Estimating Juvenile Production and Run Timing of Spring Chinook Salmon Leaving the Delta

Study Period

2021 - 2025

Funded By:

Delta Science Program
DELTA STEWARDSHIP COUNCIL

BUREAU OF RECLAMATION

About this Project

Spring-run Chinook salmon (*Oncorhynchus tshawytscha*) are a high-priority species under the Endangered Species Act due to their risk of extinction. However, understanding the factors affecting their populations is difficult when monitoring focuses only on returning adult spawners. This limited view overlooks critical life stages. To address this gap, the project aimed to estimate the number of juvenile salmon leaving the Delta at Chipps Island. Monitoring salmon throughout their entire life cycle is essential for identifying the key factors influencing their survival and reproduction.

There is a need from both scientists and managers for accurate data to make informed decisions about salmon protection and conservation. Recently, the Department of Water Resources (DWR) mandated that juvenile production estimates for spring-run salmon be included in their incidental take permit, which is necessary for the continued operation of the State Water Project. A method to estimate juvenile abundance of spring-run salmon leaving the Delta (at Chipps Island) does not exist yet.

To develop these annual estimates, researchers built on previous studies and incorporated new genetic data into updated models. This approach maximized the use of available information and the latest genetic research to improve the protection and understanding of these threatened fish.

Lead Investigators

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Project Objectives

- Develop a study design, sampling plan, and workflow to estimate annual juvenile salmon
- Develop a model to estimate abundance and run timing of salmon for genetic assignment errors
- Apply abundance models to estimate juvenile salmon production for selected outmigration years
- Create a model to estimate the number and timing of salmon that also takes possible errors in genetic analysis into account
- Provide technical guidance for modifying the trawl sampling plan to improve abundance estimates

Why this Research Matters

This project provides critical information on the federally threatened spring-run Chinook salmon. Understanding juvenile production estimates at the entrance and exit to the Delta is crucial to aiding the protection and recovery of Chinook salmon populations. Quantifying survival between different life cycle stages can reveal demographic patterns in life cycle models, connect demographic parameters to environmental or management drivers, and predict how proposed management actions might impact the risk of extinction.

Management Application

The data collected through this project plays a crucial role in managing both threatened spring-run and endangered winter-run Chinook salmon populations. Monitoring salmon at various stages of their life cycle helps assess how water management and climate change impact these populations. The findings will help inform decisions aimed at protecting these critical species and improve conservation strategies.

Connections to the 2017-2021 Science Action Agenda

2: Capitalize on existing data through increasing science synthesis

4: Improve understanding of interactions between stressors and managed species and their communities

5: Modernize monitoring, data management, and modeling