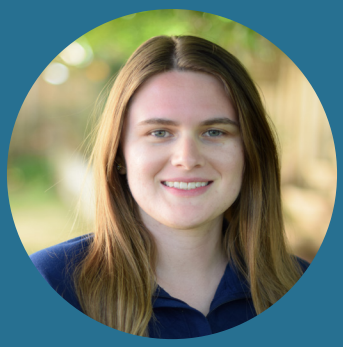
# 2020 DELTA SCIENCE FELLOW FINAL REPORT

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**Master's Fellow** California State University, East Bay

**Focus** Wetland carbon sequestration and impacts of climate change

**Award** $47,425

**Research Mentor**
Dr. Patty Oikawa, CSU, East Bay

**Community Mentors**
Dr. Lisamarie Windham-Myers, United States Geological Survey

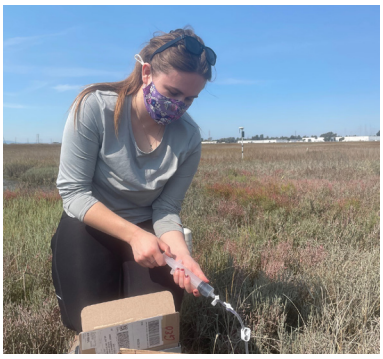

## Quantifying the atmospheric and hydrologic carbon fluxes in a restored tidal saltwater marsh and understanding the drivers of the carbon exchange

The goal of this project was to measure greenhouse gas fluxes in a restored tidal salt marsh in California's South San Francisco Bay, part of the San Francisco Bay and Delta (Bay-Delta). Researchers used eddy covariance and soil chambers to determine how much carbon dioxide and methane is taken in and emitted from the marsh. The project also examined the environmental drivers of the gas exchange.

Data collected in this study was used to create a biogeochemical model that estimates the carbon budgets of wetlands in San Francisco Bay. This information will allow researchers and decision-makers to plan wetland restoration that more effectively manages carbon fluxes in the face of possible impacts due to climate change.

### Research Conclusions

Using the "eddy covariance" method, the research team found that the marsh is consistently a strong net sink for carbon dioxide and a small net source of methane. Using the 495 chamber measurements taken from locations spanning the primary land-cover types in the wetland (Spartina foliosa, Salicornia pacifica and bare mudflats), the research team determined average daytime soil surface flux from each land-cover type and identified the highest-emitting land-cover areas.



The highest methane fluxes were observed from S. foliosa sites, while the highest carbon dioxide emissions were found at the mudflat sites. The research team also determined that the high net removal of CO2 by the marsh is mainly due to lower respiration rates to the atmosphere rather than high photosynthetic rates. This suggests that dissolved CO2 is being transported in the tidal waters. These findings are incorporated into the models and the team plans to continue to work towards accurate modeling of greenhouse gas fluxes in the marsh. The models will help inform future restoration efforts in the Bay-Delta region.