

Executive Summary

ESTIMATING JUVENILE CHINOOK SALMON SPRING AND WINTER RUN ABUNDANCE AT CHIPPS ISLAND

This project will develop and implement a DNA sampling protocol for juvenile Chinook salmon captured at Chipps Island to estimate the timing, abundance and proportion of spring- and winter-run Chinook salmon leaving the Sacramento-San Joaquin Delta. This 3-year study will estimate the abundance of winter- and spring- run juvenile production leaving the Delta and compare it to other model estimates. This project will also evaluate the feasibility of estimating abundance using DNA sampling, at additional salmon monitoring locations, by first attempting it at Chipps Island.

Fin tissue for DNA analysis will be collected from juvenile Chinook salmon captured in standard trawl sampling conducted at Chipps Island (in the western Delta, near Pittsburg). Trawling at Chipps Island has historically been used to index the abundance of Chinook salmon smolts entering saltwater each year (USFWS, 2003 and Brandes and McLain, 2001). DNA typing will substantially improve distinction of Chinook races, compared to the size-at-date criteria method (Johnson et al., 1992), that is currently in use. A statistically rigorous sampling design will be developed to ensure that results can be expanded accurately to the total population. The priority in the sampling design will be given to estimating the fraction of winter- and spring-run among all Chinook smolts at Chipps Island over a three year period.

Given that expansion of trawl catches are needed to estimate total abundance of winter and spring-run Chinook salmon leaving the Delta, this project will also thoroughly evaluate trawl efficiency at Chipps Island. Coded wire tag (CWT) recoveries from several past releases (USFWS, 2001, Newman and Rice, 2002 and Rice, 2003) will be reviewed, analyzed and modeled to identify trawl efficiency and apply it to catches of juvenile winter- and spring-run (identified using DNA) to estimate total abundance of these races passing Chipps Island

Estimating the abundance of "true" juvenile winter- and spring-run Chinook salmon leaving the Delta is fundamental to achieving two of the Science Program's priority research topics listed in this CALFED Science Proposal Solicitation: 1) identifying trends and patterns of populations and system response to a changing environment and 2) using discretionary environmental water supplies more effectively for at-risk species.

Abundance estimates based on genetic identification will be considerably more accurate than estimates that are currently based on length-at-date criteria. In addition, a more statistically robust sub-sampling protocol and further assessment of catch efficiency and its application for expansion, will improve our estimates of abundance at Chipps Island such that we can begin to identify relationships between adult escapement, juvenile production and survival, and factors such as water operations in the Delta.