AK Geosummit: April 11, 2025

Better
The ~~Bigger~~^ the Dot, the Better the Fishing?
Habitat Mapping with Community Soundings and Local Tide Data

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Project Partners: George Anderson , Jeremy Anderson, Brandon Daugherty, Andrew Lind, UW FRI

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UAF UNIVERSITY OF ALASKA FAIRBANKS

Bathy Data Sources

- Marine Volunteered Geographic Information (VGI)
- Crowdsourced (CSB)
- Citizen Science
- Trusted Community Bathymetry (TCB)

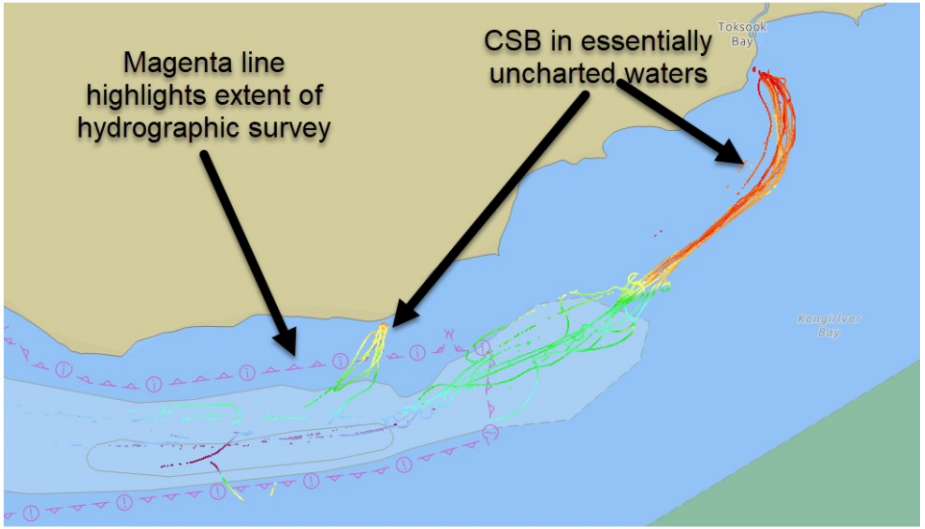
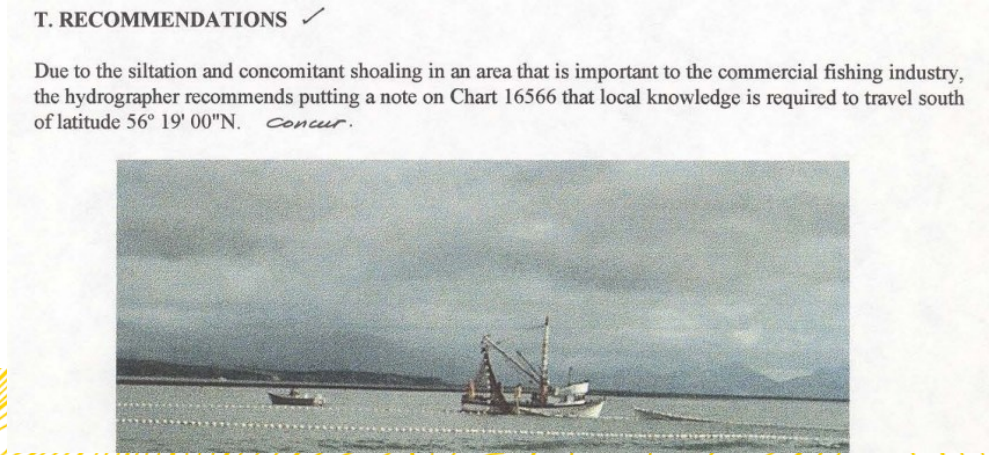


Fig. 1 CSB tracks collected through and past the extent of a NOAA hydrographic survey in Toksook Bay, Alaska. Image courtesy of NOAA.



T. RECOMMENDATIONS ✓

Due to the siltation and concomitant shoaling in an area that is important to the commercial fishing industry, the hydrographer recommends putting a note on Chart 16566 that local knowledge is required to travel south of latitude 56° 19' 00"N. *Concur.*

<u>Community-based Bathymetric Data</u>

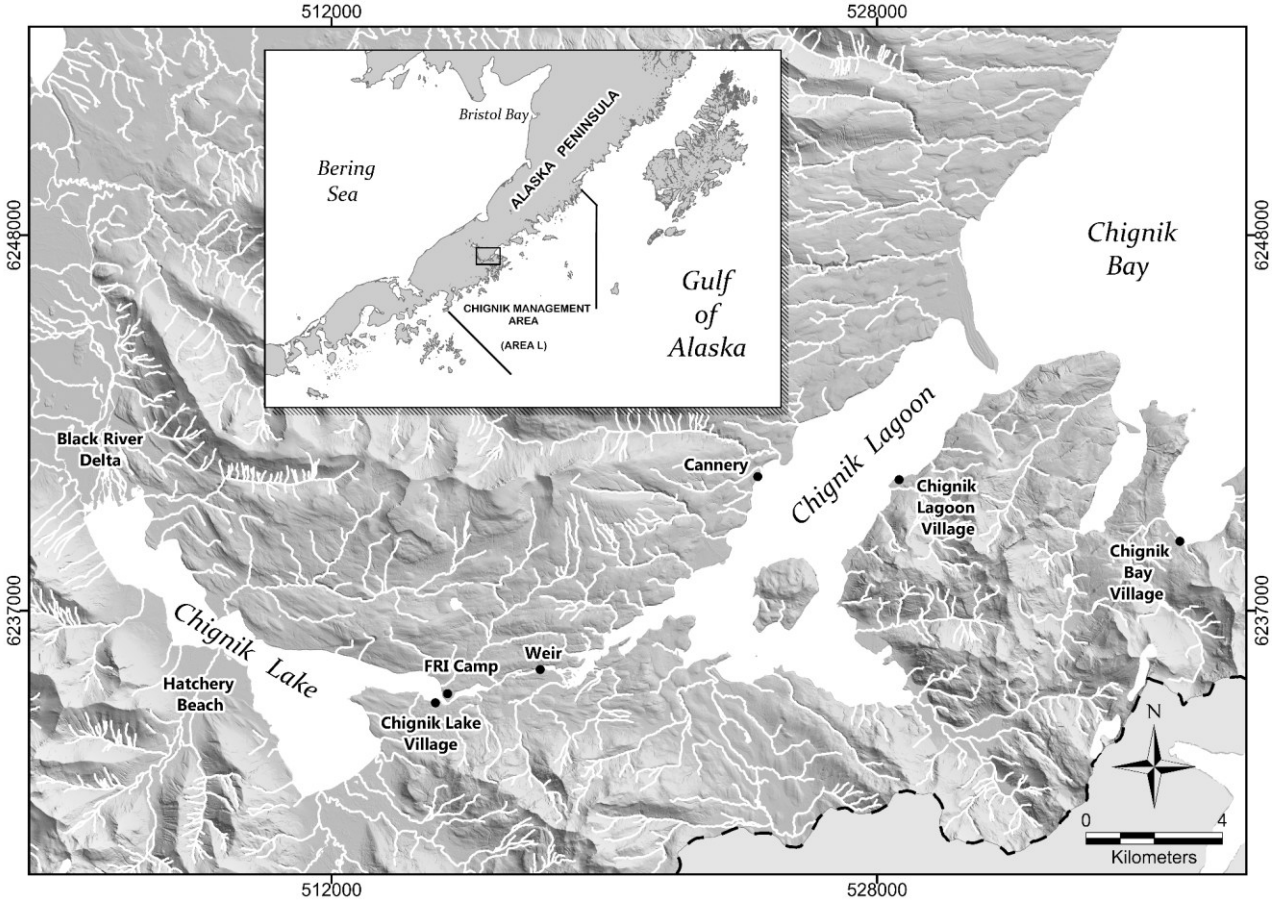
Local knowledge & mobilization

Local priorities (e.g., fisheries)

Data Sovereignty

Collaborative, intentional & structured

Study Site


512000
528000
6248000
6237000
Bristol Bay
Bering Sea
ALASKA PENINSULA
CHIGNIK MANAGEMENT AREA
(AREA L)
Gulf of Alaska
Chignik Bay
Chignik Lagoon
Black River Delta
Cannery
Chignik Lagoon Village
Chignik Bay Village
Chignik Lake
FRI Camp
Weir
Hatchery Beach
Chignik Lake Village
N
0
4
Kilometers

Project Objectives

Community-based bathymetry

Partner with and supply local vessel operators with recreational grade SBES

Continuous water level monitoring

Install sensors to obtain hyperlocal data and to process bathymetry

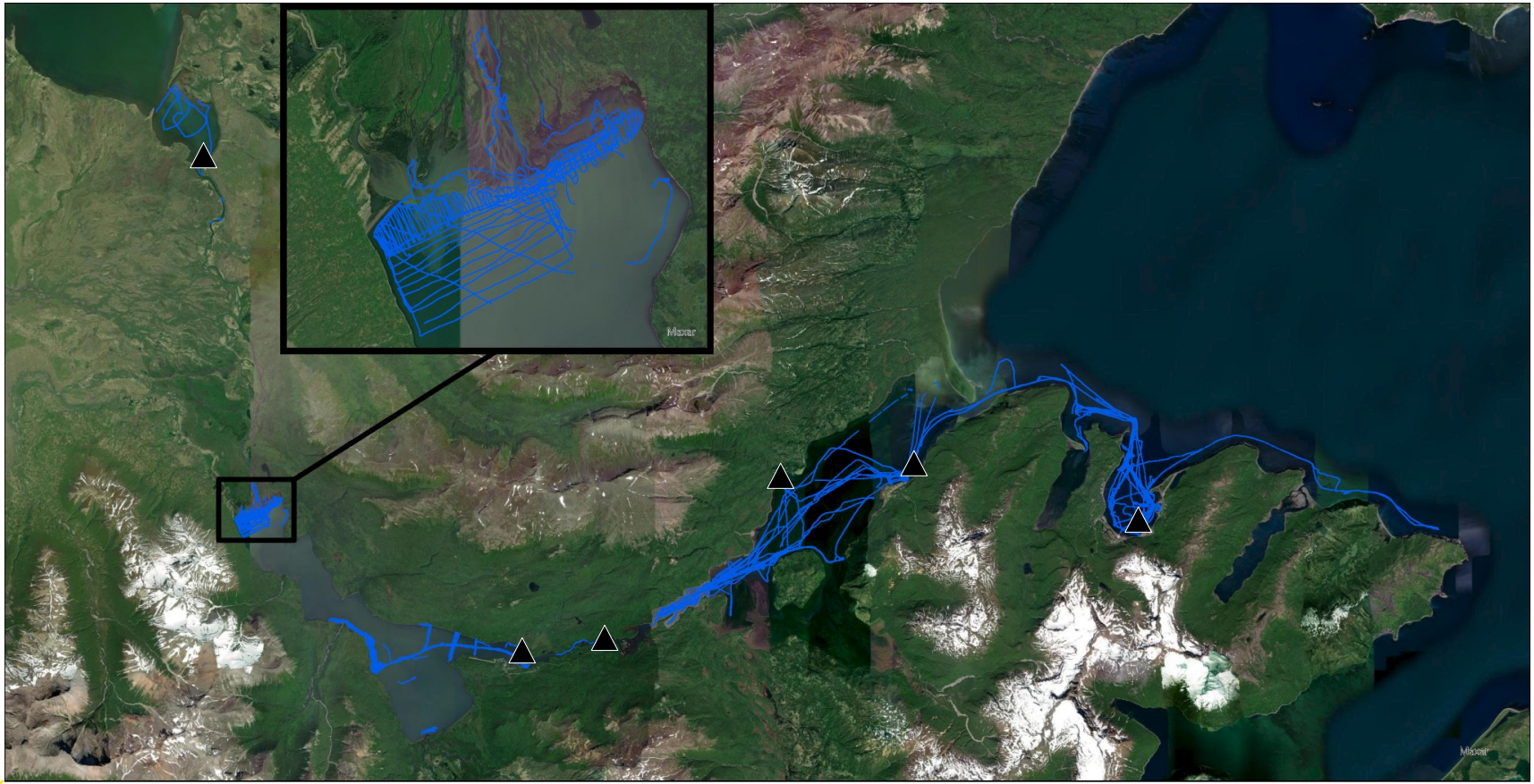
Seamless elevation modeling

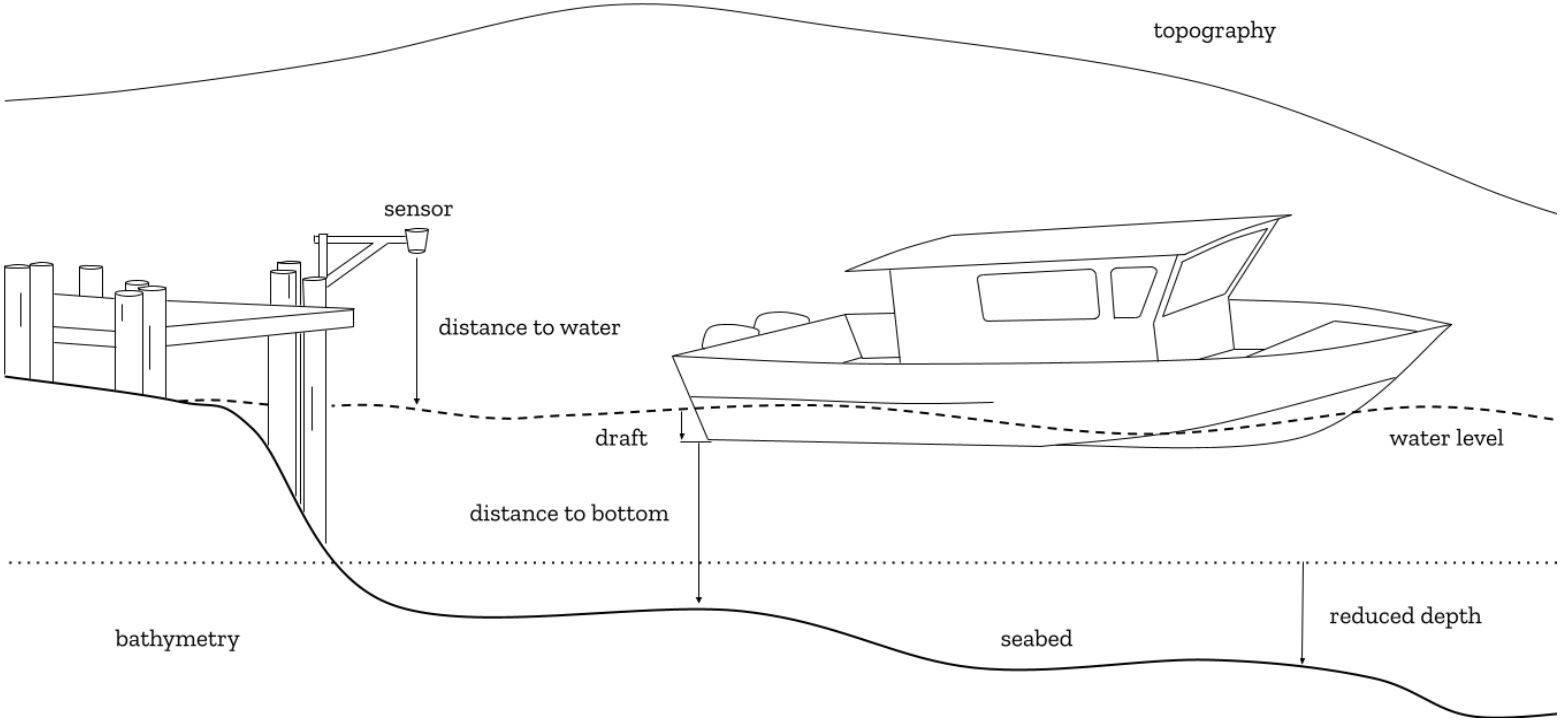
Process and compare depth measurements with high precision elevation data

Checklist

- ✓ 1. <u>Community partners</u>
- ✓ 2. Local vessel(s)
- ✓ 3. Recreational Grade Fishfinder/Chartplotter

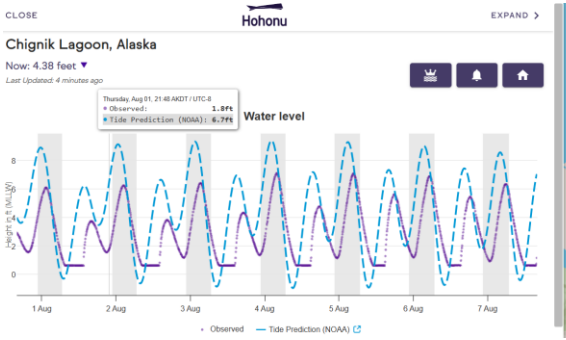
Single Beam Survey Track Lines (2023-24)

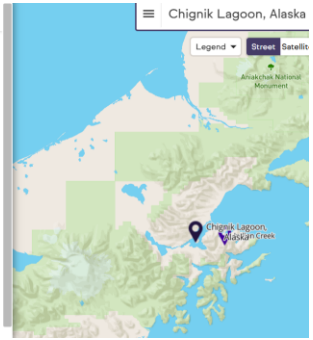




Schematic of measurements and offsets to obtain corrected depths

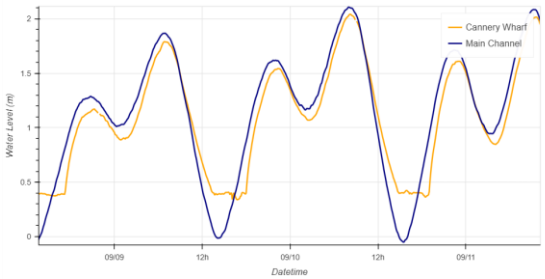
$$Depth_{NAVD88} = (H_{NAVD88}) - (+D_{water}) + (-D_{draft}) + (-D_{bottom})$$

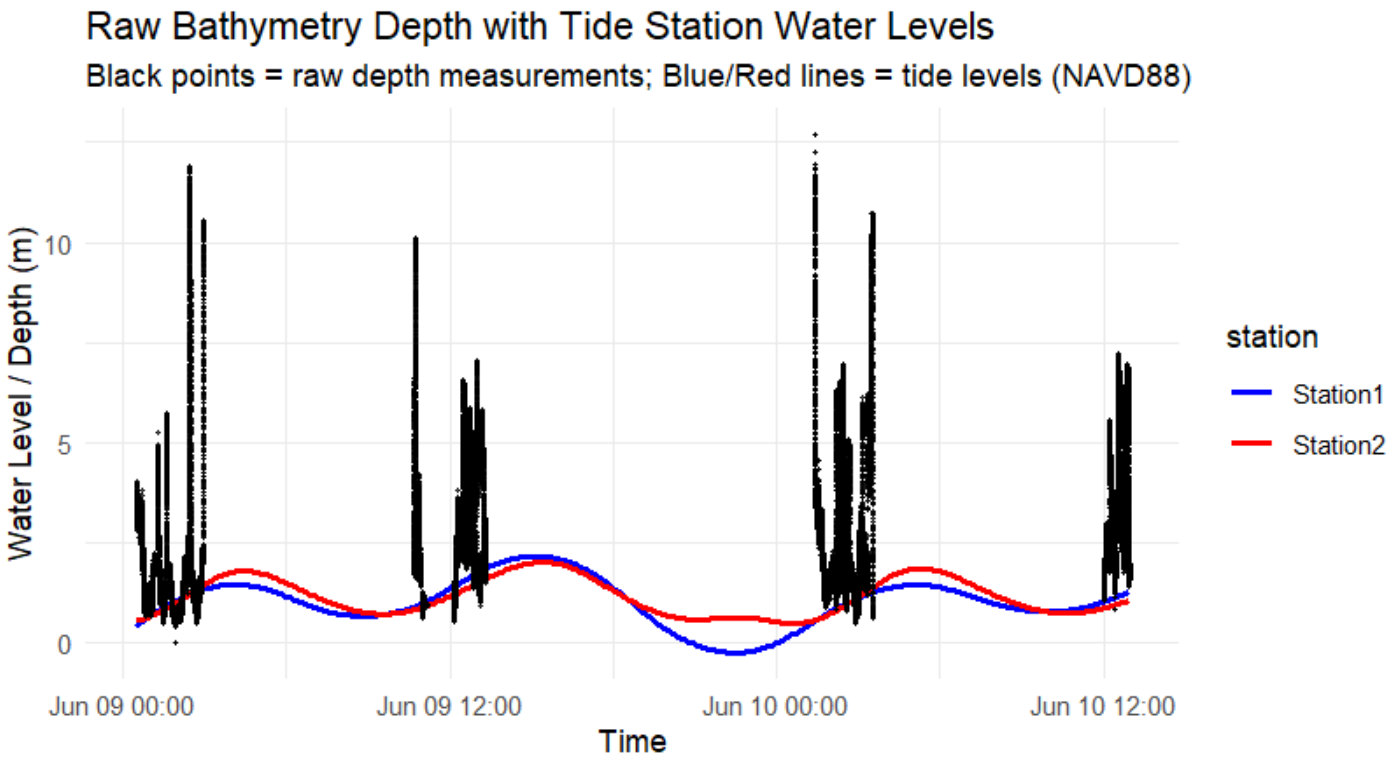




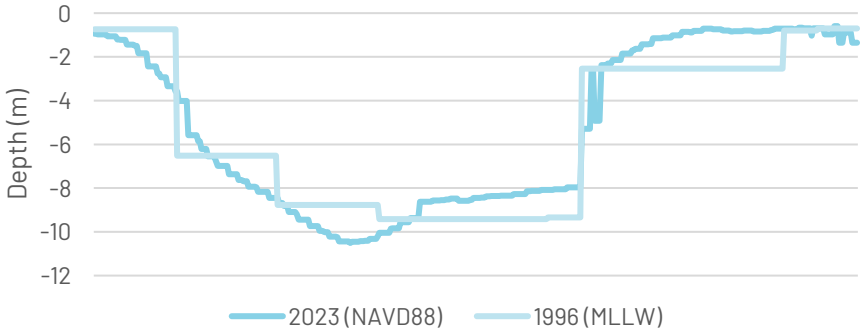
Station Datum

- Vertical Reference frame
- Accuracy & Validation
- Hyperlocal data




Raw Bathymetry Depth with Tide Station Water Levels
Black points = raw depth measurements; Blue/Red lines = tide levels (NAVD88)
Water Level / Depth (m)
10
5
0
Jun 09 00:00
Jun 09 12:00
Jun 10 00:00
Jun 10 12:00
Time
station
Station1
Station2

Methods



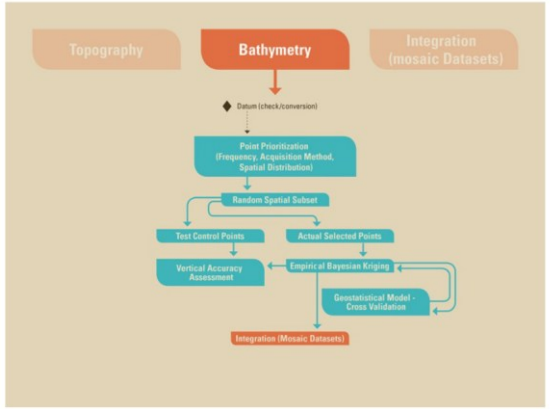
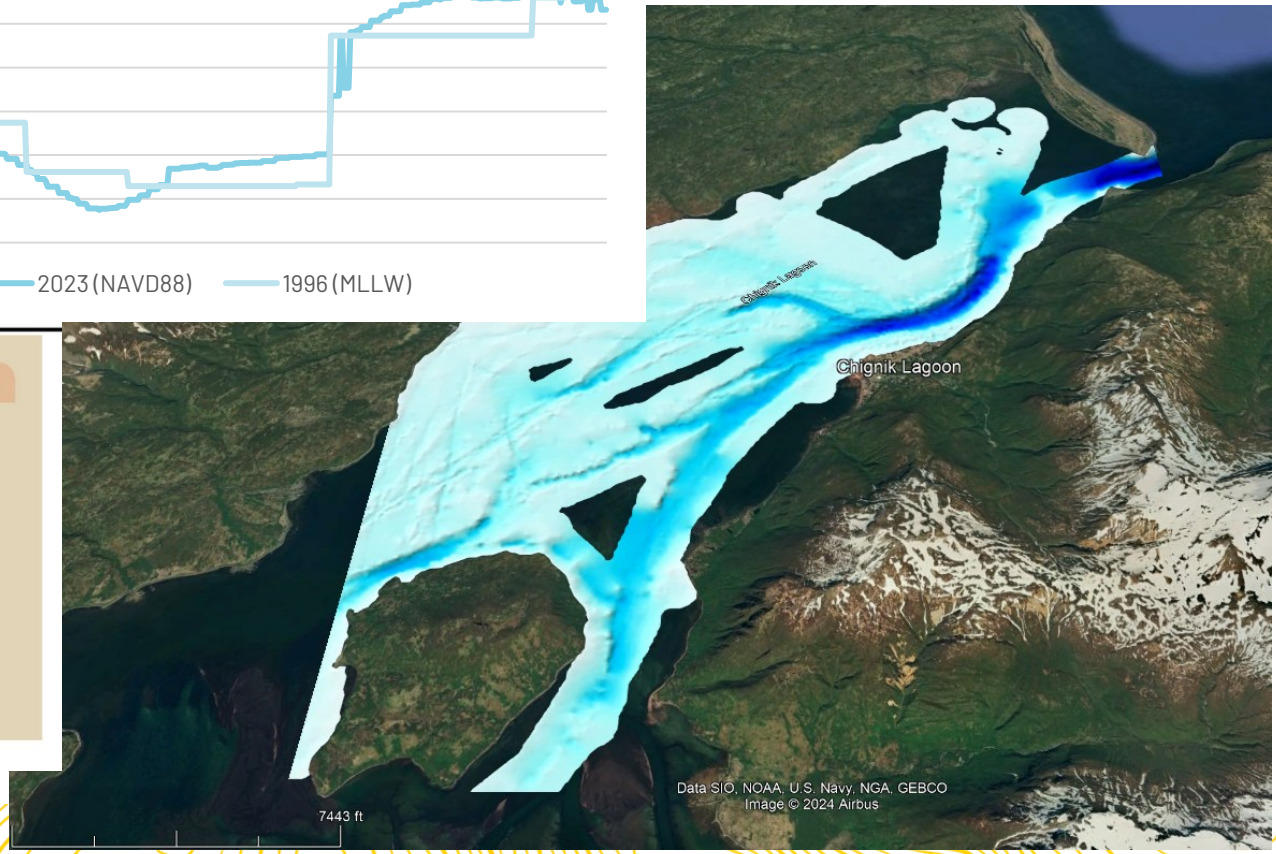


Figure 3. Bathymetry component of the topobathymetric elevation model.

Figure from Danielson, et al. 2016



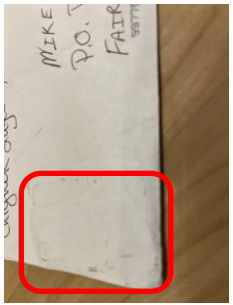
Takeaways:

Benefits

- Local data ownership
- Affordable, intuitive equipment
- Low recon, mobility & acquisition costs
- High temporal resolution

Challenges

- Quality control
- Postprocessing
- Gaps
- Proprietary equipment & services
- …Data transfer



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