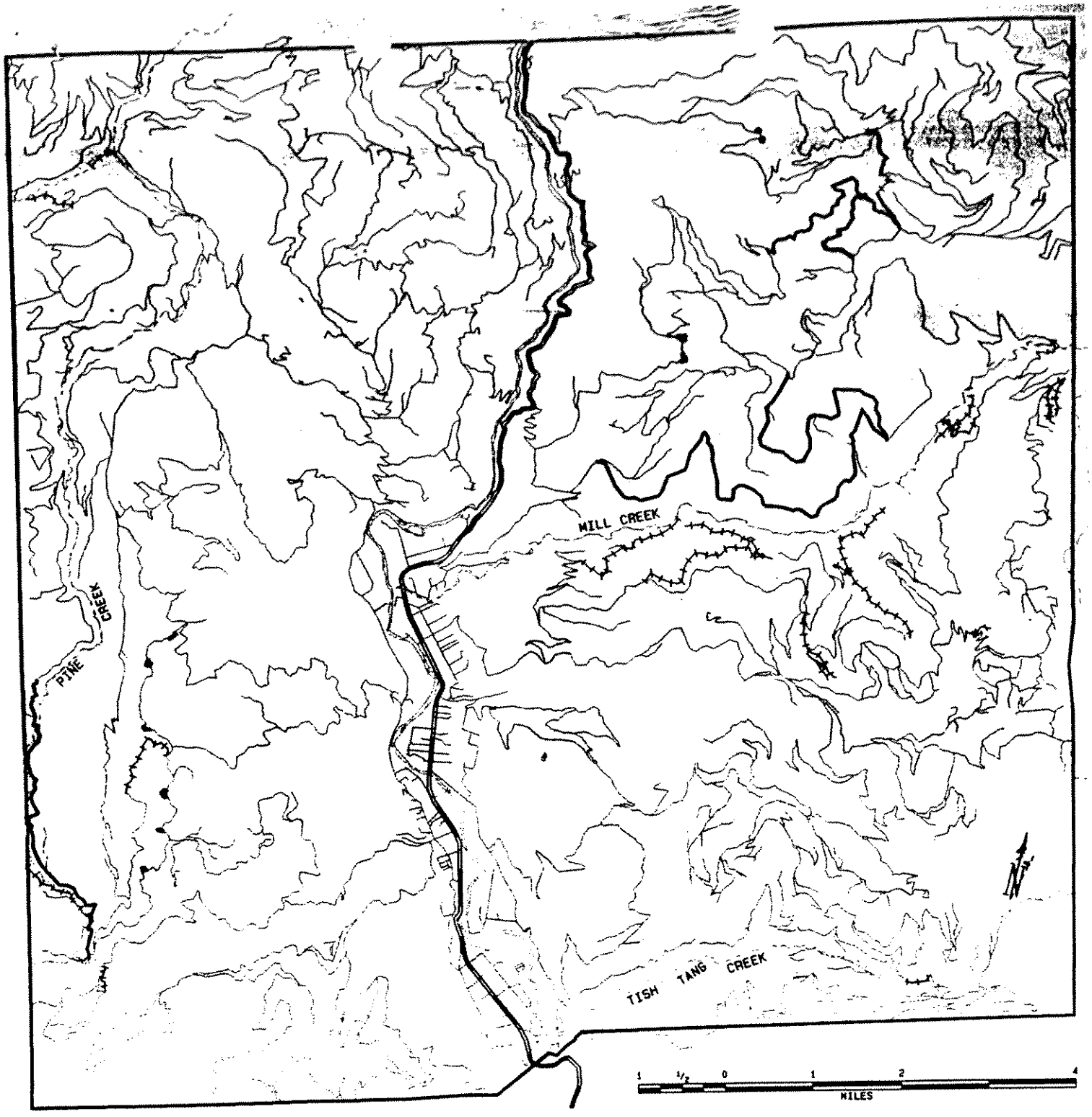
Specific projects completed in 1995 include the upgrading of 5.68 miles of road 3, and site work along an additional 2.38 miles of road 3I, and 0.67 miles of road 3J (Figure 2). Upgrades along road 3 included: installation of culverts sized to accommodate 50-year return interval maximum flood peaks; reconstruction of stream crossings with inclusion of rolling dips to minimize stream diversion potential; and outsloping of road surfaces. Work completed along roads 3I and 3J include decommissioning of road segments no longer needed for forest management activities. All work occurred at sites designated as high priority in the analyses conducted in 1990 by Pacific Watershed Associates of Arcata, California.

Techniques and equipment employed in the execution of the project are described in detail on a site-by-site basis in the 1993 report "Little Pine Creek Pilot Erosion Prevention Project", which is appended to this report by reference. The Little Pine Creek report contains photo-documentation of work completed in the Pine Creek watershed. The photographs and descriptions of techniques provided in the 1993 report portray projects analogous to those completed in 1995.

CONCLUSIONS

Increased erosion linked to hillslope processes and land management have impacted the quality of fish habitat in Pine Creek, with an overall decline in channel stability and aquatic habitat diversity. Efforts to restore fisheries habitat through implementation of erosion prevention and erosion control projects in the Pine Creek watershed are anticipated to yield substantial benefits over time. Monitoring of channel characteristics associated with stream health has been instigated by the Tribal Fisheries Department in an effort to track the success of these rehabilitation efforts.

Under its "Pine Creek Sediment Monitoring Project" , funded in part through the Klamath River Basin Fisheries Restoration Program, the Tribal Fisheries Department is investigating changes in spawning gravel quality, channel morphology and fluvial dynamics. This is being accomplished by periodically collecting data at sites along the lower half of Pine Creek's mainstem channel. In addition, fish habitat investigations completed in 1995 revealed habitat conditions and salmonid population data for the reaches of Pine Creek accessible to salmon. By repeating these investigations periodically, and



WATERSHED REHABILITATION ROAD WORK

Completed by 12/31/95

Hoopa Valley Indian Reservation

State Hwy

Upgrade, culvert repair

Decommissioned or obliterated

Other roads

Figure 2

source: HVTC, Forestry Div., GIS Database

analyzing data collected over several years, we anticipate being able to describe the impact of Pine Creek rehabilitation efforts, and perhaps to estimate recovery rates for fish habitat in Pine Creek and similar watersheds along the lower Klamath River.

FUTURE WORK

The work accomplished under the Cooperative Agreement addressed only a fraction of the high priority sites identified in Pine Creek watershed. Effective rehabilitation of fish habitat in Pine Creek will depend on continued efforts to reduce sediment yield to the channels throughout the watershed. At this time, the Tribe has begun planning additional erosion prevention projects in coordination with road construction and maintenance projects anticipated to be completed over the next several years. Much of the future work is likely to be accomplished with funds generated through the Tribe's forest management program , as future timber sales are laid out in Pine Creek and adjacent watersheds. The greatest potential for catastrophic yield of fine sediment to Pine Creek continues to be associated with road segments, stream crossings and log landings constructed prior to 1988.