



Interagency Ecological Program 2024 Work Plan Element North Delta Flow Action: Role of Improved Yolo Bypass Flows in Delta Food Web

Project Manager and Affiliation

Brittany Davis, DWR

Daphne Gille, DWR

Principal Investigator and Affiliation

Eric Holmes, DWR

Annual Cost (thousands) and Funding Sources

\$616 to \$1,275 (dependent on action scenario), DWR

In-kind Contribution, USBR

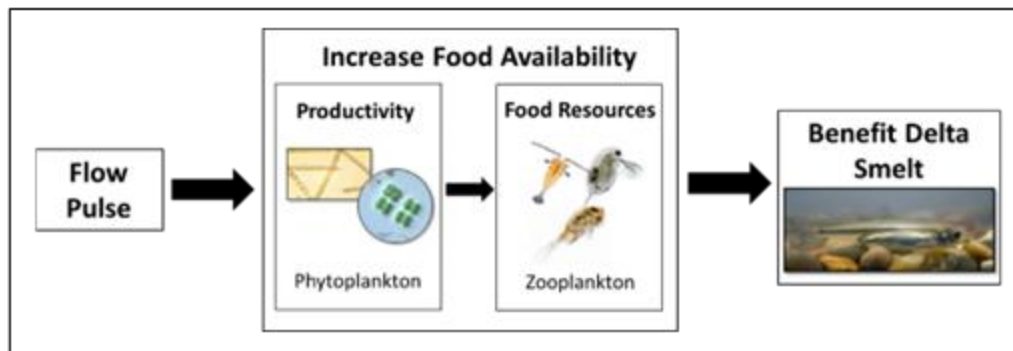


Figure 1: Conceptual hypothesis - augmented flow pulses in the Yolo Bypass transport phytoplankton and zooplankton and potentially stimulate primary productivity thereby increasing food availability for Delta Smelt in downstream habitats.

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.

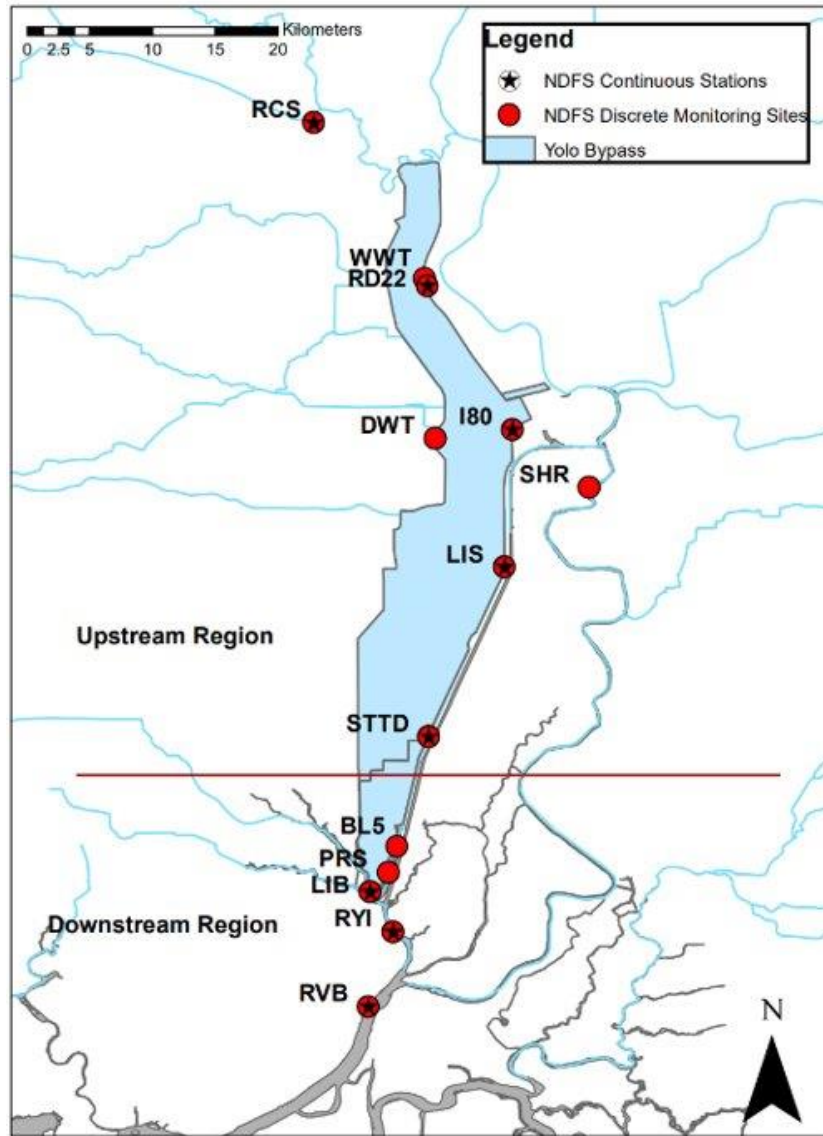


Figure 2: Map of the North Delta Food Subsidies Study area. Monitoring sites for discrete water quality and biological responses to flow pulses are shown with red circles; sites with continuous water quality are overlaid with a star. The site at the Middle Sacramento River at Sherwood Harbor (SHR) is a control site for biological monitoring.

Project Need

Due to the food- and nutrient-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.

Project 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

- June - Oct 2024. Install and maintain multi-parameter water quality instruments at designated sites.
- Jul - Oct 2024. Monitor summer-fall baseline lower trophic conditions during construction actions on flood control systems in the Yolo Bypass (construction activities will limit the ability to execute managed flow pulses in 2024).

Project Products and Publications

- December 2024. Draft Summer-Fall Habitat Action Seasonal report for WY 2024 for 2019 BiOps and 2020 ITP.
- February 2025 and May 2025. Final Summer-Fall Habitat Action Seasonal report for WY 2024 for 2020 ITP and 2019 BiOp, respectively.