



Interagency Ecological Program 2024 Work Plan Element IEP Gear Efficiency Evaluations in Support of Modeling Efforts for Delta Smelt

Project Manager and Affiliation

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Annual Cost (thousands) and Funding Sources

USFWS & CDFW: In-kind time of collaborators



RV Scrutiny & RV Beowulf in Sacramento Deep Water Shipping Channel

Description

This Element consists of gear selectivity evaluations and a quantitative analysis to investigate potential bias resulting from the use of fixed sites in the San Francisco Estuary compared to randomly selected sites. Since the gear selectivity component has largely been completed, this Element will focus on developing and implementing methods of comparing catch data from fixed site surveys (e.g., Spring Kodiak Trawl, Fall Midwater Trawl, Summer Towner, etc.) with random site surveys (e.g., the Enhanced Delta Smelt Monitoring program) to investigate potential bias in the long-term population

trends of species with sufficiently large catches. This analysis will rely on past and current routine monitoring data and therefore does not have a field work component.

Project Need

Gear selectivity evaluations are needed to integrate catch data from multiple trawl surveys to estimate abundance and ultimately to model population dynamics for Delta Smelt and other species of management concern. Data from simultaneous, adjacent deployment of IEP survey gears has permitted the estimation of size selectivity curves for multiple fish species, including Delta Smelt. These selectivity curves are used to account for size-selectivity when calculating estimates of population size based on historic survey data. As an extension of this, we plan to investigate whether any bias can be detected in data from fixed site surveys such as the Spring Kodiak Trawl and Fall Midwater Trawl when compared with data from random site surveys such as the Enhanced Delta Smelt Monitoring program. This analysis will be relevant to the sample design development of current and future monitoring programs in the San Francisco Estuary. It may also provide insight on how to integrate CDFW and USFWS survey data to inform population trends.

Project Objectives

- Investigate and quantify bias, if any, associated with current fixed-site configuration of sampling stations relative to random site selection.

Schedule of Milestones

- Spring 2024: Organize and analyze data, research similar work, and implement analysis.
- Fall 2024: Summarize methods and results in a technical report. Convert technical report to a manuscript, if appropriate.

Project Products and Publications

Several manuscripts have been published on the gear selectivity evaluation component of this Element:

Mitchell, L., Newman, K., Baxter, R. 2017. [A covered cod-end and tow-path evaluation of midwater trawl gear efficiency for catching Delta Smelt \(*Hypomesus transpacificus*\)](#). San Francisco Estuary and Watershed Science, 15(4).

Mitchell, L., Newman, K., Baxter, R. 2019. [Estimating the size selectivity of fishing trawls for a short-lived fish species](#). San Francisco Estuary and Watershed Science, 17(1).

Mitchell, L., Baxter, R. 2021. [Examining retention-at-length of pelagic fishes caught in the Fall Midwater Trawl Survey](#). San Francisco Estuary and Watershed Science, 19(2).

Additional publications that incorporate the gear selectivity evaluation results include:

Polansky, L., Mitchell, L., Newman K.B. 2019. [Using multistage design-base methods to construct abundance indices and uncertainty measures for Delta Smelt](#). Transactions of the American Fisheries Society, 148:710–724

Polansky, L., Newman K.B., Mitchell, L. 2020. [Improving inference for nonlinear state-space models of animal population dynamics given biased sequential life stage data.](#) Biometrics. 2020;1–10.