2022 DELTA SCIENCE FELLOW FACT SHEET

Garfield Kwan

Postdoctoral Fellow
Scripps Institution of Oceanography, UC San Diego

Focus Assessing and developing a model to determine habitat suitability across temperature and time

Award $241,800

Research Mentor
Dr. Nann Fangue, UC Davis

Community Mentors
Dr. James Hobbs, California Department of Fish and Wildlife

PROJECT

This project seeks to generate tools for ongoing conservation management and supplementation efforts of Chinook salmon smolts and juvenile Delta smelt. Environmental monitoring data will be combined with new data on temperature-dependent hypoxia tolerance to map spatial and temporal metabolic tolerance and habitat suitability for each species.

TIMELINE

2022-2023 Compile existing environmental data from the California Department of Water Resources California Data Exchange Center and the U.S. Geological Service's National Water Dashboard and conduct laboratory experiments.

2023-2024 Complete analysis of blood, tissue and otoliths, then synthesize a metabolic index and prepare and submit a manuscript on the research for publication.

IMPACTS

Warmer water holds less oxygen, so climate change can have devastating consequences on aquatic ecosystems. Mass mortality events have been reported across the San Francisco Bay-Delta Estuary, including the loss of nearly an entire run of spawning adult Chinook salmon in 2021. By understanding the temperature-dependent hypoxia tolerance of key native species, managers can determine habitat viability and optimize conservation efforts and improve the success of existing and future restoration efforts.

"Native fishes like the Delta smelt and Chinook salmon are particularly vulnerable to warmer and more hypoxic water, and conservation can only succeed if we fully understand a fish's physiological limitations."