



United States Department of the Interior

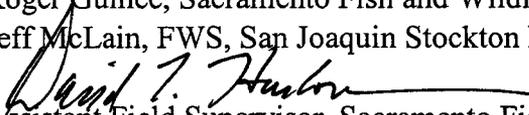


FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

REPLY TO ATTENTION TO

NOV 10 2003

To: Andy Hamilton, Sacramento Fish and Wildlife Office
Roger Guinee, Sacramento Fish and Wildlife Office
Jeff McLain, FWS, San Joaquin Stockton Fish and Wildlife Office

From: 
Assistant Field Supervisor, Sacramento Fish and Wildlife Office,
Sacramento, California

Subject: Monitoring of Restoration Projects in Merced River Annual Report

Attached for your information is a copy of the fourth annual report for the U.S. Fish and Wildlife Service's Merced River Restoration Project Investigations. During the past year, we completed fieldwork on post-restoration fall-run chinook salmon juvenile rearing and spawning habitat modeling sites on the Merced River, continued modeling work on pre-restoration modeling sites, and started modeling work on pre-restoration modeling sites. These data will be used to evaluate whether the restoration activities are successful at increasing the quality and quantity of chinook salmon rearing and spawning habitat in the Merced River. In 2004, we plan to complete a final report on these efforts.

If you have any comments or questions about the attached report or our investigations, please feel free to contact Mark Gard at (916) 414-6589.

Attachment

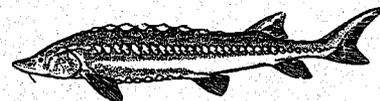
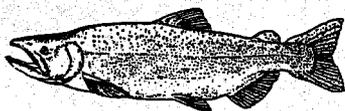
**MONITORING OF RESTORATION PROJECTS
IN THE MERCED RIVER, CALIFORNIA**

**Annual Progress Report
Fiscal Year 2003**

U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, CA 95825



Prepared by staff of
The Energy Planning and Instream Flow Branch



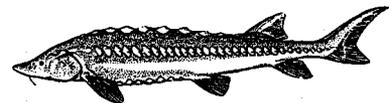
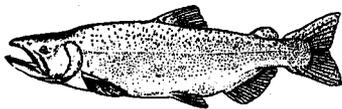
**MONITORING OF RESTORATION PROJECTS
IN THE MERCED RIVER, CALIFORNIA**

**Annual Progress Report
Fiscal Year 2003**

U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, CA 95825



Prepared by staff of
The Energy Planning and Instream Flow Branch



PREFACE

The following is the fourth annual progress report prepared as part of the Merced River Restoration Project Monitoring Investigations, a 4-year effort which began in August 2000. Funding has been provided under the Anadromous Fish Restoration Program of the Central Valley Project Improvement Act, P.L. 102-575, for channel restoration of the Merced River to provide spawning, incubation, and rearing habitat for fall-run chinook salmon. The purpose of this investigation is to evaluate the success of these channel restoration activities.

The field work described herein was conducted by Ed Ballard, Mark Gard, Bill Pelle, Rich DeHaven and Rick Williams.

Written comments or questions about this report or these investigations should be submitted to:

Mark Gard, Senior Fish and Wildlife Biologist
Energy Planning and Instream Flow Branch
U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
Room W-2605
2800 Cottage Way
Sacramento, CA 95825

Introduction

The decline of fall-run chinook salmon in the Merced River over the last decade is attributed to many factors including habitat degradation. The existing habitat appears inadequate for either spawning or rearing. Funding has been provided under the Anadromous Fish Restoration Program of the Central Valley Project Improvement Act, P.L. 102-575, for channel restoration of the Merced River to provide spawning, incubation, and rearing habitat for fall-run chinook salmon. The Merced River Study is a 4-year effort to be completed in two phases (pre-restoration and post-restoration) by 2004. The pre-restoration phase was completed in March 2001. The information provided below describes progress following the second year of post-restoration investigations. The study described herein involves application of the U.S. Fish and Wildlife Service (Service) Instream Flow Incremental Methodology to compare total weighted usable area of salmonid habitat before and after channel restoration using 2-D modeling.

Hydraulic and Structural Data Collection

Hydraulic and structural data collection was completed in April 2003. The data collected on the top and bottom transect include: 1) water surface elevations (WSELs), measured to the nearest 0.01 foot at three different stream discharges using standard surveying techniques (differential leveling); 2) wetted streambed elevations determined by subtracting the measured depth from the surveyed WSEL at a measured flow; 3) dry ground elevations to points above bankfull discharge surveyed to the nearest 0.1 foot; 4) mean water column velocities measured at a high-to-mid range flow at the points where bed elevations were taken; and 5) substrate and cover classification at these same locations and also where dry ground elevations were surveyed. Data collected between the transects include: 1) bed elevation; 2) northing and easting (horizontal location); 3) cover; and 4) substrate. These parameters are collected at enough points to characterize the bed topography, substrate and cover of the entire site.

The data is collected between the top and bottom transects by obtaining the bed elevation and horizontal location of individual points with a total station, while the cover and substrate are visually assessed at each point. Substrate and cover along the transects are also determined visually. To validate the velocities predicted by the 2-D model, depth, velocities, substrate and cover measurements are collected by wading with a wading rod equipped with a Marsh-McBirney^R model 2000 or a Price AA velocity meter at the high flow. The horizontal locations and bed elevations are determined by taking a total station shot on a prism held at each point where depth and velocity were measured. A minimum of 50 different point measurements are made.

Bed elevation, horizontal location, cover, and substrate data collection between the transects was completed for all four sites in FY 2002. In October 2002, we measured water surface elevations at mid (379-468 cfs) and high (1,047 cfs) range flows at all four sites. An additional set of water surface elevations were collected at all four sites in December 2002, at a flow of 198 cfs. Discharge was measured at one location for each flow. The flow was the same for all four sites.

The data on the transects was completed in FY 2003 with the collection of velocity sets for both transects at all four sites. The collection of depth, velocity, substrate, and cover data to validate the 2-D model was completed in FY 2003 with the collection of this data for one of the sites.

The entire Robinson Restoration reach was habitat-typed in FY 2002, so that the results from the four study sites can be extrapolated to the entire restoration reach.

Biological Validation Data Collection

Surveys for fall-run chinook salmon redds were conducted in all four post-restoration study sites on December 2 and 3, 2002, in order to collect depth, velocity, and substrate data to be used for validating the combined chinook salmon spawning habitat suitability that will be determined by the 2-D models. Redds were located on foot and all active redds (those not covered by periphyton growth) within a given site were measured. Horizontal location data for all redds observed were recorded using a total station. A total of 45 redds were observed in the four sites.

Snorkel surveys for fall-run chinook salmon juveniles were conducted in all four post-restoration sites on March 11, 2003. All four sites were surveyed for a second time on April 21-22, 2003. Depth, velocity, adjacent velocity, and cover data were collected at each location where juveniles were observed. Approximate numbers of juveniles by size class for each observation were also recorded. Horizontal location data for all observations were recorded using a total station. This data will be used for validating the combined habitat suitability for rearing juvenile chinook salmon that will be determined by the 2-D models. A total of 30 observations of juveniles were made in the four sites during the two snorkel surveys.

Hydraulic Model Construction and Calibration

All data for the pre-restoration and post-restoration spawning and juvenile habitat sites have been compiled and checked. PHABSIM data decks and hydraulic calibration have been completed for the upstream and downstream transects for all of the pre-restoration and post-restoration sites. The bed file and computational mesh for the 2-D modeling program have been completed for all of the pre-restoration and post-restoration sites. Construction of final 2-D modeling files and production runs for all of the simulation flows have been completed for two of the pre-restoration sites and all of the post-restoration sites.

Habitat Suitability Criteria (HSC) Development

Habitat Suitability Criteria data will not be collected during this study. HSC previously developed on the Merced River for spawning and on the Sacramento River for rearing will be used to predict the amount of spawning and rearing habitat present over a range of discharges in the restoration site prior to and after restoration actions.

Habitat Simulation

Spawning and rearing habitat at all of the simulation flows has been generated for two of the pre-restoration sites. A final report evaluating the success of restoration activities in providing more spawning and rearing habitat for salmon will be completed by May 2004.