



Interagency Ecological Program 2023 Work Plan Element Endangered winter-run Chinook salmon entrainment prediction tool: a machine learning approach to inform management

Project Manager/Principal Investigator and Affiliation

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Annual Costs (thousands) and Funding Sources

\$0 DWR; \$0 USBR; CDFW In-Kind Contribution

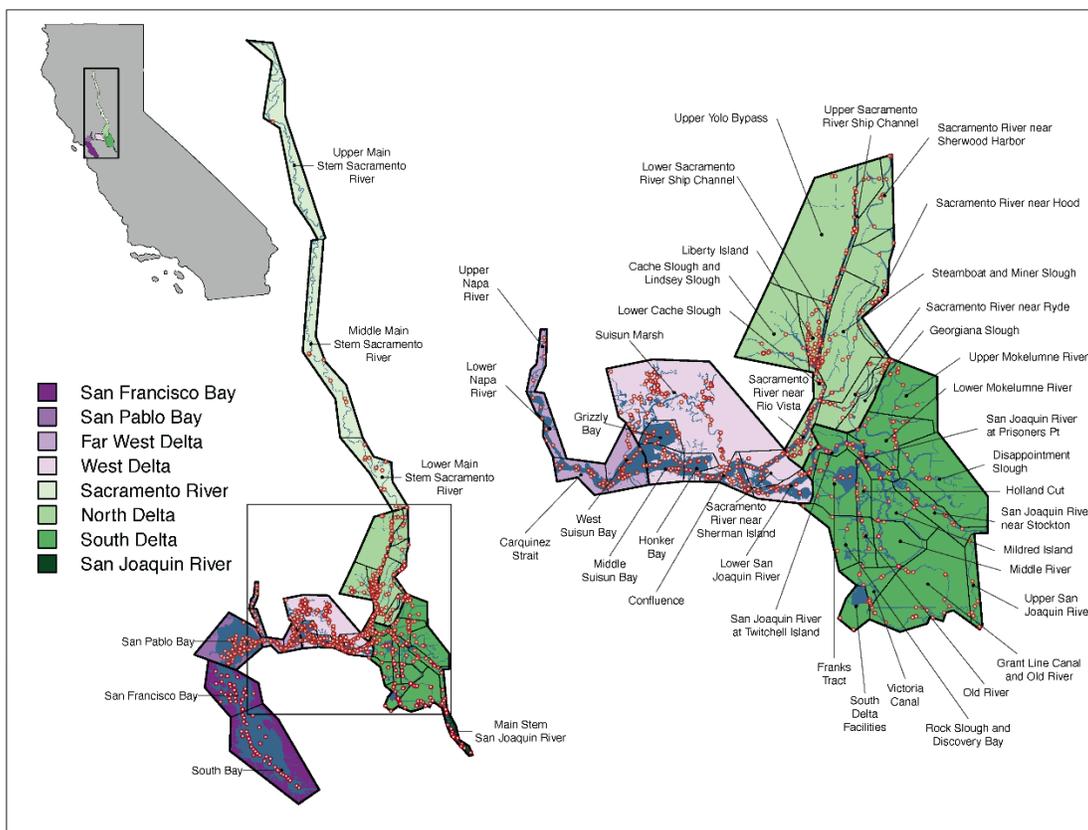


Figure: Study map of the winter-run Chook salmon machine learning project's (Interagency Ecological Program Project Element Number 2021-349) synthesized dataset study site locations (red-bordered yellow points). Shown with project sub-regions (thin bordered, labeled polygons) and regions (thick bordered, colored polygons; see legend for labels). Water bodies shown in steel blue. EDSM sites are removed for clarity.

Description

The purpose of this project is to inform Science Requirement 7.5.3 of the 2020 CDFW Incidental Take Permit for State Water Project operations. More specifically, we propose developing a suite of statistical models that provide the Salmon Monitoring Team with

predicted winter-run Chinook salmon detection in salvage given current or hypothetical conditions in the San Francisco Estuary. The primary deliverable of this effort will be an interactive web-tool that provides the Salmon Monitoring Team with a time-series estimating the probability of winter-run Chinook salmon salvage given current and recent conditions in the San Francisco Estuary as well as a scenario tool predicting winter-run Chinook salmon salvage given a user selected suite of near-future conditions. Ultimately, the goal of this effort is to increase our understanding of endangered winter-run Chinook salmon ecology and support the Salmon Monitoring Team's efforts to provide water to the State of California while meeting the conservation need of minimize endangered species entrainment.

Need

The model and web tool developed during this project will fulfill the 2020 Incidental Take Permit condition 7.5.3. Specifically, the model will allow the Salmon Monitoring Team to *proactively* manage winter-run Chinook salmon entrainment.

Objectives (Research Questions to be Addressed)

- Can we minimize endangered winter-run Chinook salmon entrainment risk (as measured by salvage) while continuing to provide water to the State of California? Specifically, can recent and historical data be used to effectively predict winter-run Chinook salmon detection in salvage under current and near-future conditions in the San Francisco Estuary to promote conservation of this endangered fish? If so, can we develop useful and accessible automated and interactive real-time and scenario-based risk assessment web-tools?
- Would expedited processing of any non-real-time samples significantly improve model fit and predictive capacity? Specifically, which non-real-time limnological and biological variables improve real-time model fit and predictive capacity? If we could prioritize non-real-time limnological and biological sample processing, which study-station samples should be prioritized and how would this improve risk assessment?

Schedule of Milestones

- November/December 2021 – Annual oral update reporting to Salmon Monitoring Team and Synthesis PWTs
- March 2022 – IEP Workshop presentation
- October/November 2022 – Stakeholder web-tool interactive workshop
- December 2022 – Technical report to IEP and PWTs
- December 2022 – Web-tool publication
- December 2022 – Data package publication behind firewall embargo (of integrated datasets approved for publication)
- March 2023 – Peer-reviewed journal article submission
- July 2023 – Remove data embargo
- January-December 2023 – Explore the potential development of genetics-based models