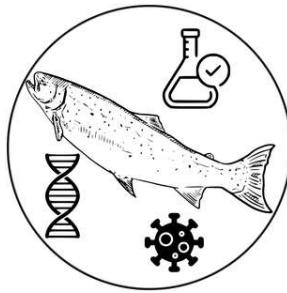


Development and application of laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) to determine saltwater entry size of juvenile salmonids and track habitat usage



Salmon otolith showing laser scar and measurements for estuary entry size.

This project addresses the (IOS Mass Spectrometry) lab-based component of otolith microchemistry work that forms a key part of the ["Follow the Fish"](#) program (FtF), the subject of a broader PSSI project proposal focused on West Coast Vancouver Island (WCVI) Chinook salmon. The aim is to develop in-house capacity for laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS), a powerful tool to assess the estuary entry size and habitat usage by juvenile Chinook salmon smolts. This provides specialized analytical support for FtF and capacity to conduct similar analyses for other salmon populations, such as Fraser and East Coast Vancouver Island Chinook salmon. This method allows DFO to assess the relative survival of different life history strategies within a season and across years.

Priorities are to:

- 1) Develop LA-ICP-MS methods for analysis of otoliths.

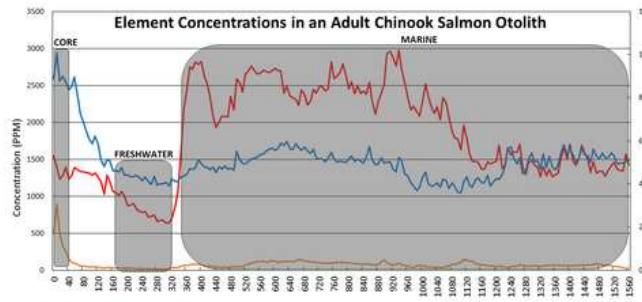
Take-aways

- Advances in lab microchemistry (mass spectrometry) can be used to track salmon movements from ear stone (otolith) samples.
- Body size at estuary entry and habitat use can be measured and compared to age at return, life history specific survival, and relative fitness.
- This project develops methods for LA-ICP-MS to test on juvenile Chinook sampled in the Follow the Fish program.

2) Assess estuary entry size and habitat usage by juvenile Chinook salmon throughout the 2021-2023 field seasons as well as adult returns from 2015-2023.

3) Summarize data regarding size at estuary entry across all life stages of juvenile chinook collected and compare across various WCVI River systems.

4) Provide microchemistry and size at marine entry data to FtF team for coordination with plankton, biotoxins, and contaminants groups



Graph of elements measured in an otolith by distance from core.

Timeline

- ✓ Apr 2023-Mar 2024: analyze otolith samples from PSSI collections
- ⌚ Apr 2024-Mar 2025: further analyses & internal Technical Reports

DFO Science Division
Ocean Sciences

DFO Science Section
Ecology and
Biogeochemistry

Project Leads
[Andrew Ross](#)
[Xiangjun Liao](#)
[Nicole LaForge](#)

Locations
[IOS Sidney](#)

Species
[Chinook](#)



Follow the Fish

Project ID
2422