Interagency Ecological Program 2024 Work Plan Element
Delta Smelt Life Cycle Model

Project Manager and Affiliation

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Principal Investigator and Affiliation

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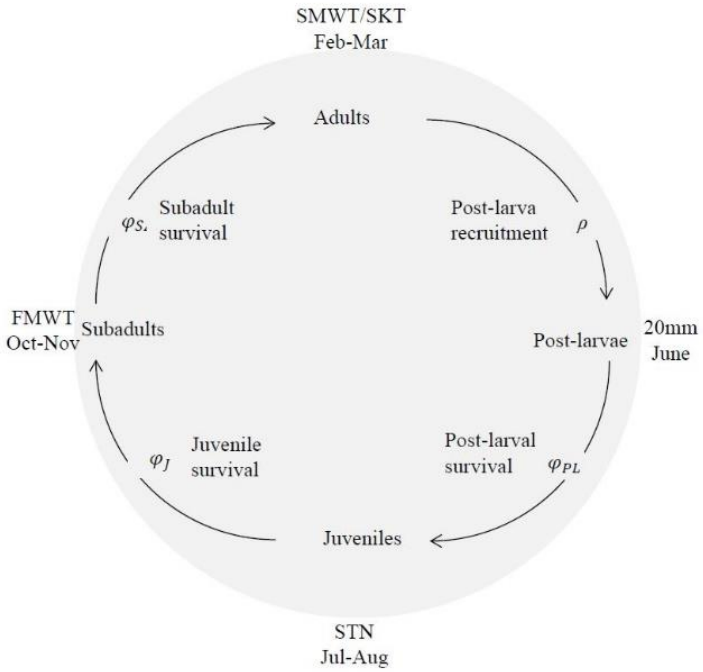
Annual Cost (thousands) and Funding Sources

DWR & USBR: In-kind time of collaborators



Conceptual model of Delta Smelt life cycle

Description

The Delta Smelt Life Cycle Model (DSLCM) is a state-space model designed (a) to provide a quantitative, empirically-based decision support tool for assessing the effects of management actions and environmental conditions on the population dynamics of Delta Smelt, (b) to suggest management actions, (c) to provide guidance and recommendations for future data needs and data collection procedures, and (d) to carry out Population Viability Analysis (PVA) to predict the long term consequences of particular actions.

Project Need

The DSLCM addresses the need for data-based tools designed to improve the understanding of Delta Smelt population dynamics, assess the effectiveness of potential population management strategies, predict the population trajectory under a variety of environmental and management scenarios, and ultimately aid in the development of a recovery plan.

Project Objectives

- Refine Delta Smelt Life Cycle Model(s) and assess data gaps.
- Assess factors that may influence reproductive success and survival processes.

Schedule of Milestones

- Throughout 2024: Continued development of technical notes related to DSLCM efforts.
- Throughout 2024: Submitting and/or revising manuscripts to peer reviewed journals on DSLCM work as appropriate.

Project Products and Publications

Products include publications and technical notes. A partial list is provided here:

Polansky, L., K.B. Newman, L. Mitchell. 2020. Improving inference for nonlinear state-space models of animal population dynamics given biased sequential life stage data. Biometrics. 1–10. https://doi.org/10.1111/biom.13267.

Smith, W.E., K.B. Newman, L. Mitchell. 2019. A Bayesian hierarchical model of postlarval delta smelt entrainment: integrating transport, length composition, and sampling efficiency in estimates of loss. Canadian Journal of Fisheries and Aquatic Sciences. Published on the web 7 December 2019. https://doi.org/10.1139/cjfas-2019-0148.

Smith, W.E. 2019. Integration of transport, survival, and sampling efficiency in a model of south delta entrainment. San Francisco Estuary and Watershed Science, 17. https://doi.org/10.15447/sfews.2019v17iss4art4

Smith, W.E., L. Polansky, M.L. Nobriga. 2021. Disentangling risks to an endangered fish: using a state-space life cycle model to separate natural mortality from anthropogenic losses. Canadian Journal of Fisheries and Aquatic Sciences, 78, 1008–1029. https://doi.org/10.1139/cjfas-2020-0251