

# OPERATION BASELINE

*“If you can’t measure it, you can’t improve it.” – Peter Drucker*

Initiated by the Delta Science Program in 2016, Operation Baseline refers to a suite of research projects to develop tools and collect data prior to 2021 upgrades to the Sacramento Regional Wastewater Treatment Plant (SRWTP). The primary purpose of the mandated upgrades is to improve the quality and availability of food for Delta Smelt and other native fishes. To determine whether the intended benefit for the food web occurs, it is critical that robust monitoring and analyses take place to examine the ecosystem effects of the upgrade. However, existing monitoring was not adequate for measuring the effects.

## What is the Sacramento Regional Wastewater Treatment Plant?

The largest inland discharger west of the Mississippi, Regional San processes ~130 million gallons of wastewater daily– which would fill nearly 200 Olympic-sized swimming pools each day. The wastewater contains pollutants as a result of human water uses, including household and commercial activities. A combination of physical, chemical, and biological treatment processes remove most pollutants from the wastewater, but currently leave high ammonium concentrations in water that ultimately flows into the Sacramento River.

## Why Study the Upgrade?

- This is a “now or never” opportunity to study the before and after of how \$1.7 billion improvements to a major wastewater treatment plant affects the Delta food web, good or bad. Many questions we have about the effects of the upgrade can only be answered with data and research conducted before the upgrade.
- Upgrades will dramatically reduce total nitrogen (by ~ 65%) and ammonium (by ~ 93%) in the Sacramento River. While some nutrients are required for a healthy ecosystem, excess nutrients can have negative ecological consequences. Efforts such as Operation Baseline can improve future management actions.

## How is it Being Studied?

### Nutrients



### Phytoplankton and Food Webs



### Aquatic Vegetation



### Sediment



### What?

Coordinated samplings at the base of the food web, including: flow, nutrients, phytoplankton and aquatic vegetation.

New sensors to rapidly measure ammonium and the major types of phytoplankton, the base of the food web.

New methods and tools to measure sediment nutrients, their forms and movement at the bottom floor of the Delta.

### Why?

Field sampling that includes multiple elements and sampling teams can better capture the connections between related elements and tell a holistic story.

Understanding the amount of ammonium and types of phytoplankton in the water tells us whether the food web is changing for better or for worse.

Sediment may play a key role in controlling levels of nutrients in the water, but little information on sediment nutrients exists. This is a key gap for modeling nutrients and their impacts on the Delta.

## Who is Involved?

- Operation Baseline was initiated in 2016 by then Delta Lead Scientist, Dr. Cliff Dahm, and this research was identified in the 2017-2021 Science Action Agenda as a high priority science action. The Delta Stewardship Council approved funding for this work in 2017.
- Researchers include the United States Geological Survey, San Francisco State University, San Francisco Estuary Institute - Aquatic Science Center, California Maritime Academy, and Sacramento Regional County Sanitation District. Supplemental studies were separately funded by the State Water Contractors. Additional collaborators include the Central Valley Regional Water Quality Control Board, Metropolitan Water District, and many interested researchers and stakeholders.

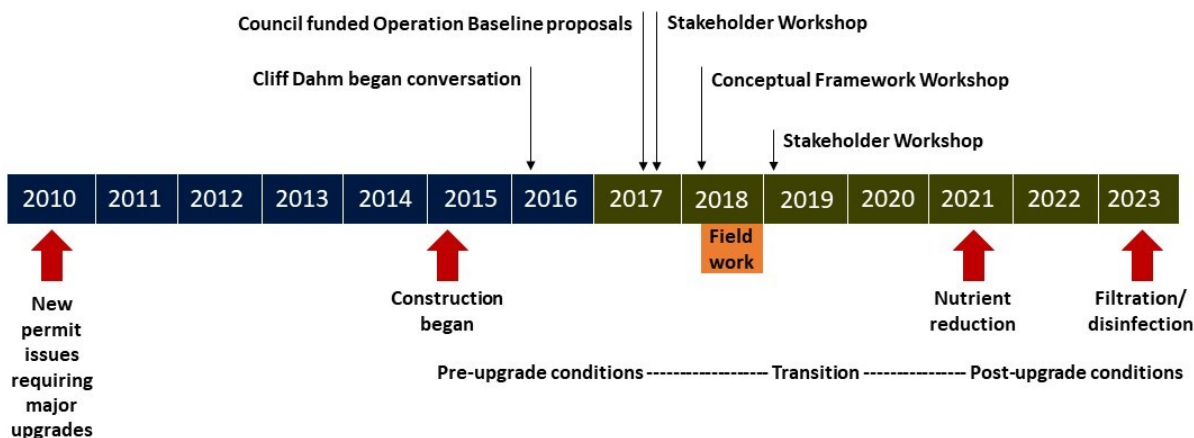


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## Timeline and Next Steps

- In 2020, the Delta Science Program will fund additional studies to build upon previous work and continue to fill the highest-priority data gaps, identified through a collaborative conceptual framework effort.
- Coordination will continue among researchers, managers, and stakeholders as results from the studies become available through 2023.



## More Information

Want to learn more about Operation Baseline? Visit [deltacouncil.ca.gov/delta-science-program/directed-actions](https://deltacouncil.ca.gov/delta-science-program/directed-actions) or e-mail [Dylan.Stern@deltacouncil.ca.gov](mailto:Dylan.Stern@deltacouncil.ca.gov).