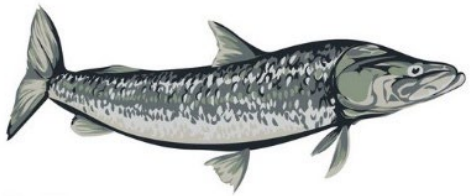
Kotzebue Sound Sheefish Movements and Coastal Distribution



WCS Arctic Beringia
A Wildlife Conservation Society Program

Kevin Fraley
Wildlife Conservation Society
Fairbanks, Alaska

Background

Sheefish caught by WCS in Kotlik Lagoon, June 2021

Reports and evidence of changing sheefish coastal distribution

- Bob Uhl journals (1990-1999)
- WCS lagoon monitoring catches from 2016-2021
  - Catches in Kotlik and Ikpek Lagoons
- WCS interviews of subsistence fishers (2016)
  - More sheefish seen at Anigaaq
  - Where they are coming from and going to along the coast is unclear
- Federal Subsistence Priority Information Needs (2022-present)
  - “Changes in Grayling, Dolly Varden and Sheefish populations related to climate change”
  - “Identify spawning areas, critical habitat and range expansion…”

Study structure

- Part 1: Interviews of Northwest Alaska subsistence fishers and Traditional Ecological Knowledge literature compilation
- Part 2: Summarization of 2012-2024 fish capture data from Wildlife Conservation Society monitoring of coastal lagoons of Northwest Alaska and from the Alaska Department of Fish and Game's Anadromous Waters Catalog
- Part 3: Sheefish satellite tagging to examine coastal movements, water temperatures, and depths used
- Part 4: Otolith (fish earbone) microchemistry to see what habitats sheefish are using and which river fish originate from

Part 1: Interviews and TEK literature review

Subsistence fisher interviews

- Kotzebue, Sissualik/Anigaaq, Kivalina, Point Hope, and Buckland

TEK Literature Review

- Bob Uhl Journals
- “Whitefish: traditional ecological knowledge and Subsistence fishing in the Kotzebue Sound Region”
- “Iqaluich Niginaqtuat, Fish That We Eat”
- “When the Fish Come, We Go Fishing: Local ecological knowledge of Non-salmon fish used for subsistence in the Bering Strait Region”

Community meeting in Point Hope, Feb 2023

Part 2: WCS coastal lagoon monitoring and ADFG Anadromous Waters Catalog data search

Sheefish caught by WCS at Aukulak Lagoon, 2018

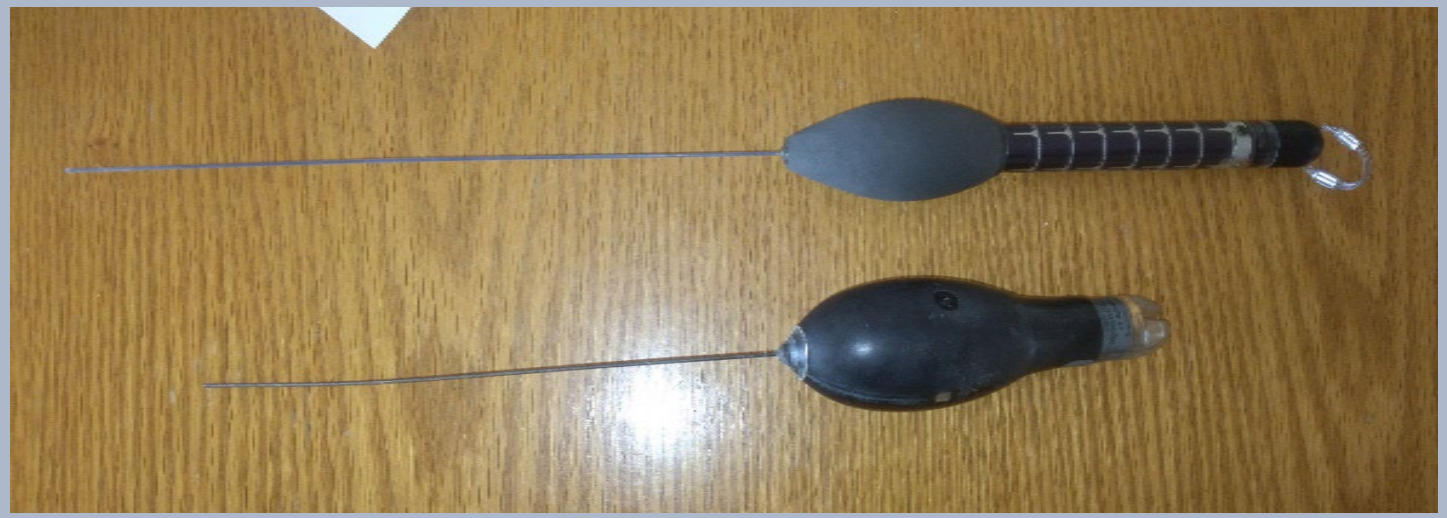
WCS lagoon fish monitoring data

- Aukulak, Krusenstern, Kotlik, and Tasaychek Lagoons
  - 2012-2024
- Ikpek and Kupik Lagoons
  - 2012, 2015-2016
- Kemegrak, Akoviknak, Atosik, Mapsorak, and Singoalik Lagoons
  - 2018, 2021
- Imik Lagoon/Rabbit Creek, Atilagauraq Lagoon
  - 2023-2024

Anadromous Waters Catalog data

- All lagoons and coastal rivers from Wales to Point Lay

Part 3: Satellite Tagging



Tag types and how they are attached to fish

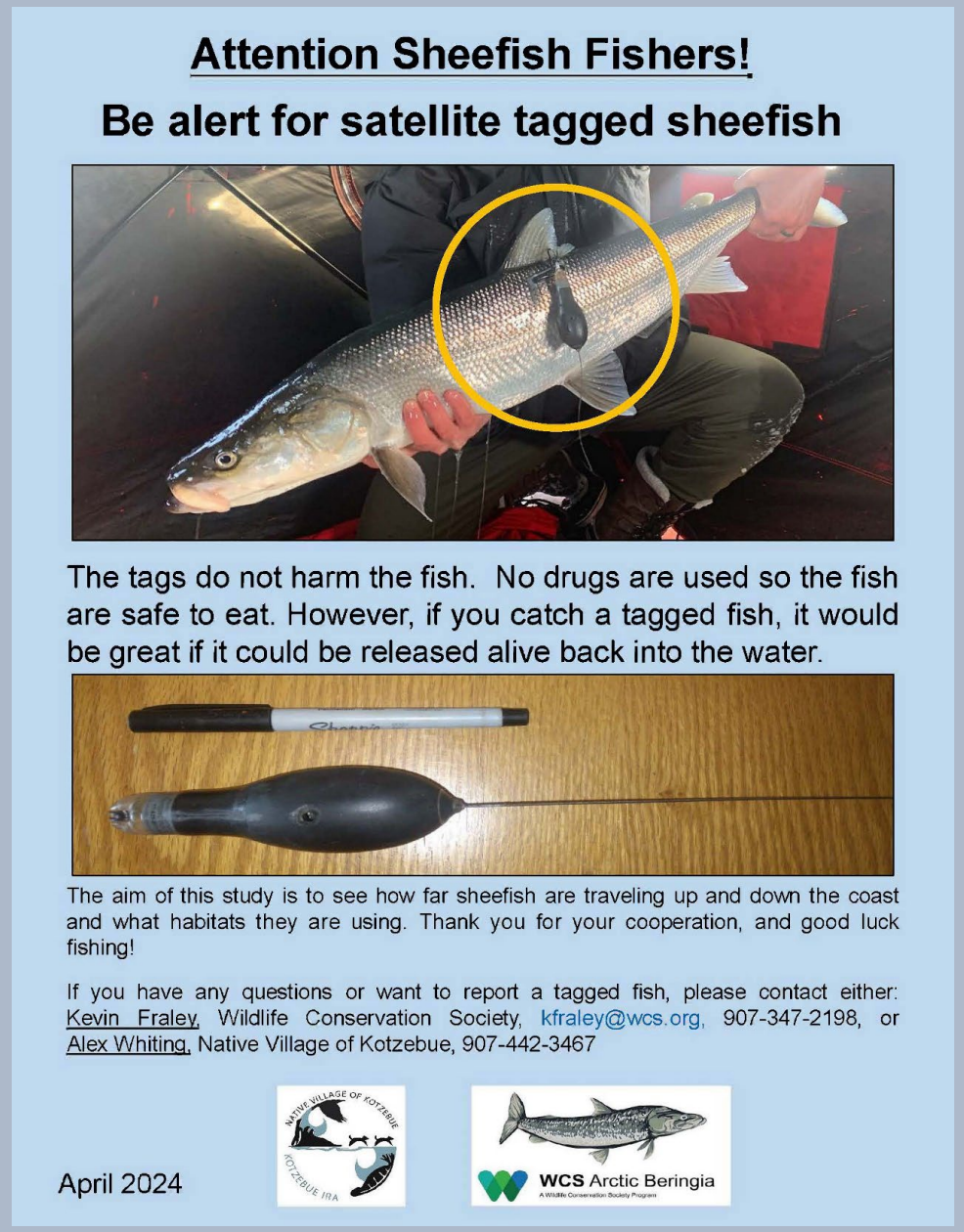
Locations where sheefish were tagged

Kotzebue May 2023

Kobuk River Sept 2023

Outreach and awareness

- KOTZ radio interview and PSA
- Flyers posted on USFWS, NPS, NVoK social media
- Flyers posted at the AC Store and other stores
- Updates on project given periodically to Cape Krusenstern SRC, NWASRAC, local contacts



Attention Sheefish Fishers!

Be alert for satellite tagged sheefish

The tags do not harm the fish. No drugs are used so the fish are safe to eat. However, if you catch a tagged fish, it would be great if it could be released alive back into the water.

The aim of this study is to see how far sheefish are traveling up and down the coast and what habitats they are using. Thank you for your cooperation, and good luck fishing!

If you have any questions or want to report a tagged fish, please contact either: Kevin Fraley, Wildlife Conservation Society, kfraley@wcs.org, 907-347-2198, or Alex Whiting, Native Village of Kotzebue, 907-442-3467

April 2024

NATIVE VILLAGE OF KOTZEBUE
KOTZEBUE IRA

WCS Arctic Beringia

Part 4: Otolith microchemistry

Otoliths collected and prepared from 15 fish from Cape Krusenstern lagoons, 5 from Kobuk River spawning area, and 3 from Selawik River spawning area

Strontium michrochemistry assessed at UAF Stable Isotope Facility

Results analyzed to assign fish to river of origin (Kobuk or Selawik) and to see what habitats were used throughout their lives (freshwater, brackish, and salt water)

Sheefish otoliths

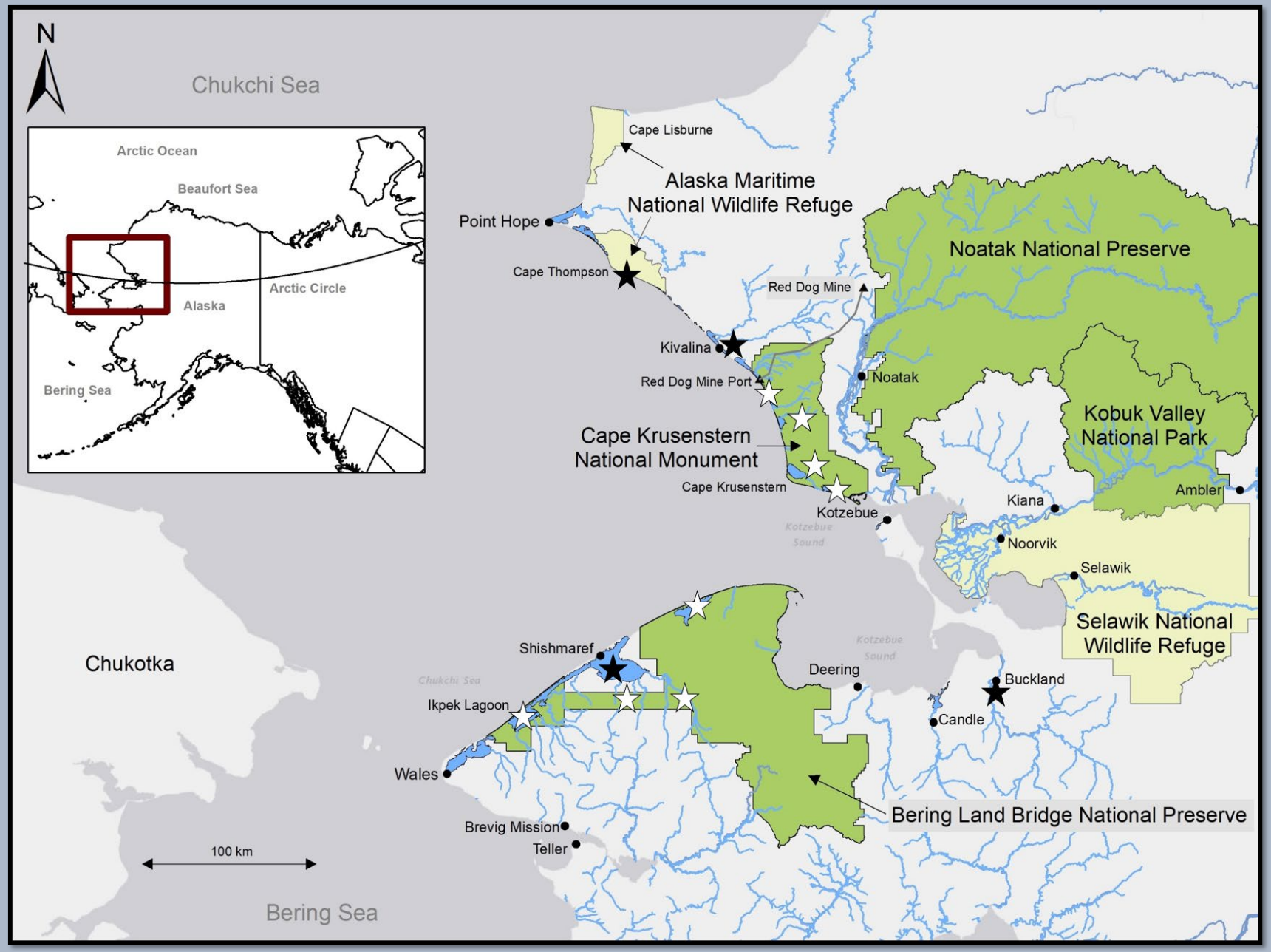
A sheefish otolith prepared for microchemistry with laser ablation path shown

Results

Results: Interviews, TEK, and fish data

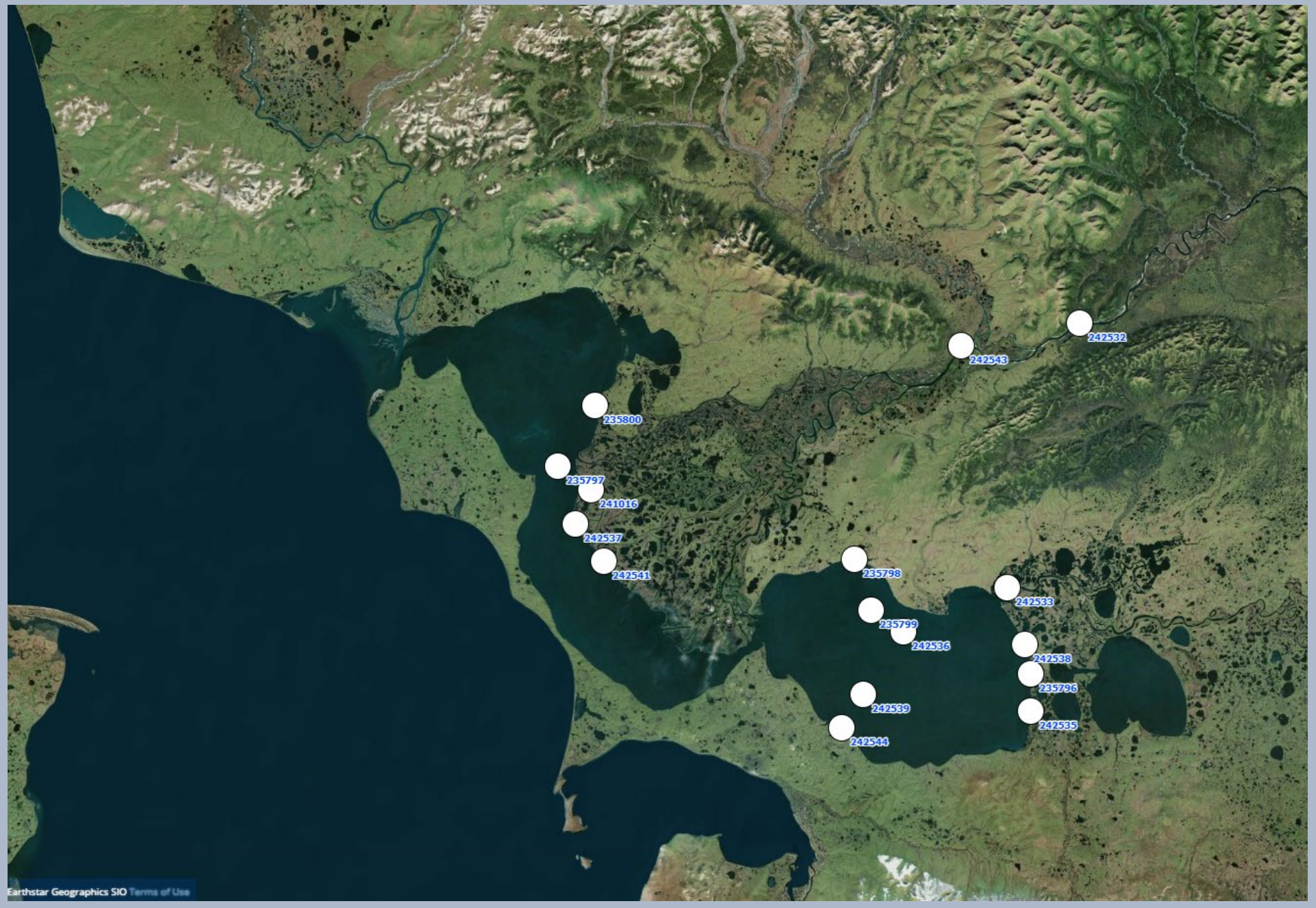
Black stars = observations of sheefish from subsistence fishers and TEK literature

White stars = observations of sheefish from long-term coastal lagoon fish monitoring efforts and ADFG Anadromous Waters Catalog surveys

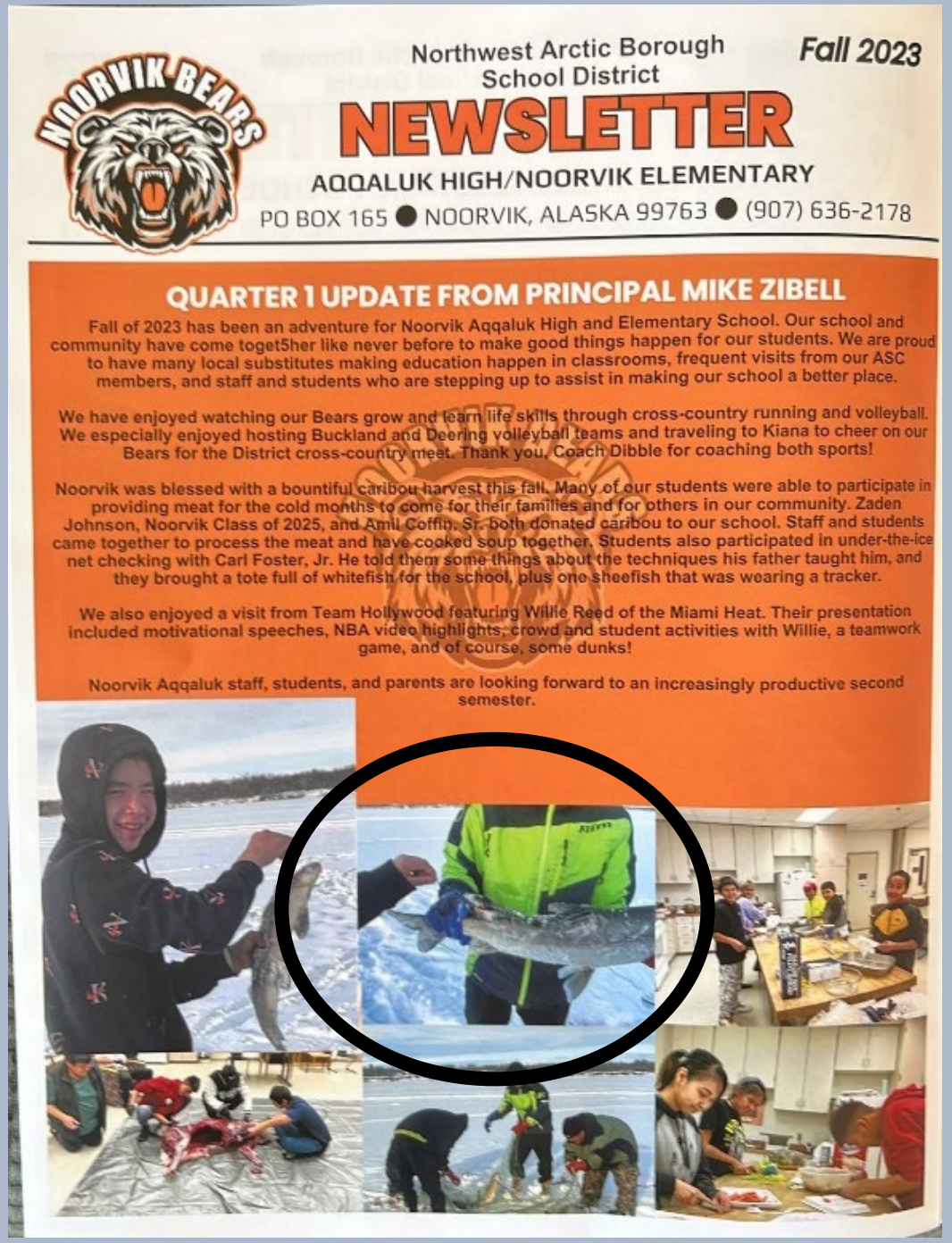


Results: PSAT tag final locations

16 tags reported, 2 additional caught and returned for data retrieval and reward $ by Noorvik and Kiana fishers



Tagged sheefish caught in under-ice net in Noorvik during school net check and tag returned for reward



Northwest Arctic Borough School District

Fall 2023

NEWSLETTER

AQQALUK HIGH/NOORVIK ELEMENTARY

PO BOX 165 ● NOORVIK, ALASKA 99763 ● (907) 636-2178

QUARTER 1 UPDATE FROM PRINCIPAL MIKE ZIBELL

Fall of 2023 has been an adventure for Noorvik Aqqaluk High and Elementary School. Our school and community have come toget5her like never before to make good things happen for our students. We are proud to have many local substitutes making education happen in classrooms, frequent visits from our ASC members, and staff and students who are stepping up to assist in making our school a better place.

We have enjoyed watching our Bears grow and learn life skills through cross-country running and volleyball. We especially enjoyed hosting Buckland and Deering volleyball teams and traveling to Kiana to cheer on our Bears for the District cross-country meet. Thank you, Coach Dibble for coaching both sports!

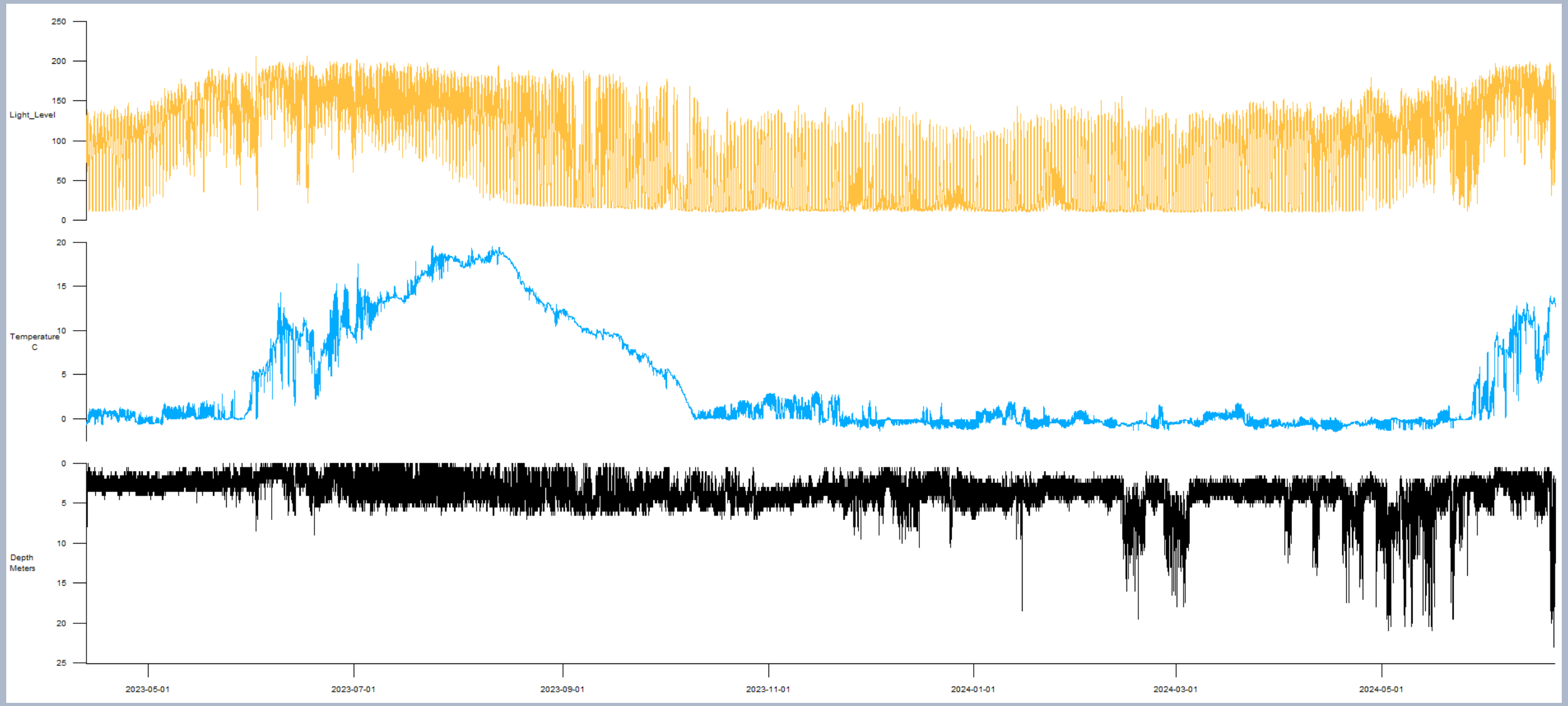
Noorvik was blessed with a bountiful caribou harvest this fall. Many of our students were able to participate in providing meat for the cold months to come for their families and for others in our community. Zaden Johnson, Noorvik Class of 2025, and Amil Coffin, Sr. both donated caribou to our school. Staff and students came together to process the meat and have cooked soup together. Students also participated in under-the-ice net checking with Carl Foster, Jr. He told them some things about the techniques his father taught him, and they brought a tote full of whitefish for the school, plus one sheefish that was wearing a tracker.

We also enjoyed a visit from Team Hollywood featuring Willie Reed of the Miami Heat. Their presentation included motivational speeches, NBA video highlights, crowd and student activities with Willie, a teamwork game, and of course, some dunks!

Noorvik Aqqaluk staff, students, and parents are looking forward to an increasingly productive second semester.

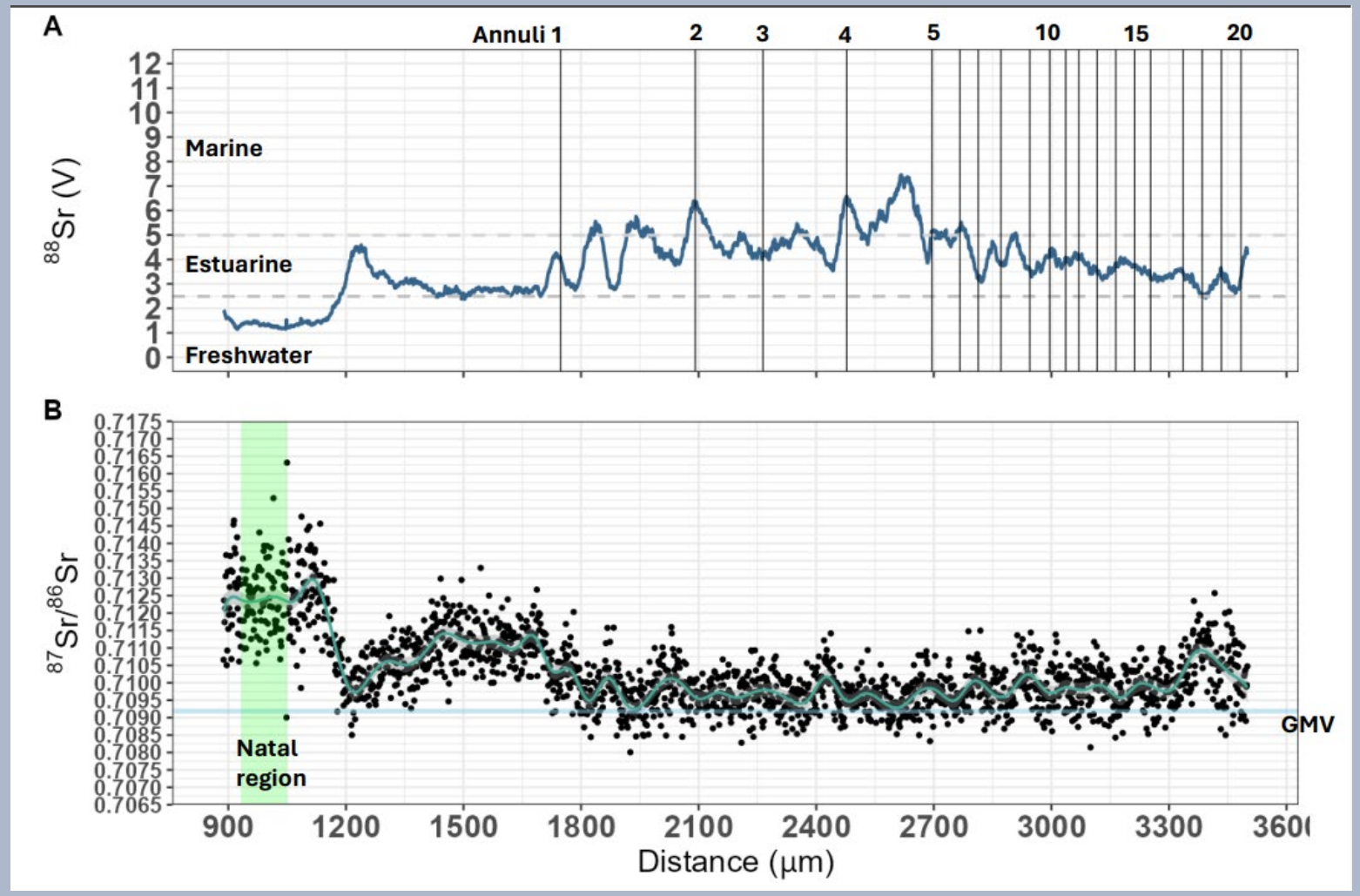
Results: PSAT tag data

Tagged near Kotzebue in April 2023, caught by angler in Kiana in June 2024

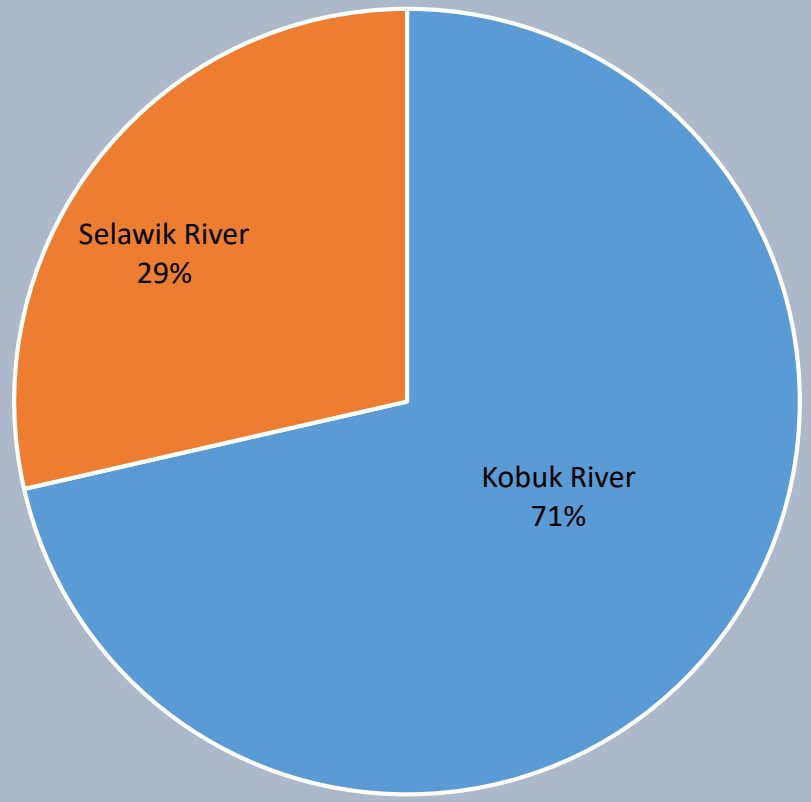


Results: Otolith microchemistry

Example otolith data from a Kotzebue Sound sheefish. “Annuli”= winter period over years



River of origin for 14 sheefish captured in Cape Krusenstern National Monument coastal lagoons



Conclusions and Recommendations

- PSAT tags and otolith microchemistry are useful tools for studying sheefish movements and life history, and complemented local observations and TEK well
- Sheefish from both Kobuk and Selawik Rivers travel the coast and enter lagoons and river mouths to feed and grow during the summer, the majority originate from the Kobuk
- Sheefish that are trapped in lagoon systems (example: Krusenstern Lagoon and Tukrok River) for the winter are able to survive and return to Hotham Inlet
- Fish can occupy sub-freezing (<0° Celsius) water under the sea ice and will dive as deep as 27 m (89 ft)
- The species appears to have expanded in distribution since the 1990s, when compared to the ADFG “Species Profile” map and a map in the book “Fishes of Alaska.” Based on our results, Kotzebue Sound-origin sheefish are now found from Shishmaref to Cape Thompson
- A similar study design would be useful to examine movements and habitats used for Yukon-Kuskokwim Delta and Mackenzie River Delta coastal sheefish

Thanks for Listening!

For more info: leucichthys.org

Or scan the QR code

Project partners/contributors: