

Malte Williams

Postdoctoral Fellow
University of California, Davis

WHY THIS RESEARCH MATTERS

The Sacramento-San Joaquin Bay-Delta forms a vital link in California's water supply but is also home to several species of endangered native Californian fish causing significant conflict over the use of the limited fresh water resources for human and environmental flows.

The endangered Delta Smelt (*Hypomesus transpacificus*) is at the centerpiece of this conflict. Having diverse life-history strategies allowed Delta Smelt to persist in the dynamic habitat of the Delta, by spreading the risk of catastrophic mortality between multiple habitats. However, over the next century, warming water temperatures will bring major changes to current habitat conditions, further threatening the resilience of Delta Smelt.

In search of refuge: Investigating the thermal life history of Delta Smelt through in-situ oxygen isotope ratio analysis of otoliths

STATUS

Started March 1, 2017

PROJECT COST

\$216,042

RESEARCH MENTOR

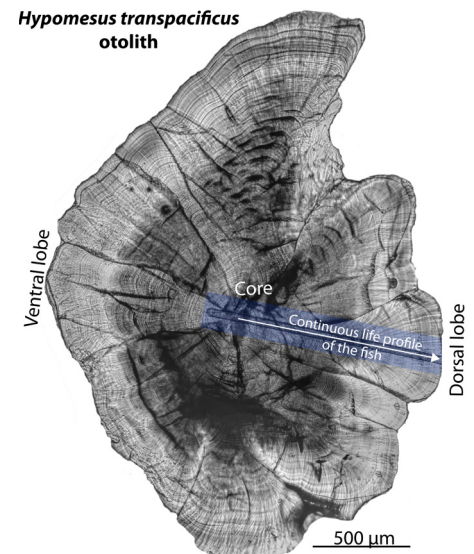
James A. Hobbs,
University of California, Davis

COMMUNITY MENTORS

Randall Baxter,
CA Department of Fish and Wildlife

Louise Conrad,
CA Department of Water Resources

Carol Kendall,
United States Geologic Survey



A cross-section of a Delta Smelt (*Hypomesus transpacificus*) otolith. The otolith grows from the core outwards and researchers will conduct an analysis along a profile indicated by the white arrow, which spans the full life of the fish. Courtesy photo

Using existing fish otoliths (tiny bones in the inner ear of fish) samples provided by CA Department of Fish and Wildlife, this project will:

1. Utilize in-situ chemical analysis to determine the oxygen isotopic composition of otoliths, which can reflect the water temperature that a fish has experienced.
2. Investigate the relationship between Delta Smelt abundance and environmental parameters, such as water temperature. Determine if Delta Smelt are able to find temperature refuges, even in drought years.

This research will be used by the Interagency Ecological Program (IEP), which includes nine State and Federal agency partners, to understand which habitat conditions Delta Smelt can utilize in different water years, and help local and state agencies to better manage the limited water resources of California for both fish and people.