



Interagency Ecological Program 2023 Work Plan Element North Delta Flow Action: Role of Improved Yolo Bypass Flows on Food Web Dynamics

Project Manager and Affiliation

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Annual Costs (thousands) and Funding Sources

\$924 DWR

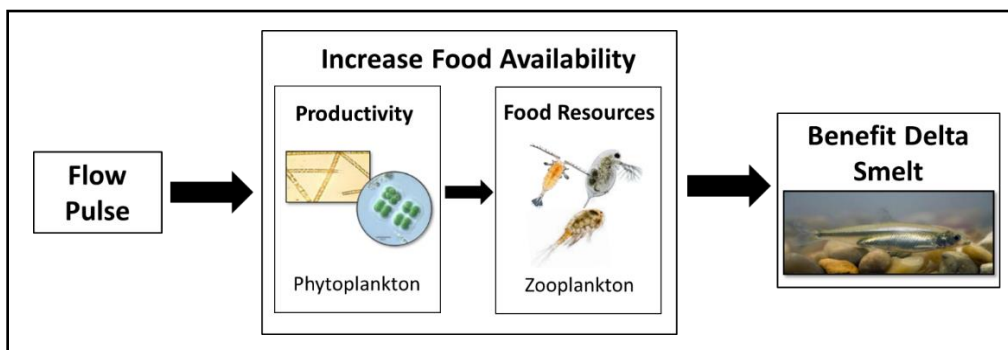


Figure: Flow pulses generated in the Yolo Bypass floodplain are hypothesized to stimulate productivity of phytoplankton and zooplankton, increasing food availability for Delta Smelt in downstream habitats.

Description

In a collaborative effort between CA Department of Water Resources, US Bureau of Reclamation, CA Department of Fish and Wildlife, United States Geological Survey, US Fish and Wildlife Service, and San Francisco State University, this project monitors and evaluates the effects of augmented summer and fall flows in the Yolo Bypass and North Delta on lower trophic food web dynamics and the benefits to listed fish species. Using both continuous and discrete sampling approaches, this study relates hydrologic patterns to chlorophyll-a, nutrients and primary productivity, plankton densities and composition (phytoplankton and zooplankton), contaminant concentrations, as well as water quality parameters such as electrical conductivity, turbidity, temperature, and dissolved oxygen. This project is included as a component of the Summer Fall Habitat Action Plan described in the 2019 Biological Opinions and 2020 Incidental Take Permit. This is also one of several Delta Smelt Resiliency Strategies used by the Natural Resources Agency.

Need

Due to the food-limited nature of the San Francisco Estuary, it is critical to understand mechanisms that result in food web productivity to support endangered fishes. It is also important that we use adaptive management to implement food actions to benefit listed fish species. In 2011 and 2012 there was evidence that flow pulses in the Yolo Bypass during the fall agricultural drainage period were followed by phytoplankton blooms in the lower Sacramento River. Studies using managed flow actions through the Yolo Bypass in 2016, 2018, and 2019 showed increases in density and/or transport of plankton to downstream habitats following managed flow actions; however, efficacy of managed flows for increasing food availability varied across years, suggesting that more research is warranted to understand the relationships between flow and abiotic conditions, and the biological response of the food web.

Objectives

- Monitor flow pulses through the Yolo Bypass for positive net flow to downstream habitats and increased productivity of phytoplankton and zooplankton locally and downstream.
- Evaluate spatial and temporal changes in nutrients, chlorophyll, and plankton (composition and density) in the Yolo Bypass Toe Drain, Cache Slough Complex, and lower Sacramento River in response to flow pulses.
- Characterize system limitations from abiotic and biotic factors and monitor pesticide concentrations during the study period.
- Compare efficacy of managed and non-managed flow pulses on positive net flow and productivity across years with different hydrologic conditions to adaptively manage the project.

Schedule of Milestones

March 2023. Presentation of 2022 preliminary results for annual IEP workshop.

June 2023. Annual Stakeholder Meeting.

Jul-Oct 2023. Conduct and monitor summer-fall flow pulses through Yolo Bypass (planning for Sacramento River pulse).

December 2023. Summer-Fall Habitat Seasonal report for WY 2023 for 2019 BiOps.

February 2024. Summer-Fall Habitat Seasonal report for WY 2023 for 2020 ITP.