

# Shasta River Biotechnical Bank Protection Final Report

Cooperator: Great Northern Corporation  
Cooperative Agreement #: 14-48-11333-98-J202  
Vendor Agreement #98-JITW-41  
Date of report: August 8, 2002

## Abstract

Long standing livestock impacts to the banks of the Shasta River appear to be the predominant source of problems currently affecting the Shasta, along with the impacts of irrigation water withdrawal and tailwater return. These impacts have resulted in high water temperatures, low levels of dissolved oxygen, excessive sediment load, reduced rearing habitat for salmonids, and reduced instream flows.

The Shasta CRMP is assisting landowners in developing land management plans that minimize impacts to the health of the Shasta watershed and salmonid habitat. A comprehensive riparian protection and rehabilitation effort is underway on the Freeman Ranch. Cantara and CWA 319(h) funding has been used to build cattle exclusion fencing along the riparian zone, re-establish riparian vegetation, and stabilize eroding banks. The recent bank stabilization work performed under this agreement was needed to complete the rehabilitation effort. The work accomplished included approximately 470 linear feet of vertical bank protected with the installation of willowing matting and the planting of approximately 3,200 willow whips and stakes.

## Introduction

The goal of this project was to stabilize and re-vegetate 400 feet of river bank using willow matting techniques. This stabilization will assist in the reduction of excessive sediment load, and re-establish riparian vegetation.

## Study Area

The project is located on the Freeman Ranch along the Shasta River approximately 12 miles southeast of Yreka, Ca.

## Methods and Materials

The project consists of willow matting placed horizontal and parallel to the stream flow from the stream bed up the vertical cut banks. Approximately 470 feet (linear length) of bank was protected. Large quantities of willow branches, roughly one inch in diameter and 10 to 20 ft. long are wired into bundles approximately nine inches in diameter. The bundles are placed diagonally and parallel, side by side on the banks, from the toe of the bank up towards the top of the banks. The bundles are secured with wires running from steel T-posts that have been driven into the substrate. Once the appropriate surface has been covered with matting, lengths of willow are utilized as perpendicular caps across the willow matting and secured to the T-posts for security. Willow whips,

cuttings, and stakes were planted in and along the willow mattings and in the remaining vertical banks above the matting. Due to the steepness of the vertical banks and the deepness of the water, tule could not be effectively planted along the water's edge prior to putting in the willow matting. The willow planting will add to the re-establishment of riparian vegetation, add root strength and shading.

## **Results and Discussion**

Approximately 470 feet of vertical cut bank was protected. Minor adjustments in application had to be made to accommodate the extreme verticality of the stream bank and the extreme water depths in some locations. The minor adjustment in application was a reduction in horizontal angle of the willow matting along the stream bank to a more parallel approach. The original plan to plant tule in the mud along the water's edge prior to placing the willow matting was not possible due to the severe verticality (in some places negative verticality) of the banks and the depth of the water. To compensate, additional willow cuttings and stakes were planted in and among the willow matting with additional willow whips planted in the remaining vertical bank above the willow matting. This process of approximately 470 feet of willow matting consisted of 895 willow bundles, planting of 2,000 willow whips, and 1,200 willow stakes. Before and after photos were taken to provide the baseline for future monitoring.

## **Summary and Conclusions**

This willow matting process of approximately 470 linear feet, consisted of 895 willow bundles, planting of 2,000 willow whips, and 1,200 willow stakes. Before and after photos were taken to provide the baseline for future monitoring.

Depending on survival rates of the initial planting, future supplemental planting may have to take place to ensure appropriate plant densities and diversity.

The willow matting is completely installed, is very stable, and all T-posts have been bent over as appropriate.

This bank stabilization project was one of the final pieces to a comprehensive riparian protection and rehabilitation effort on the Freeman Ranch.

**Attachment 1a**

**GRANT AGREEMENT  
14-48-11333-98-J202  
Project (98-JITW-41)**

**SUMMARY OF EXPENDITURES  
SHASTA RIVER BIOTECHNICAL BANK PROTECTION**

Salaries (including benefits)		\$10,400
Expendable equipment, materials, supplies		950
Equipment rental		1,378
General and Administrative Expenses (overhead)		<u>1,272</u>
TOTAL PROJECT COST TO USFWS		\$14,000
In-kind contribution	\$494	
Total project cost with in-kind		\$14,494