

San Joaquin River basin- Scale reading and cohort analysis
AFRP AWP 00 Initial Scope of Work

AFRP- Annual Workplan 2000

Initial Scope of Work for:

Scale and cohort analysis of San Joaquin Basin scale samples to refine existing fisheries management tools

PROPOSED AFRP CONTRIBUTION: \$ 50,000

A Scope of Work Submitted by:

California Department of Fish and Game- Region 4

I SCOPE OF THE PROJECT

This project deals with age determination of spawning chinook salmon in the San Joaquin River basin. This basin is the southern-most extreme of the present chinook salmon distribution in the Central Valley of California. Salmon spawn primarily in three eastside tributaries; the Stanislaus, the Tuolumne and the Merced Rivers. Although some spring-run chinook occur in the basin the majority are fall-run and they will be the subjects of this study.

Cohort analysis of the spawning runs in all three tributaries is the primary objective of this project. Presently, 4,000 scale samples are available from spawning fall-run chinook in this basin back to the early 1980's. Scales were removed from carcasses, above the lateral line and below or slightly posterior to the dorsal fin.

The existing inventory of scale samples greatly simplifies this project. There will four tasks in this project.

Task 1 - This will be a process of cleaning the scales and attaching them to a glass slide that they can be viewed. Organization and inventory of the scale collection will also be a component of this 1st task. This task should be completed within one year of the project being funded. The primary product will be a table of the number of samples by fork length by river by year.

Task 2 - Age determinations will be made for all scale samples in the collection. This will involve two readers assigning ages to all scale samples. This task should be completed within two years of the project being funded. The primary product will be a table of age distribution by fork length category by year. An additional product will be a protocol for identification of annulus resorption.

Task 3 - This is the quality control task. This involves both reading of known age fish and rereading of 10% of all scales by both readers. This allows for determination of both precision and accuracy of the process the readers are using. This task will be performed concurrently with task 2. Primary product will be a table of percent precision and accuracy of both readers by river by year. Also variability between readers will be evaluated on this table. One reader will be from outside the Department of Fish & Game.

Task 4 - Last task involves data management, analysis and reporting. Much of this will not be performed as part of this contract as the principle investigator will be doing most of this work and will not be paid through this contract. These items will be completed within 3 years of the project being funded. Primary product will be a report analyzing spawning escapements on the basis of cohort contribution and a summary of the total spawning escapement contributed by any one cohort (brood year). Additional products will include summaries of data used to evaluate scale resorption and freshwater residence.

There is wide spread local support throughout the basin for this work. Specifically, the Lower Tuolumne Technical Advisory Committee and the Stanislaus Fish Group both are supportive of

this effort.

II BENEFITS OF THE PROJECT

Carcass surveys are the primary monitoring tool for evaluating the health of the chinook salmon stocks in the San Joaquin River basin. Age of the spawning chinook salmon has traditionally been determined by length-frequency analysis and the identification of nadirs in the distribution of lengths. While this works fairly well for identifying the break between 2 and 3 year olds, the extent of overlap is so great among 3, 4 and 5 year olds that the technique is very limited. In order to more accurately assign fish of various lengths to cohort, age determinations need to be made for fish of a variety of fork lengths in each year of carcass survey data.

This will allow a more accurate allocation of chinook spawning escapement to brood year. Once this has been done total number returning from any one brood year can be compared with the environmental conditions of the brood year's spring and summer environmental conditions as well as spawning numbers. Results of these evaluations should give a more clear understanding of the variables that affect the ultimate production of chinook salmon in the San Joaquin River.

Many restoration plans have been put forward for the San Joaquin River. These include the Restoring Central Valley Streams: A Plan for Action by California Department of Fish and Game, the San Joaquin River Management Plan by California's Resources Agency, the Anadromous Fisheries Restoration Plan by US Fish and Wildlife Service and various plans by the multi-agency CalFed program. A critical component of these restoration plans is the monitoring of the effectiveness of the proposed actions. Cohort analysis will allow a watershed-specific evaluation of overall success of restoring the watershed. This analysis will also help in the identification of limiting factors in the system when used in conjunction with outmigration indices and harvest estimates.

A clearer understanding of the limiting factors in the system will help in the adaptive management process by assisting in identifying restoration actions that are most effective and least effective.

Although this project is not linked to the AFRP through any stream-specific actions, it is linked via the watershed-specific monitoring it provides and its ability to reduce scientific uncertainty. It is also part of a recommended tool in the CVPIA (section 3406(b)(16)).

III MONITORING AND DATA EVALUATION

IV WORK TO BE PERFORMED AND DELIVERABLES

V BUDGET- Estimated cost for all 4 Tasks \$100,000