Interagency Ecological Program 2024 Work Plan Element PEN 322: Estimating the abundance of run specific juvenile Chinook salmon entering and exiting the Delta from genetic monitoring data, estimates of trawl efficiency from coded wire tags, and acoustic telemetry releases

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Annual Cost (thousands) and Funding Sources

$600 DWR; $600 USBR (CVPIA)

Costs are included in the DJFMP agreements with DWR and USBR.

Description

This is a continuation of a five-year project funded by CDWR and CDFW and the Central Valley Project Improvement Act in 2017. The objective of the project is to improve estimates of population abundances for fall, winter and spring run juvenile Chinook Salmon at Sacramento and Chipps Island by improving trawl efficiency estimates using data from releases of coded wire tags (CWT), acoustic tags (AT), and by genetically sampling the trawl catch in 2023 and 2024.

The project will:

(1) develop statistical models for estimating trawl efficiencies using 2016-2023 data for paired AT-CWT releases of winter run and fall-run Chinook Salmon.

(2) use 2016-2023 genetic sampling of trawl catch in combination with efficiency estimates to estimate population abundances of fall, spring and winter run at Sacramento and Chipps Island for 2016-2023.

(3) implement trawl efficiency studies for multiple salmon runs in 2023-2024 informed by the prior results and in coordination with hatcheries for inclusion of AT fish with existing CWT releases; and

(4) combine trawl efficiencies with genetic samples of trawl catch to provide estimates of fall, spring and winter-run salmon abundance (with estimated precision) entering and exiting the Delta in 2016-2023.

Project Need

There is growing appreciation that a salmon monitoring network that quantitative estimates of abundance are desirable to improve our knowledge and resolution of life stage success and movement across the landscape (Salmon SAIL conceptual models 2016).

Project Objectives

- Estimate the population-level status and trends for winter run; and status of spring and fall run
- Evaluate production estimates for juvenile winter-run Chinook Salmon entering the Delta used in water project take development
- Provide estimates of winter and fall run-specific freshwater cohort strength to support ocean harvest management decisions
- Establish a time series of winter, spring and fall run-specific production estimates at key locations for incorporation into life cycle models.

Schedule of Milestones

October – May (annually) → Field sampling/tagging completed

February – September (annually) → CWT and genetic identification processing

October – December (annually) → Data processing, analyses, modeling and reporting

Project Reports and Publications

We are still in the process of finalizing reports and publications. We expect that results for abundance estimation for winter-run at Sacramento would end up in a manuscript rather than report. There should also be two more manuscripts focused on the key results of (1) and (2).

1. "Analysis of historical trawl data for juvenile Chinook salmon at Chipps Island" (Bayesian models analyzing factors affecting catch-by-tow across four decades)

2. "Temporal and spatial patterns of movements of acoustic-tagged juvenile Chinook salmon at Chipps Island" (data consist of our 31 AT releases from 2016-2021; analyses seek to augment our understanding of factors affecting efficiency/catch rates)

3. "Analysis of trawl efficiency for juvenile Chinook salmon in the Sacramento River" (a diverse collection of analyses using historical CWT releases, historical catch-by-tow data, and our AT releases from 2016-2021)