



Interagency Ecological Program 2024 Work Plan Element Physical and Biological Drivers of Fish Distribution in Suisun Bay

Project Manager and Affiliation

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Annual Cost (thousands) and Funding Sources

\$ 157 USACE

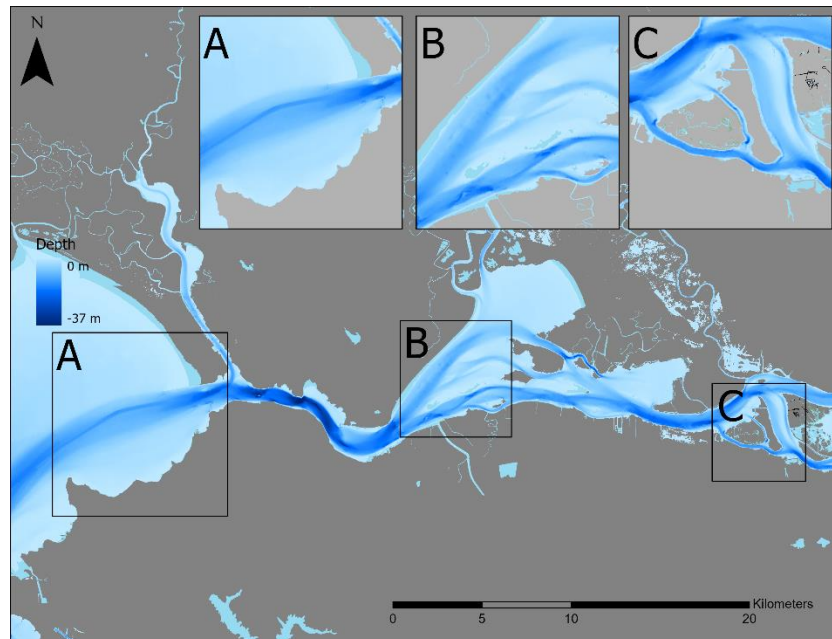


Figure: Map of study sites within the San Francisco Estuary. Panel A denotes shoal and channel habitat in San Pablo Bay between the Napa River and Point Pinole. Panel B denotes channel and shoal habitat in Suisun Bay upstream of Carquinez Strait. Panel C denotes New York Slough near Brown's Island. Water depth is indicated by color.

Description

Species distributions in San Francisco Estuary are controlled by factors acting at multiple spatiotemporal scales, including physical habitat (e.g., channels, shoals, wetlands), water quality conditions (e.g., salinity, turbidity), hydrodynamics (water velocities), and species-specific behavioral responses to these factors in time and space. There is substantial variability in the lateral and vertical distribution of abundant pelagic fish species. This variability in lateral and vertical distribution of fishes can have important implications for resource managers assessing dredging impacts on fish habitat use. Vertical and lateral distribution studies will be conducted at various locations in the central San Francisco Estuary.

Project Need

Given the variability in the fine-scale distribution of fishes, additional information is needed to assess the impact of spatiotemporally discrete management actions, such as dredging. The United States Army Corps of Engineers needs higher resolution information on fish distribution to assess alternate methods of data collection (i.e., bioacoustics) and ultimately inform their estimates of dredging impacts. Additionally, detailed information on the fine-scale distribution of fishes can provide important context for mechanisms that drive fish distribution at fine temporal or spatial scales (e.g., tidal). This could enhance understanding of microhabitats used by various fish species, with the ultimate benefit of explaining uncharacterized variability in monitoring surveys that operate at broader spatiotemporal scales.

Project Objectives

The primary objective of this study is to identify factors that drive variability in vertical and lateral distribution of San Francisco Estuary fishes (both populations and communities) in early Autumn, and thus potential susceptibility to dredging. This objective will be met by addressing the following specific study questions:

- Are fishes evenly distributed vertically and laterally in the water column near potential channel dredging operations by the Army Corps of Engineers?
- Does fish distribution respond to environmental cues, including gradients in tidal currents, turbidity, salinity, ambient light, or dredging operations?
- Can hydroacoustic data on fish abundance collected by the US Army Corps of Engineers approximate conclusions reached from sampling using towed nets?

Schedule of Milestones

- October 2023: Field data collection
- June 2024: Data publicly available via sciencebase.gov
- September 2024: Annual report due to funding agency
- September-October 2024: Field data collection
- June 2025: Data publicly available via sciencebase.gov
- September 2025: Final report due to funding agency

Project Products and Publications

Palm et al. 2023. A preliminary look at fine-scale drivers of pelagic fish distribution in Suisun Bay, California. IEP Annual Workshop. Sacramento, CA. Poster Presentation

Palm, D.L., Martinez, A.R., Young, M.J., and Stumpner, P., 2023, Fish distribution and tidal currents in the Upper San Francisco Estuary in 2022: [U.S. Geological Survey data release](https://doi.org/10.5066/P9B6YYBU), <https://doi.org/10.5066/P9B6YYBU>.