

Merced River- Restoration evaluation using PHABSIM 2-D model
AFRP AWP 00 Initial Scope of Work

AFRP- Annual Workplan 2000

Initial Scope of Work to:

Evaluate use of PHABSIM/2D modeling of spawning and rearing habitat to assess benefits of channel restoration

PROPOSED AFRP CONTRIBUTION: \$ 50,000

An Initial Scope of Work Submitted by:

FWS Energy and Power and Instream Flow Assessment Branch

SCOPE OF WORK

MERCED RIVER SALMON RESTORATION ACTION **Robinson Restoration Site Pre/Post Habitat Monitoring**

1. Scope of the Project

The proposed project is to quantify the amount of fall-run chinook salmon spawning and rearing habitat, before and after restoration, in the Robinson restoration project, located at RM 42-43.5 on the Merced River. The primary fishery objective of the project is to evaluate whether the Robinson restoration project on the Merced River increases spawning habitat (and thus spawning success) and rearing habitat (and thus juvenile survival). The tasks comprising this project are: 1) project management; 2) field reconnaissance and site selection; 3) hydraulic data collection; and 4) construction and calibration of hydraulic and habitat simulation models; the latter three tasks will be conducted both before and after restoration of the Robinson project. Analytical procedures will involve the application of a two-dimensional hydraulic and habitat simulation model (River2D). The deliverable for this project will be a final report comparing the amount of spawning and rearing habitat present, over a range of flows, before and after restoration. Pre-restoration activities will be conducted in FY-2000, while post-restoration activities will be conducted in FY-2001 or 2002, depending on the schedule for restoration.

2. Justification and Benefits of the Project

Project benefits will target the Merced River fall-run chinook salmon. The primary fishery objective of the project is to evaluate whether restoration projects have increased spawning and rearing habitat.

Specific project biological/ecological objectives/benefits are:

Primary Project Objectives/Benefits

- < Increase spawning success through increased spawning habitat associated with habitat restoration
- < Increase juvenile survival through increased rearing habitat associated with habitat restoration

Project objectives address the following:

Primary Ecosystem Restoration Stressors:

- < Identified Stressor #1 - Channel Form Changes
Alterations of channel form have resulted in declines in spawning and rearing habitat in the Merced River. The proposed study will evaluate the extent to which the Robinson

Restoration Project reverses this decline.

3. Monitoring and Data Evaluation

The entire extent of this project is monitoring and evaluation of the Robinson restoration project. The monitoring and evaluation is to achieve the project objective and benefits, i.e. evaluating whether the Robinson restoration project has increased spawning and rearing habitat for fall-run chinook salmon. The main hypothesis to be tested by this project is that restoration activities will increase the amount of spawning and rearing habitat for chinook salmon in the Merced River. There is a high potential for coordination with other monitoring and evaluation activities, such as geomorphology and monitoring of habitat use, of the Robinson restoration project. The monitoring should also be useful in evaluating the potential for restoration projects to alter the flow needs for chinook salmon in the Merced River. It is anticipated that the results of this project will be incorporated into a manuscript to be submitted for publication in a peer-reviewed scientific journal.

4. Work to Be Performed and Deliverables by Task/Phase

Actual work and schedules will be fully described in and authorized through Task Orders, which will be attached to this Agreement at a later date.

Listed below are the tasks needed to fully complete the Robinson Restoration Site Pre/Post Habitat Monitoring Project. The general work to be completed is as follows:

OVERALL PROJECT TASKS

< Indicates a deliverable. This is a minimum list of deliverables. Additional deliverables may be negotiated by Task Order.

1. Project Management (Initiated)

Overall project management and administration including overseeing project coordination meetings, managing project finances (budgets, contracts, etc.), and preparing project progress reports.

< Annual Progress Reports will be submitted covering work completed, future work, and financial aspects.

2. Modeling of Spawning and Rearing Habitat in Restoration Site Prior to Restoration Actions

2.1 Field Reconnaissance and Study Site Selection

Three to four study sites will be selected in the Robinson restoration area.

2.2 Hydraulic Data Collection

Data will be collected on water surface elevations, bed topography, cover and

substrate distribution for input into a 2-dimensional hydraulic and habitat model.

2.3 Construction and Calibration of hydraulic and habitat simulation models.

The data from Task 2.2 will be used in a 2-dimensional hydraulic model to predict the velocities and depths present in the study sites over a range of discharges.

This output, along with the substrate and cover distribution in the site and Habitat Suitability Criteria previously developed on the Merced River or other streams, will be used to predict the amount of spawning and rearing habitat present over a range of discharges in the Robinson restoration site prior to restoration actions.

3. Modeling of Spawning and Rearing Habitat in Restoration Site After Restoration Actions

3.1 Field Reconnaissance and Study Site Selection

Three to four study sites will be selected in the Robinson restoration area.

3.2 Hydraulic Data Collection

Data will be collected on water surface elevations, bed topography, cover and substrate distribution for input into a 2-dimensional hydraulic and habitat model.

3.3 Construction and Calibration of hydraulic and habitat simulation models.

The data from Task 3.2 will be used in a 2-dimensional hydraulic model to predict the velocities and depths present in the study sites over a range of discharges.

This output, along with the substrate and cover distribution in the site and Habitat Suitability Criteria previously developed on the Merced River or other streams, will be used to predict the amount of spawning and rearing habitat present over a range of discharges in the Robinson restoration site after restoration actions.

< Final Report, comparing the amount of rearing and spawning habitat present in the Robinson restoration area before and after restoration actions over a range of discharges.

5. Budget

Cost Breakdown Table

PROJECT PHASE/TASK	DIRECT LABOR HRS.	DIRECT SALARY & BENEFITS	INDIRECT COST RATE (19%)	TRAVEL COSTS	TOTAL COSTS
1. PROJECT MANAGEMENT	48	\$1,680	\$320		\$2,000
2. PRE-RESTORATION HABITAT MODELING	24	\$600	\$114		\$714
2.1 FIELD RECONNAISSANCE/STUDY SITE	384	\$9,600	\$1,824	\$3,497	\$14,921
2.2 HYDRAULIC DATA COLLECTION	320	\$8,000	\$1,520		<u>\$9,520</u>
2.3 MODELING					\$25,155
3. POST-RESTORATION HABITAT MODELING	24	\$600	\$114		\$714
3.1 FIELD RECONNAISSANCE/STUDY SITE	384	\$9,600	\$1,824	\$3,497	\$14,921
3.2 HYDRAULIC DATA COLLECTION	320	\$8,000	\$1,520		<u>\$9,520</u>
3.3 MODELING					\$25,155
TOTALS					\$52,310

Note: Budget Justification follows

BUDGET JUSTIFICATION

The following rates were used to determine the budget:

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1. Project Management		
GS 12 (\$280/day)(3 days/year)(2 years)		= \$1,680
2.1 Field Reconnaissance/Study Site Selection		
Field staff (\$200/day/person)(3 people/crew)(1 day)		= \$600
2.2 Hydraulic Data Collection		
Field staff (\$200/day/person)(3 people/crew)(16 days)		= \$9,600
Travel costs (\$291.40/week/person)(3 people/crew)(4 weeks)		= \$3,497
2.3 Modeling		
Field staff (\$200/day)(40 days)		= \$8,000
3.1 Field Reconnaissance/Study Site Selection		
Field staff (\$200/day/person)(3 people/crew)(1 day)		= \$600
3.2 Hydraulic Data Collection		
Field staff (\$200/day/person)(3 people/crew)(16 days)		= \$9,600
Travel costs (\$291.40/week/person)(3 people/crew)(4 weeks)		= \$3,497
3.3 Modeling		
Field staff (\$200/day)(40 days)		= \$8,000

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Quarterly Budget Table

PROJECT PHASE/TASK	Oct- Dec 00	Jan- Mar 01	Apr- Jun 01	Jul-Sep 01	Oct- Dec 01	Jan- Mar 02	Apr- Jun 02	Jul-Sep 02	TOTAL
1. PROJECT MANAGEMENT	\$250	\$250	\$250	\$250	\$250	\$250	\$250	\$250	\$2,000
2. PRE-RESTORATION HABITAT MODELING	\$714	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$714
2.1 FIELD RECONNAISSANCE/STUDY SITE	\$7,460	\$7,461	\$0	\$0	\$0	\$0	\$0	\$0	\$14,921
2.2 HYDRAULIC DATA COLLECTION	\$0	\$0	\$4,760	\$4,760	\$0	\$0	\$0	\$0	<u>\$9,520</u>
2.3 MODELING									\$25,155
3. POST-RESTORATION HABITAT MODELING	\$0	\$0	\$0	\$0	\$714	\$0	\$0	\$0	\$714
2.1 FIELD RECONNAISSANCE/STUDY SITE	\$0	\$0	\$0	\$0	\$7,460	\$7,461	\$0	\$0	\$14,921
2.2 HYDRAULIC DATA COLLECTION	\$0	\$0	\$0	\$0	\$0	\$0	\$4,760	\$4,760	<u>\$9,520</u>
2.3 MODELING									\$25,155
TOTALS	\$8,424	\$7,711	\$5,010	\$5,010	\$8,424	\$7,711	\$5,010	\$5,010	\$52,310