

# 2020 DELTA SCIENCE FELLOW **FINAL REPORT**



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**Focus** Nitrogen cycling and  
ecosystem metabolism before  
and after regulatory action

**Award** \$231,399

### **Research Mentor**

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### **Community Mentors**

Dr. David Senn, San Francisco  
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## **Nitrogen cycling and ecosystem metabolism in the Sacramento-San Joaquin Delta measured before and after a key regulatory action**

This project focuses on nitrogen and carbon cycling within the San Francisco Bay and Delta (Bay-Delta), both before and after planned 2021 upgrades to the Sacramento Regional Wastewater Treatment Plant (SRWTP). The team measured in situ benthic nitrate and oxygen fluxes using a new non-invasive technique that provided high frequency continuous data over a much larger sediment surface area than traditional methods.

The SRWTP currently represents one of the largest point sources of nitrogen to the Bay-Delta, and the upgrades were projected to cut nitrogen outputs from the plant by approximately 65%. This project helps to assess the efficacy of this major management action. The results will help improve biogeochemical models for the Bay-Delta.

### **Research Conclusions**

Unlike previous research that primarily focused on the role of phytoplankton in the ecosystem metabolism and carbon cycling, the research team concluded that ecosystem metabolism in the Bay-Delta is primarily driven by benthic aquatic plants, or macrophytes, many of which are invasive. Additional analysis suggested that previously high nitrification rates in the Sacramento River have been substantially diminished following upgrades to the Sacramento River Wastewater Treatment Plant, which included adding nitrification of effluent prior to discharge to the Sacramento River.

