



**NOAA**  
**FISHERIES**

# Results from the Summer 2023 Gulf of Alaska Acoustic-Trawl Survey

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Groundfish Plan Team, September 20, 2023

# Outline

- Survey design, equipment & analysis
- What was planned & accomplished
- Pollock distribution and size
- Distribution of other fish species
- Environmental conditions
  
- DriX (uncrewed surface vessel) testing

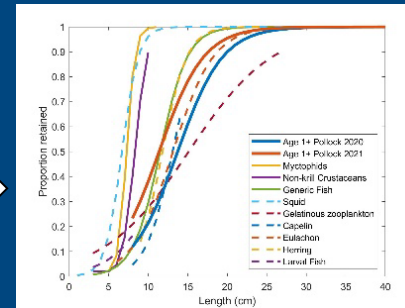
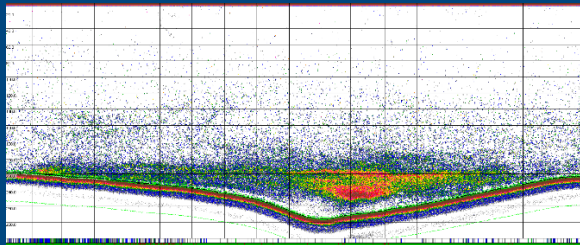
# Acoustic-Trawl Survey Methods

- Spacing 30-40 nmi on Shelf, 15 nmi in Shelikof, 3-6 nmi in Shumagin Islands, 6 nmi Barnabas/Chiniak Troughs
- Survey sunrise to sunset (special projects at night)
- Abundance estimates from 16 m below surface to 0.5 m above seafloor
- Backscatter scaled by "targeted" trawls
- Physical oceanographic data collected in nightly CTD + PMEL CTD stations

**Acoustic data  
collection along  
parallel transects**

**Nearest Haul**

**Net Selectivity &  
Target Strength**

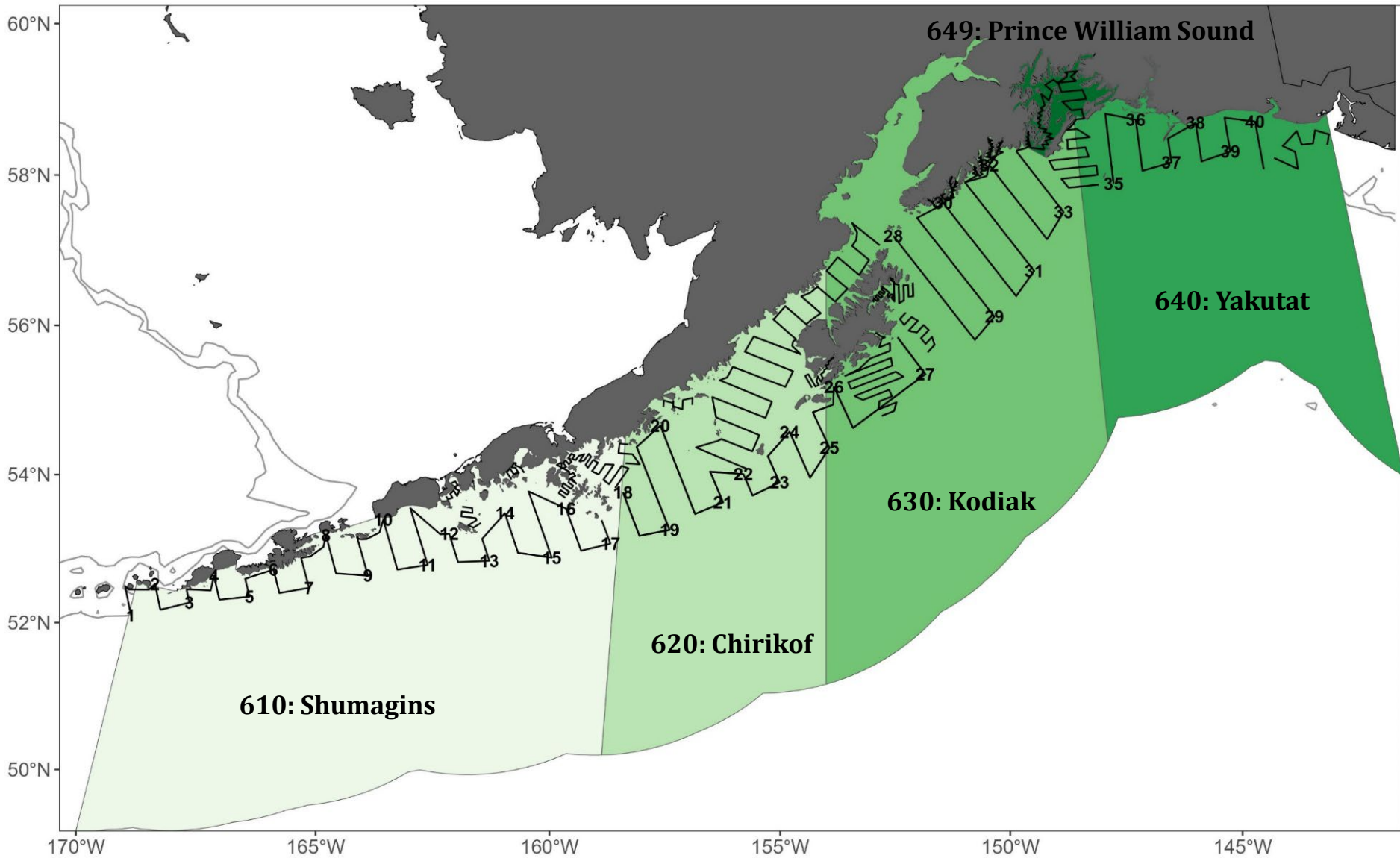


**Survey  
Biomass  
estimate**

**\*\*\* Survey results are preliminary \*\*\***

Complete remaining QC and analysis of the effects of radiated noise from ship on acoustic data

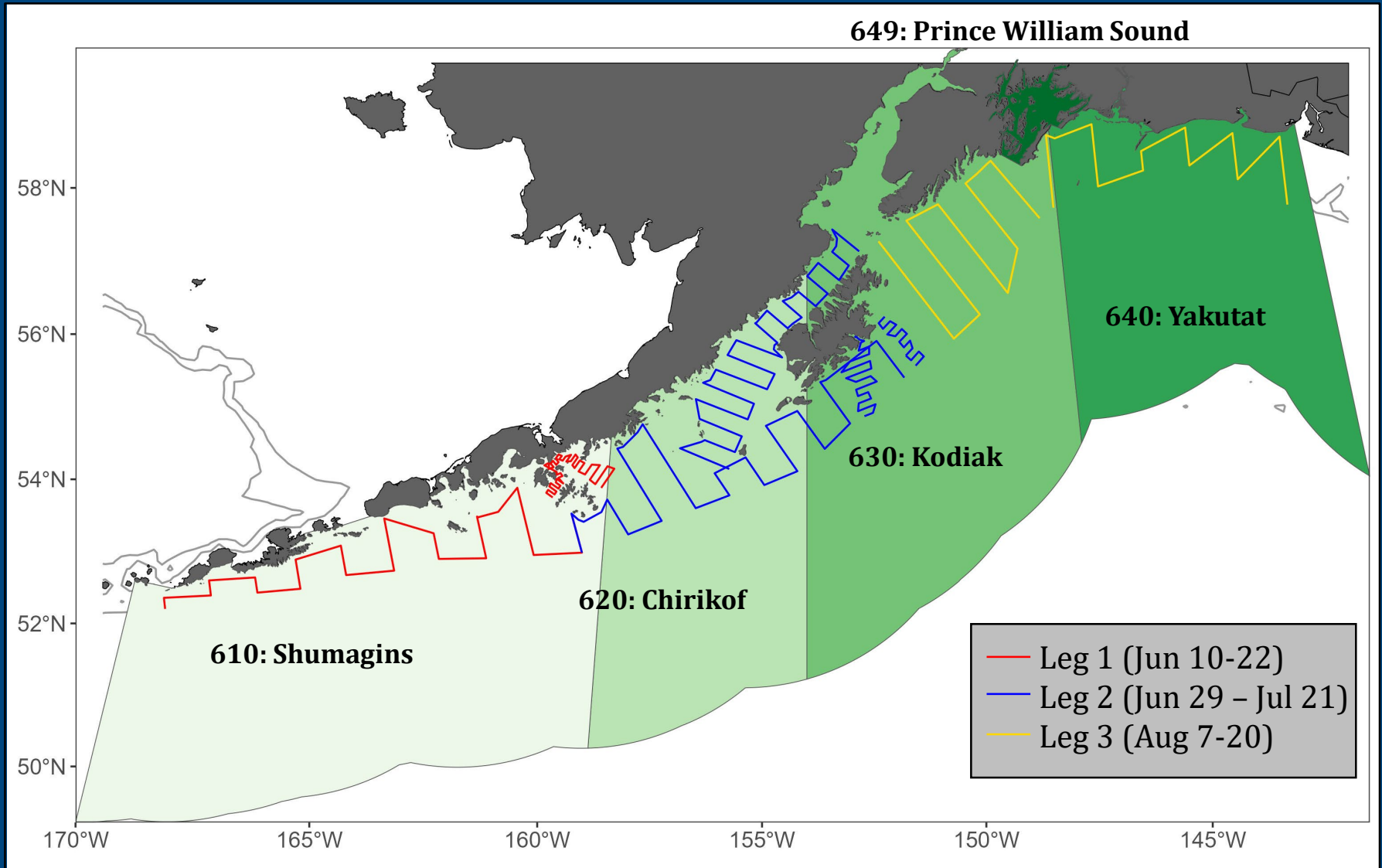
# Planned survey coverage – 66 days



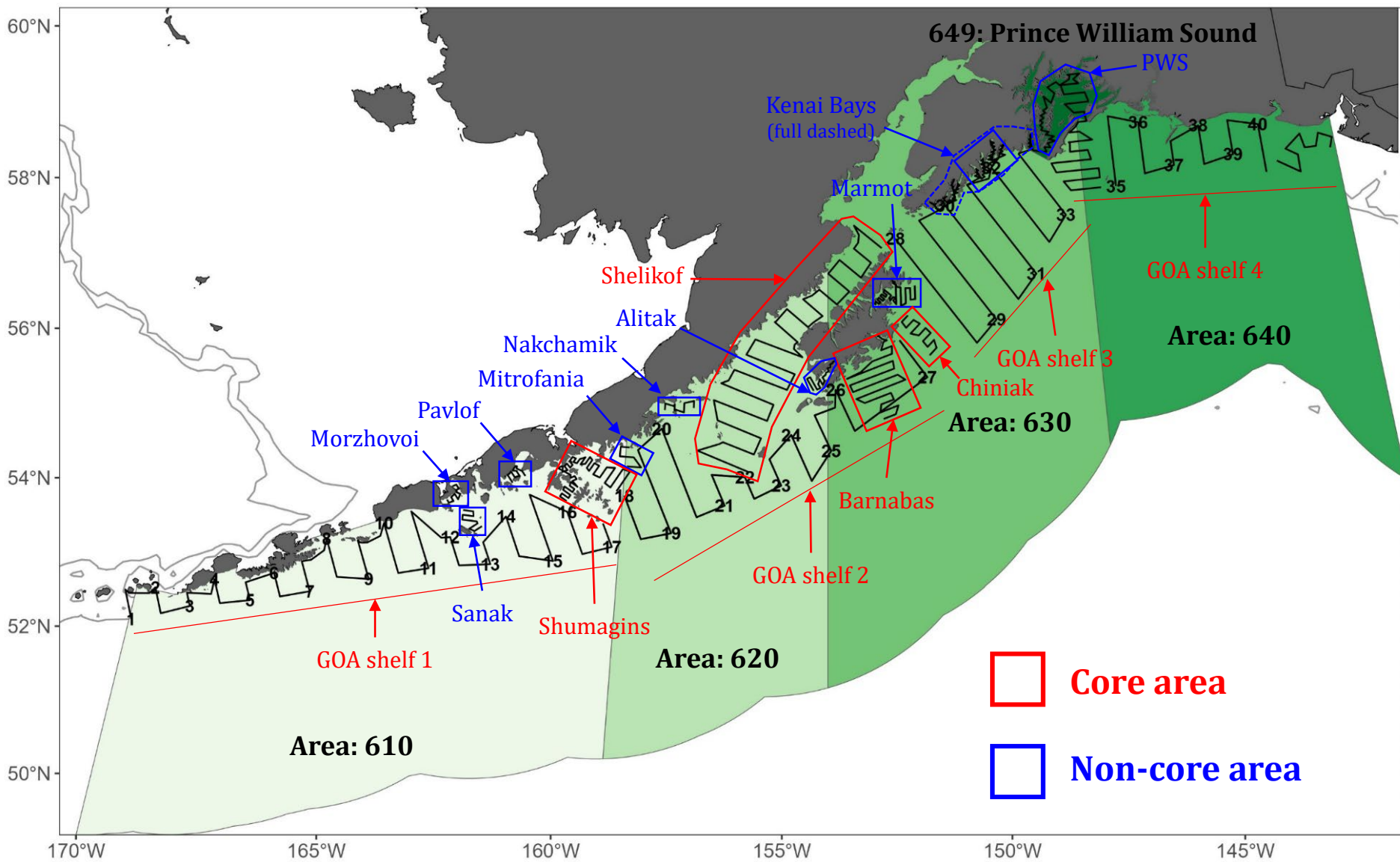
# Completed coverage

**20 days lost due to Dyson crew staffing issues**

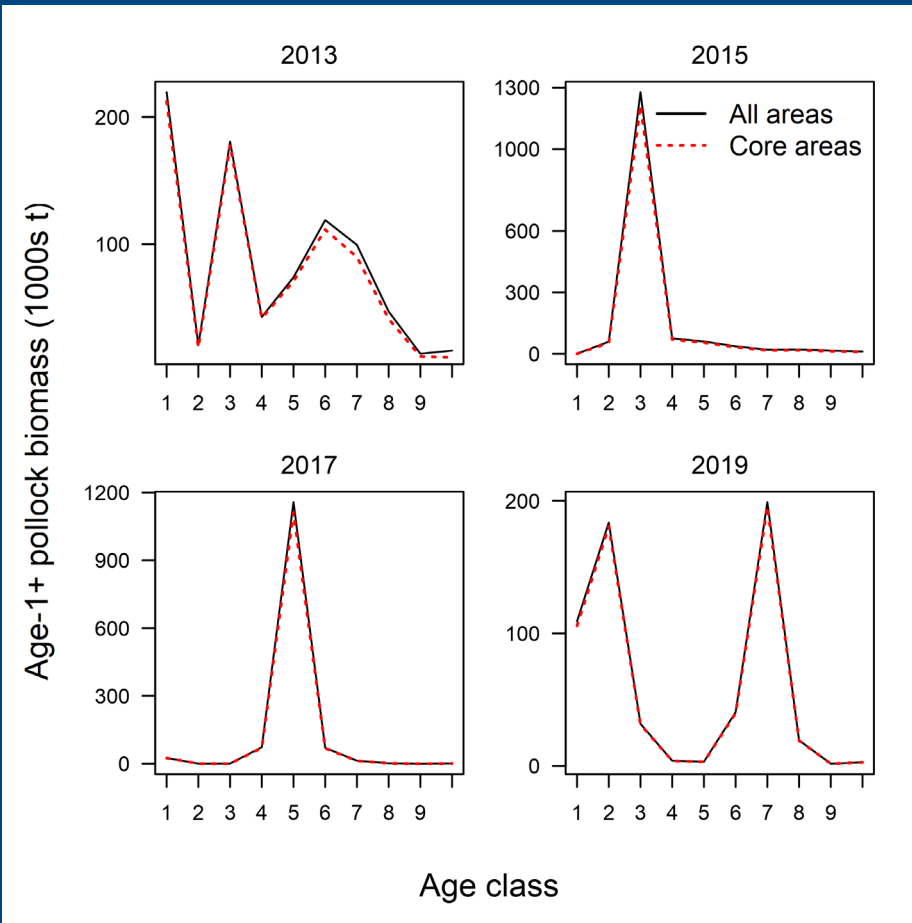
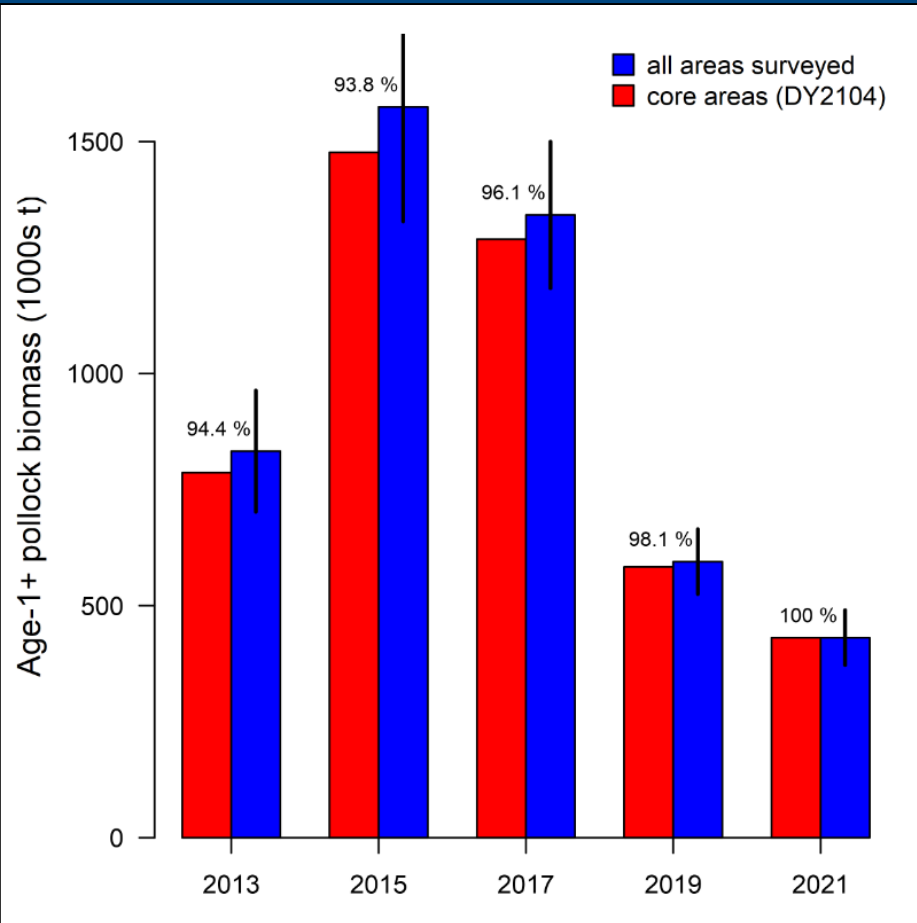
Full survey area covered at reduced sampling resolution (same as 2021)



# Core vs. non-core survey areas



# Core vs. non-core survey areas



# 2023 sampling

2,373 km trackline

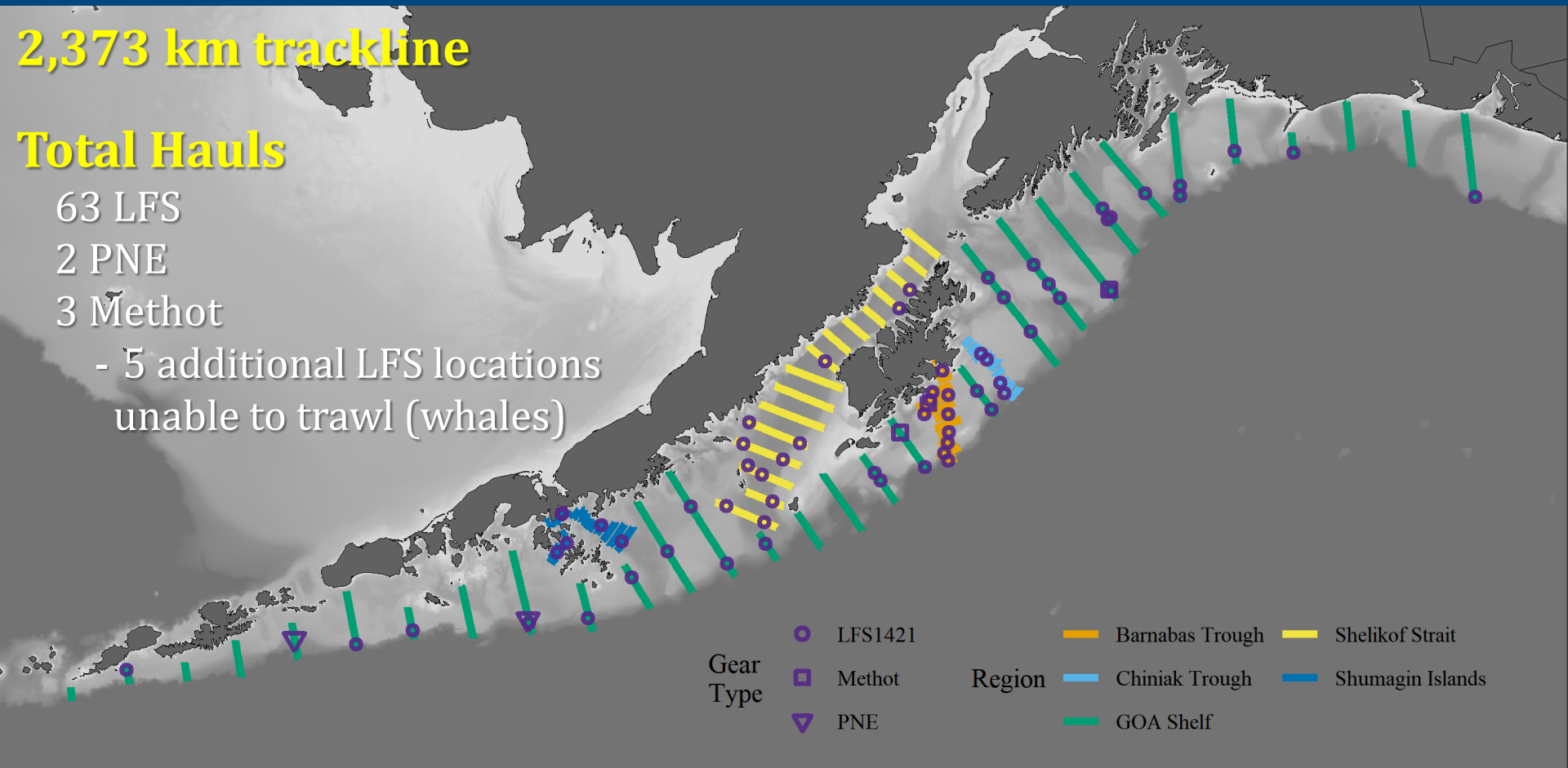
## Total Hauls

63 LFS

2 PNE

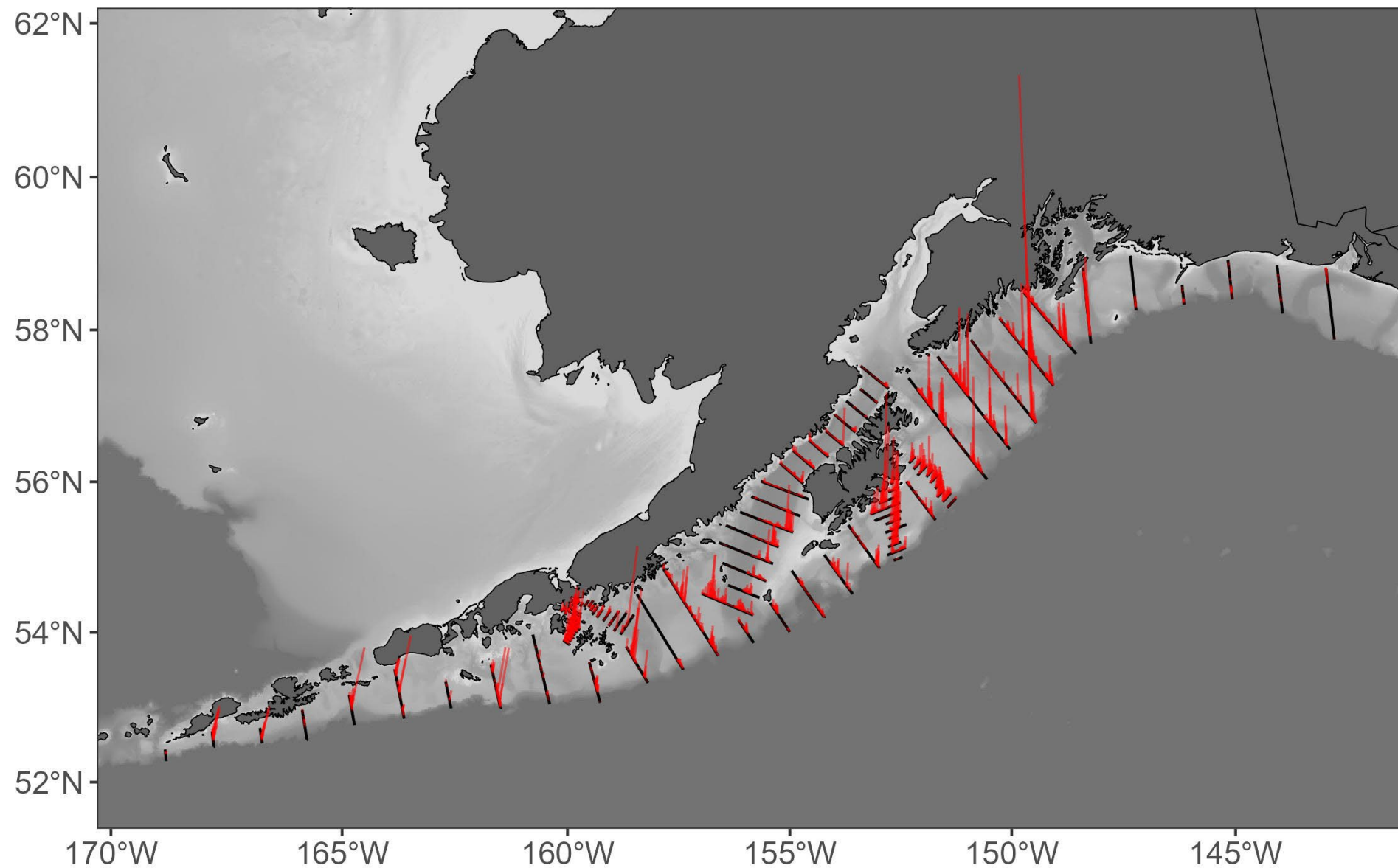
3 Methot

- 5 additional LFS locations  
unable to trawl (whales)

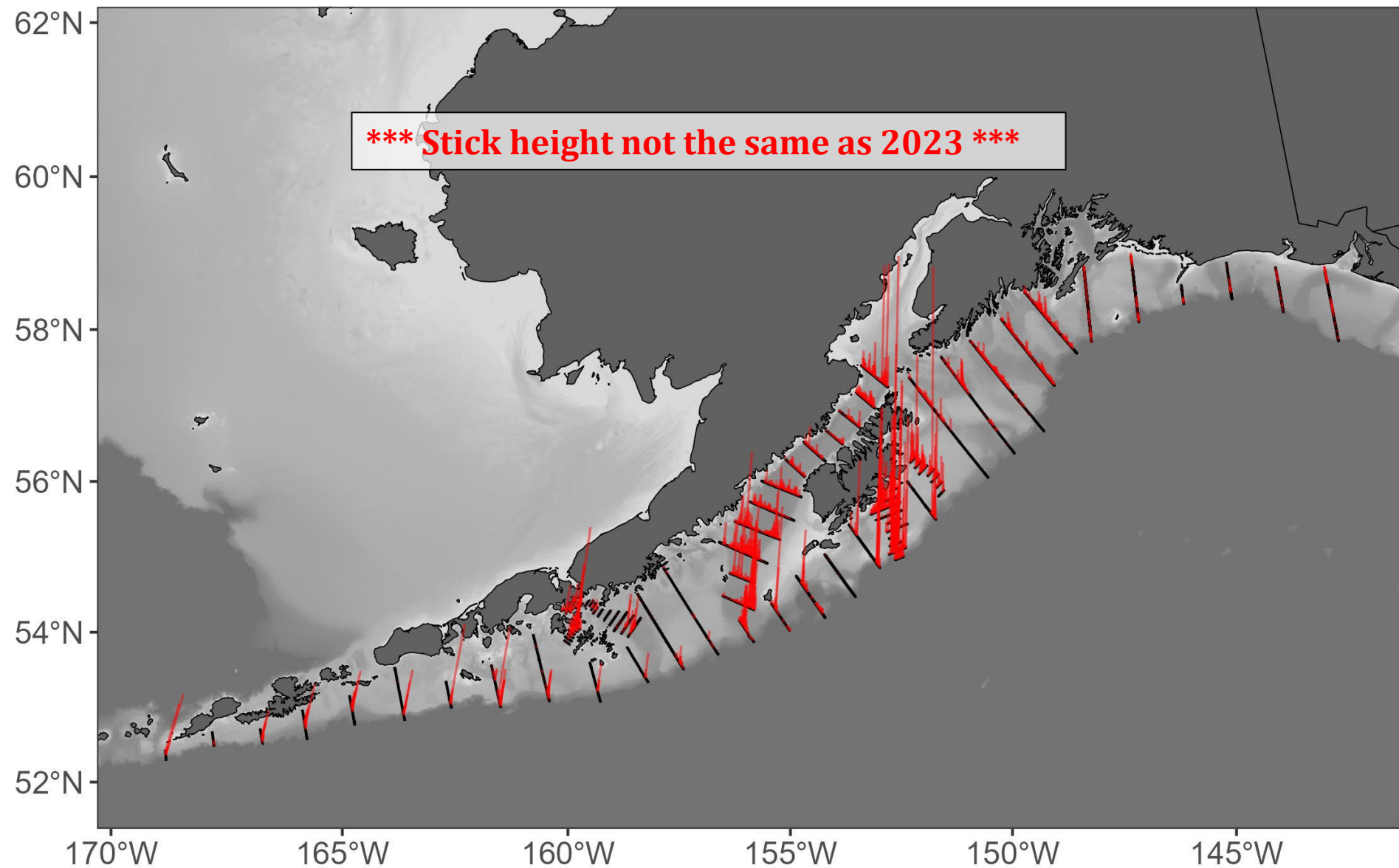




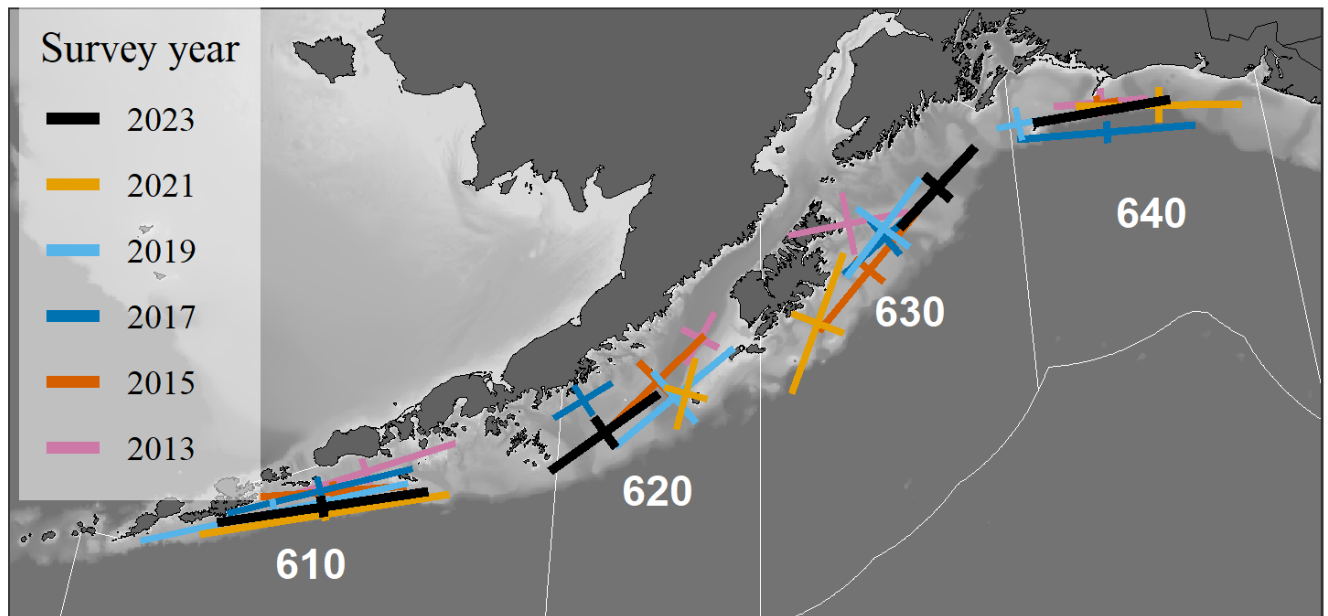
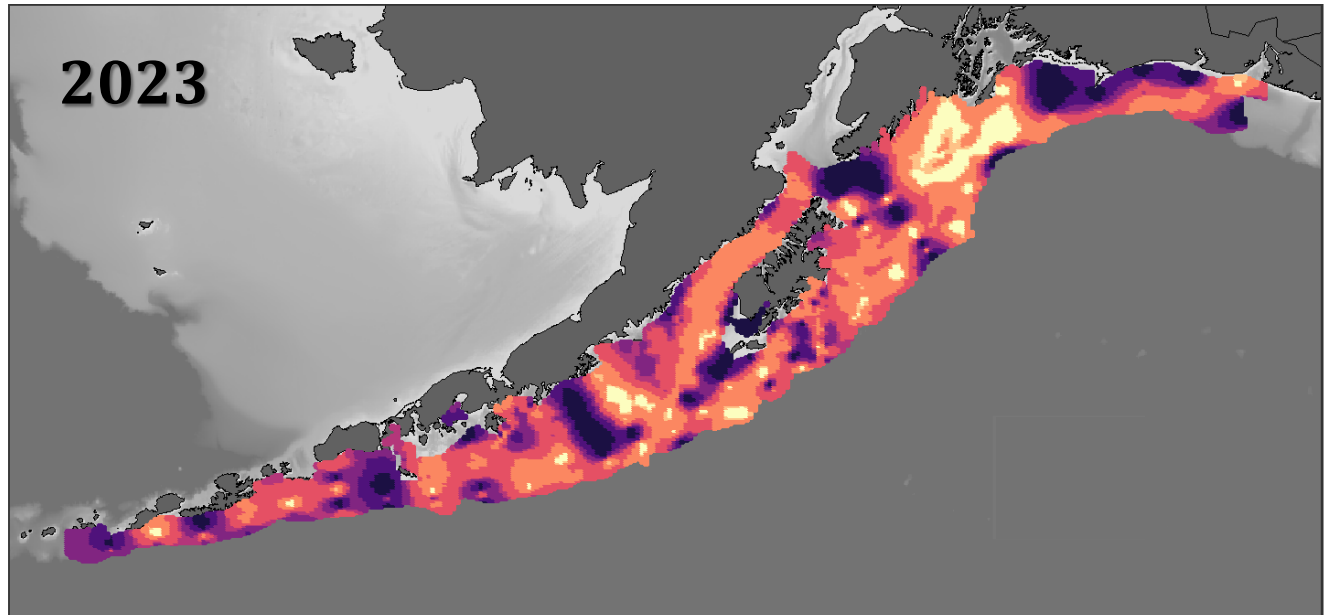
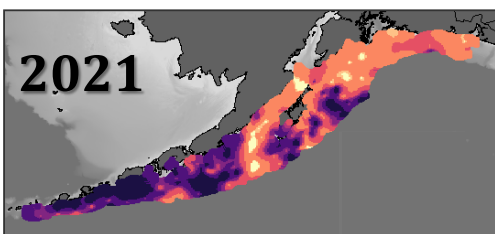
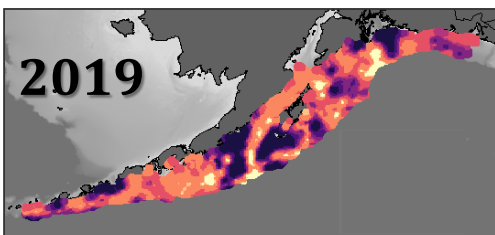
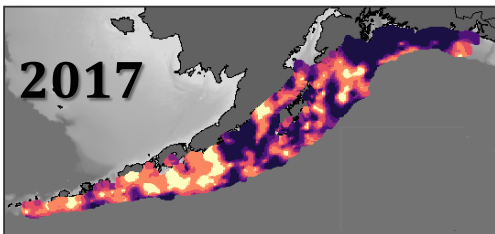
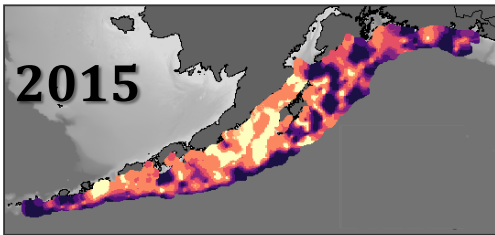
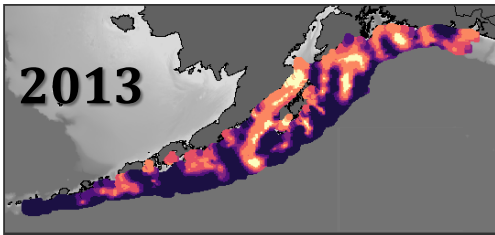
# 2023 Pollock biomass density



# 2021 Pollock biomass density



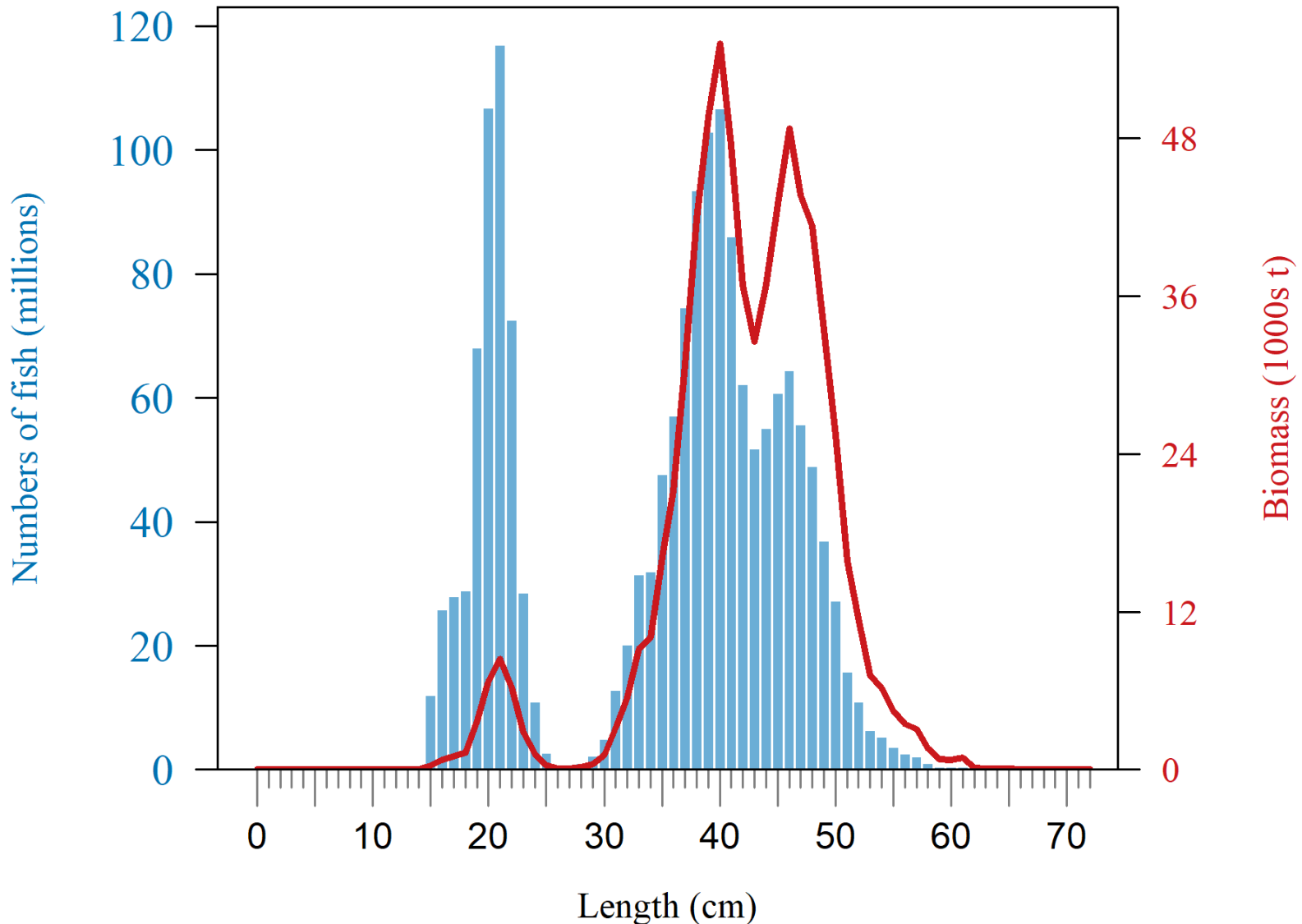
# 2023 vs. historical distributions



# 2023 Pollock estimates by length

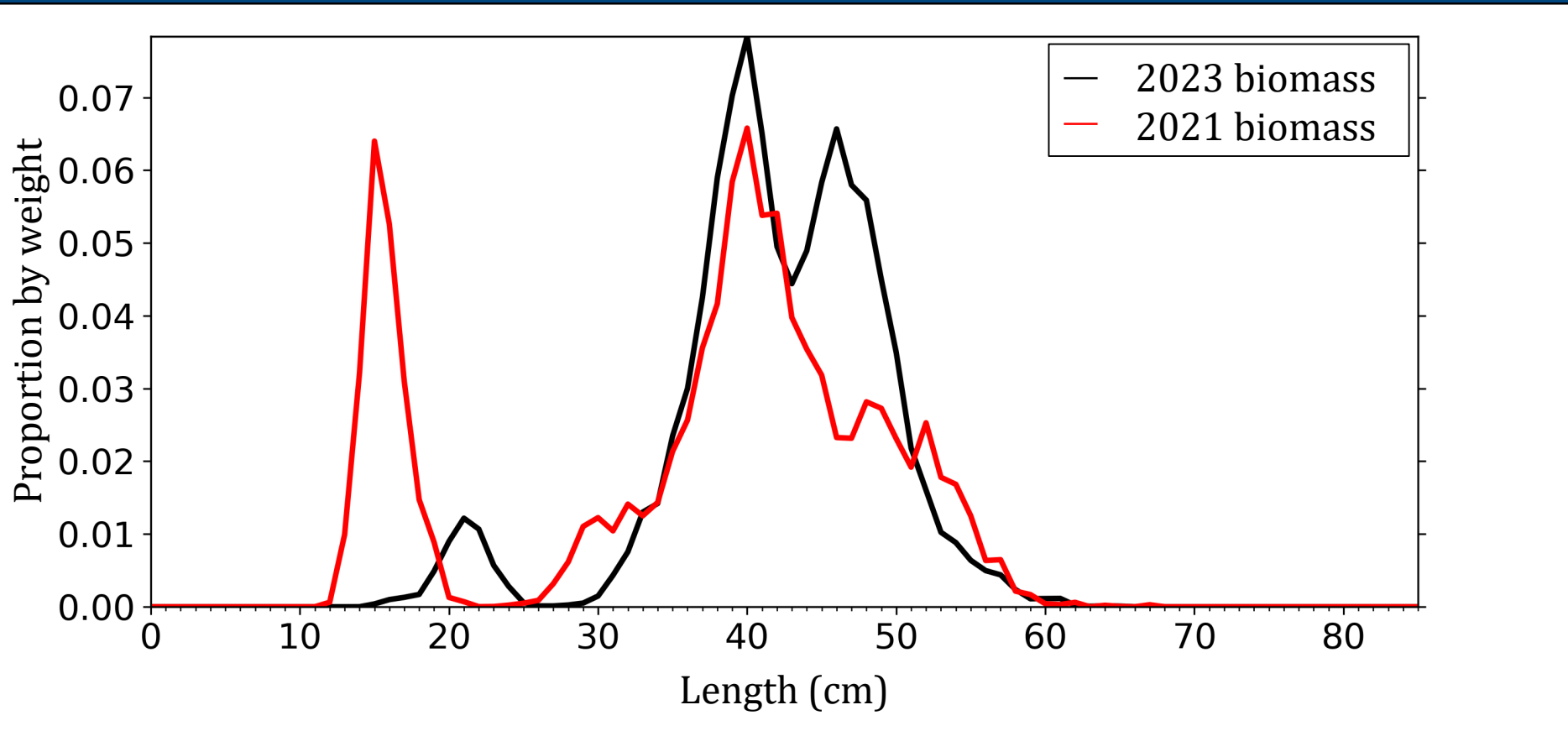
Abundance = 1.79 billion age-1+ fish (length modes at 21, 40, 46 cm)

Biomass = 745,066.3 t (7.8% est. error) → **~73% increase from 2021**

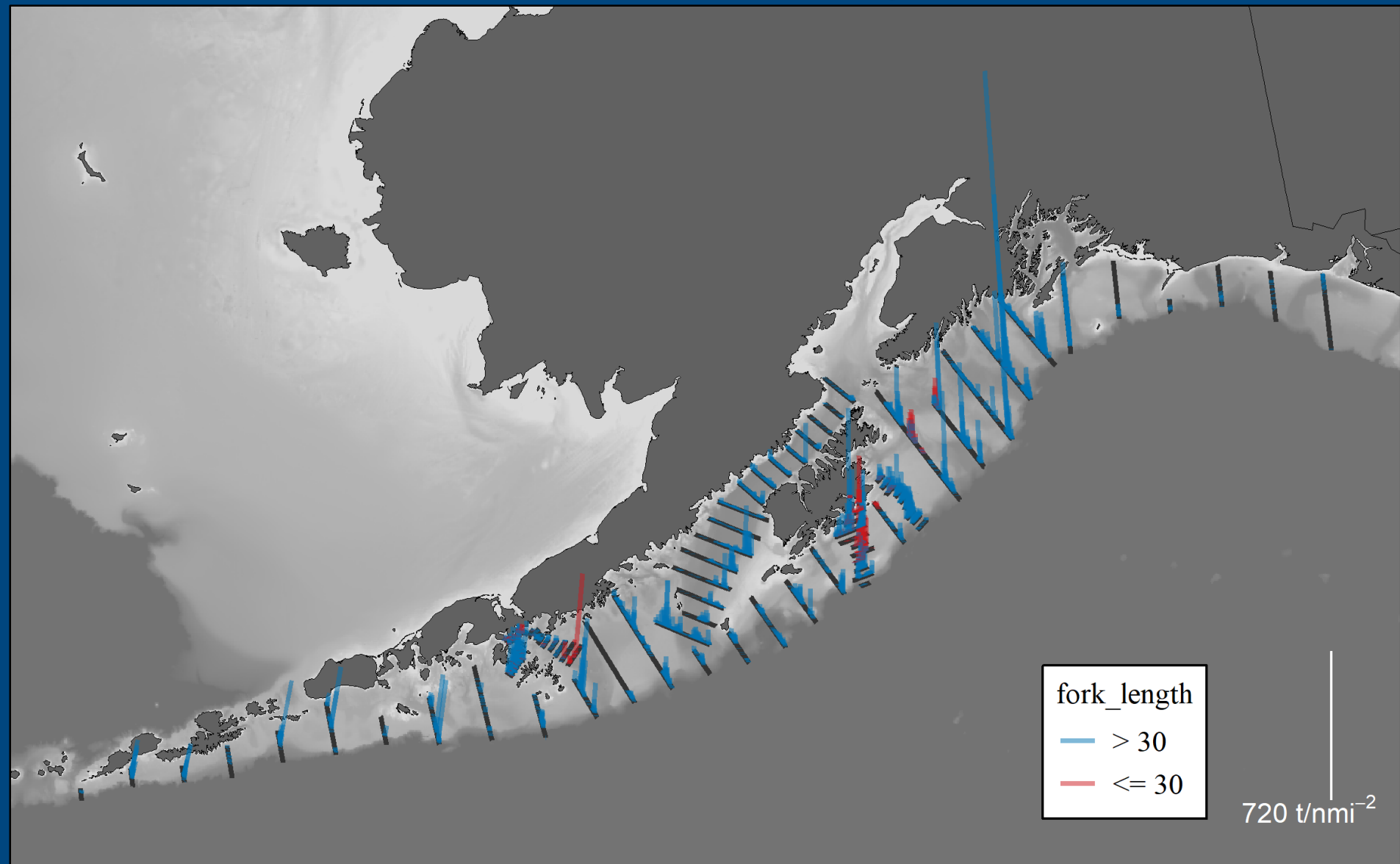


# Pollock biomass by length 2023 vs. 2021

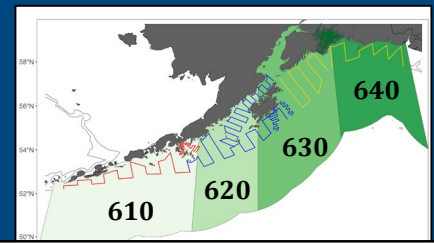
Year	Abundance (millions age-1+)	Biomass (t)
2023	1,791.1	745,066
2021	4,307.6	431,053



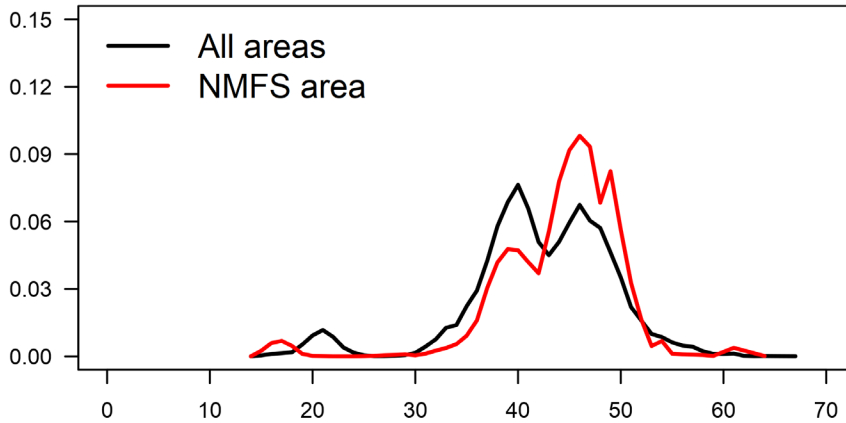
# Distribution of adults vs. juveniles



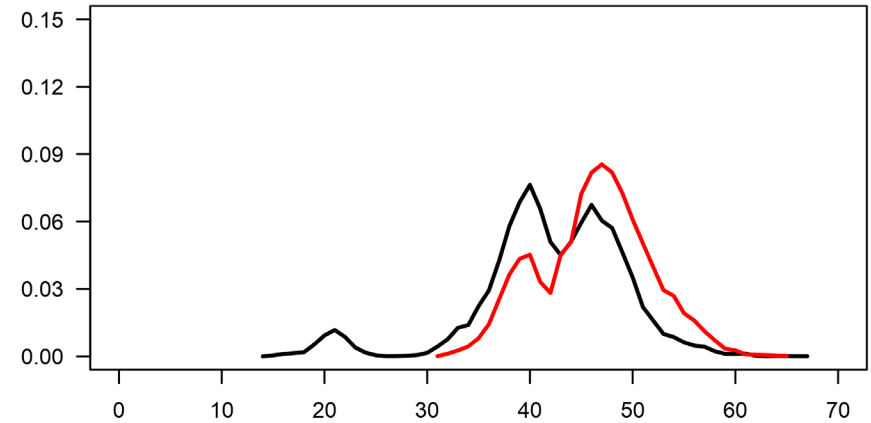
# Biomass by length & NMFS management area



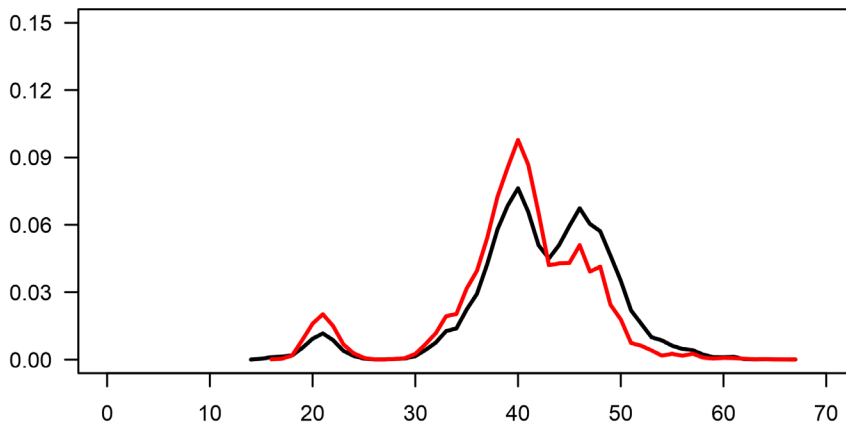
## 610: Shumagins



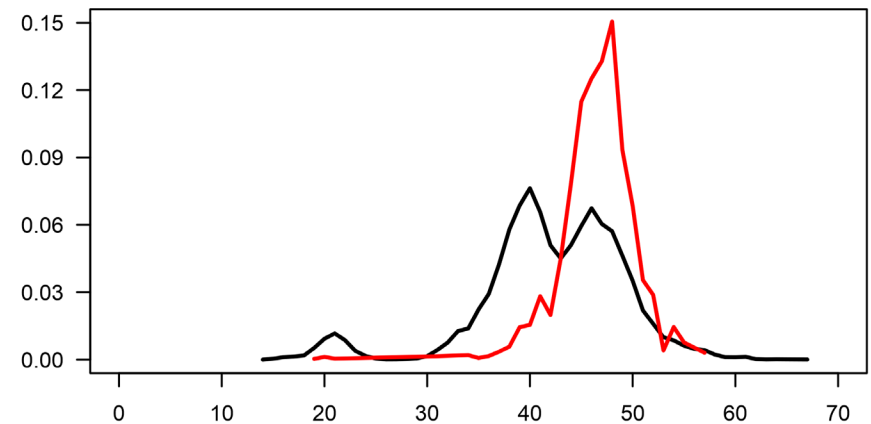
## 620: Chirikof



## 630: Kodiak



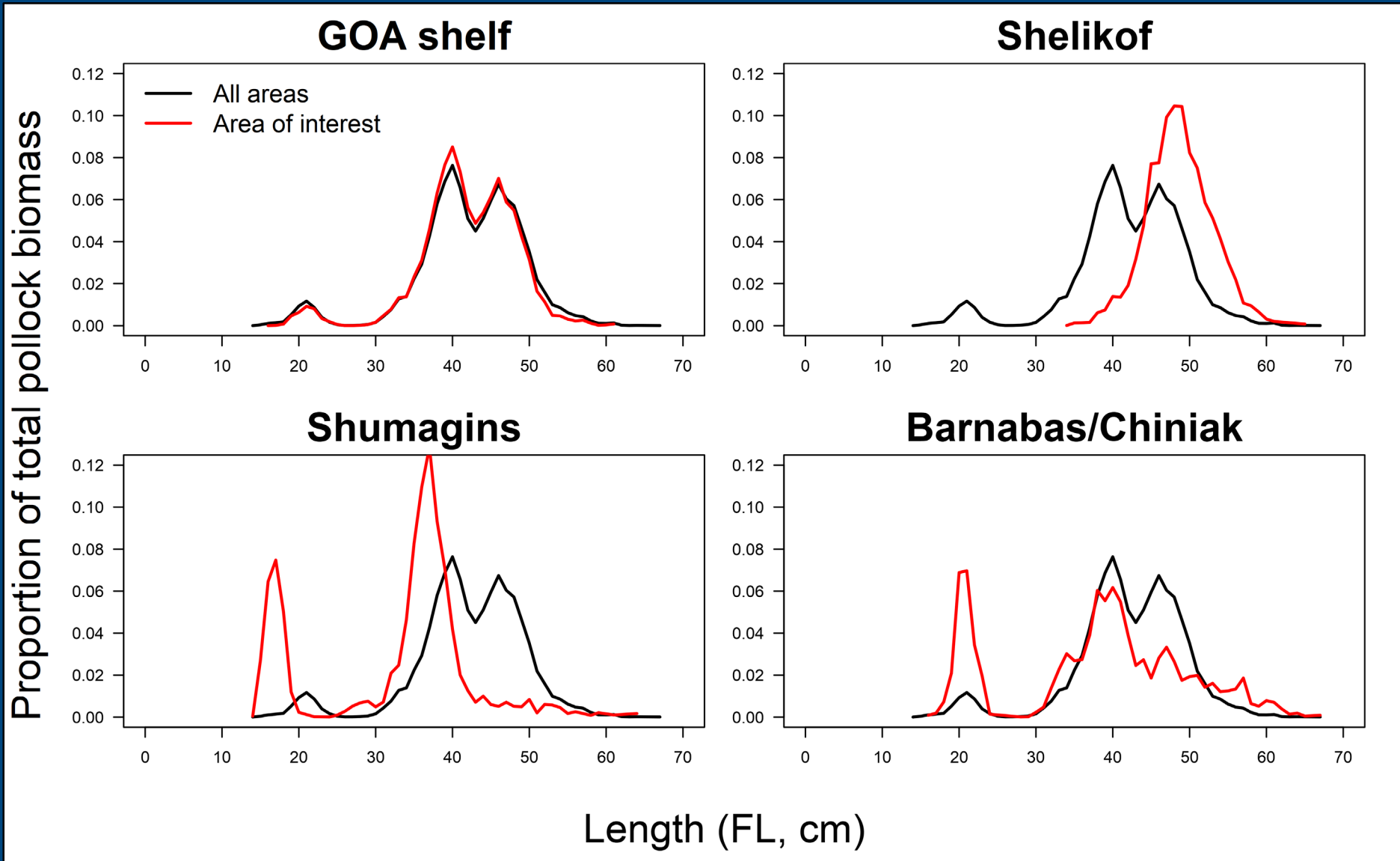
## 640: Yakutat



Length (FL, cm)

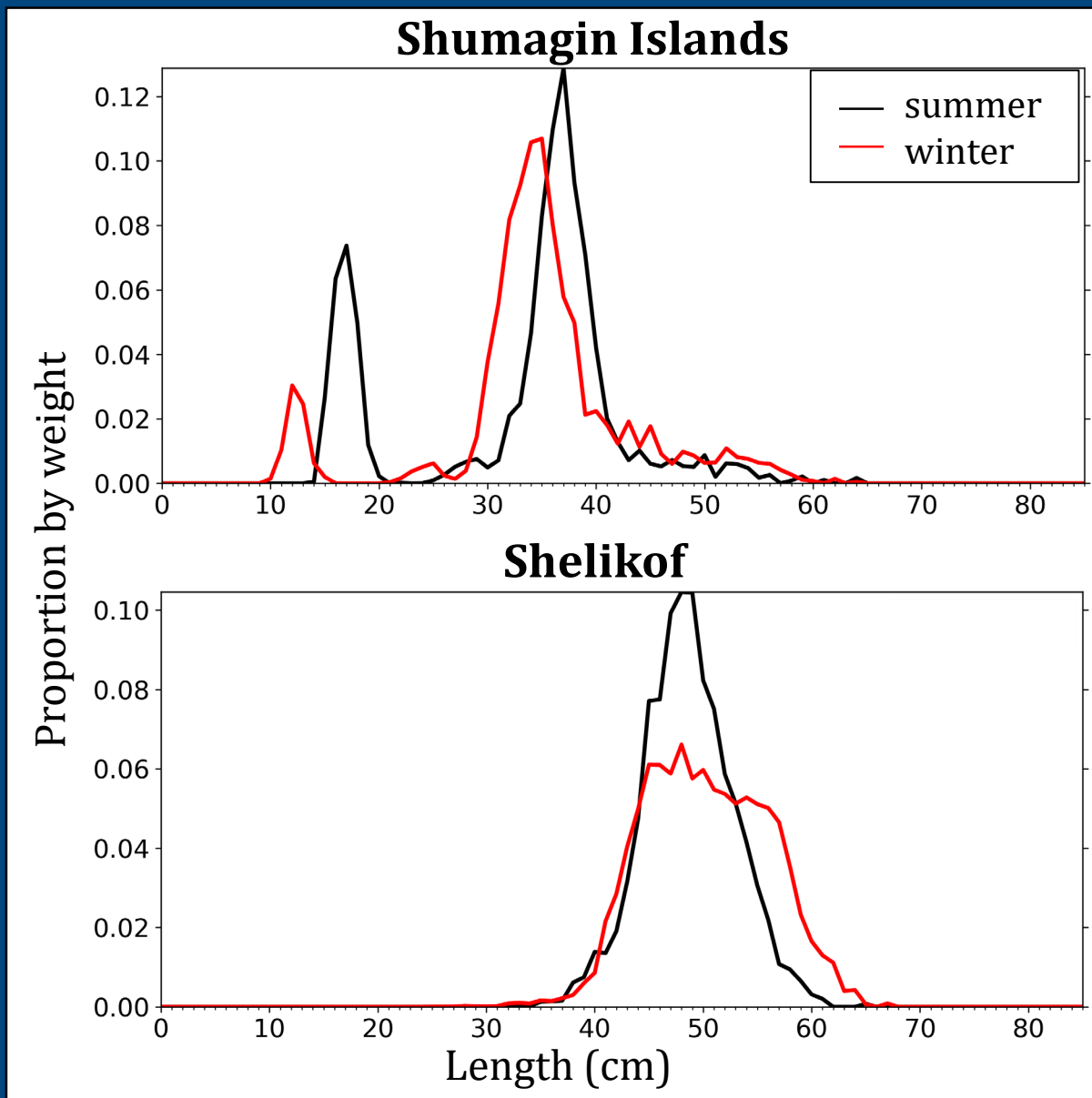
Proportion of total pollock biomass

# Biomass by length & survey area

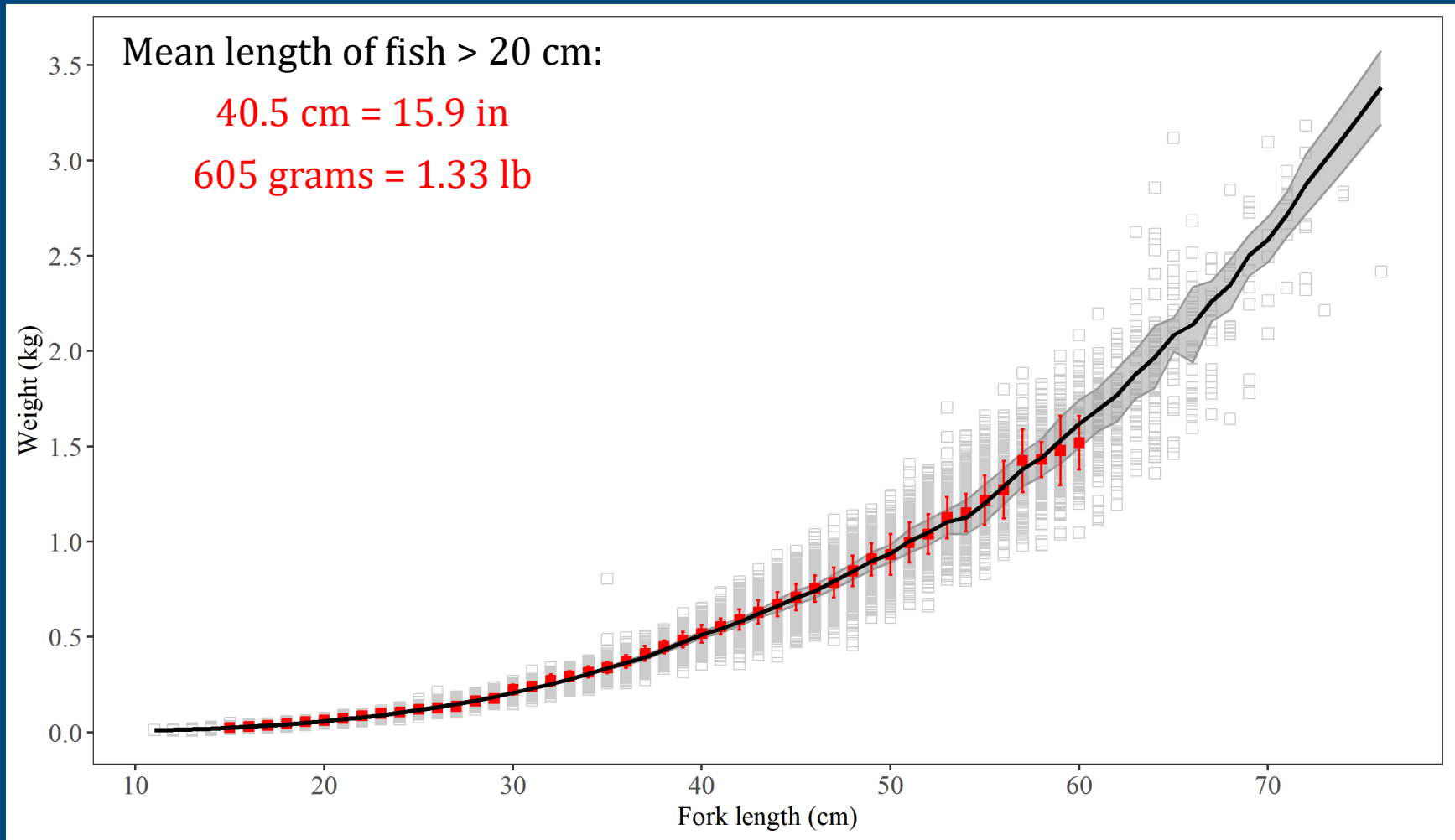




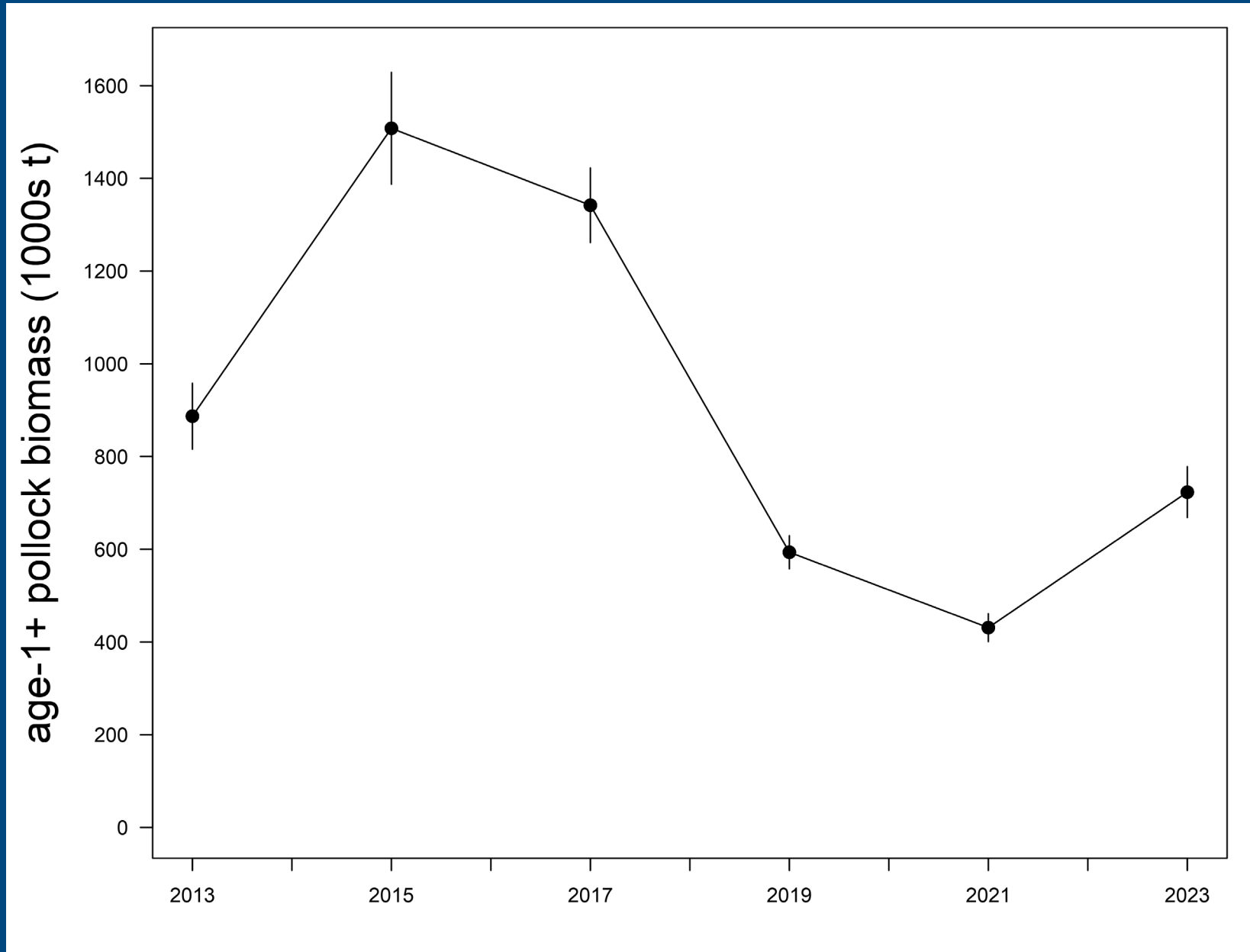
# Pollock biomass proportion by length summer 2023 vs. winter 2023



# Length-weight



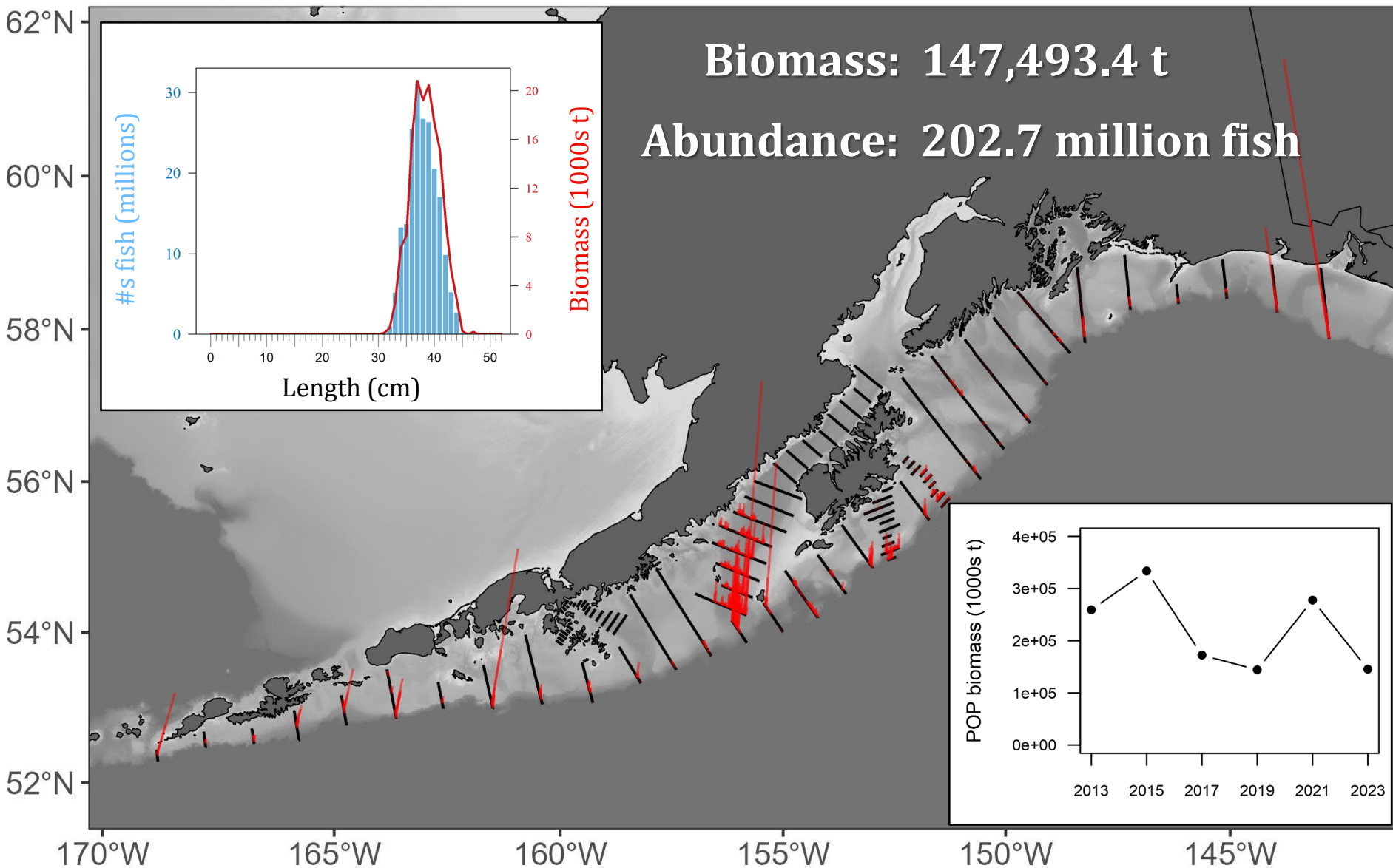
# GOA pollock time series



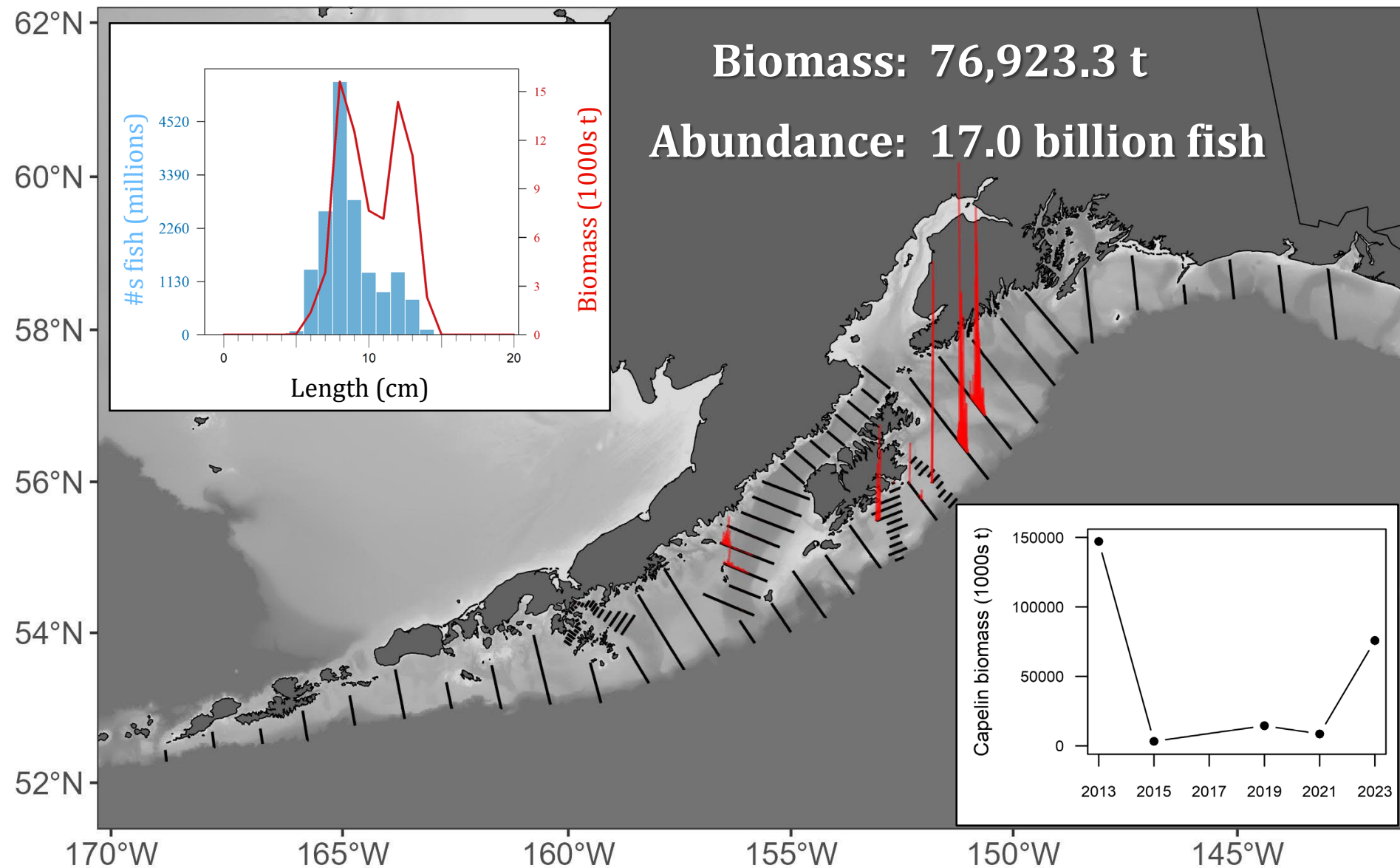
# 2023 POP biomass density

**Biomass: 147,493.4 t**

**Abundance: 202.7 million fish**



# 2023 Capelin biomass density

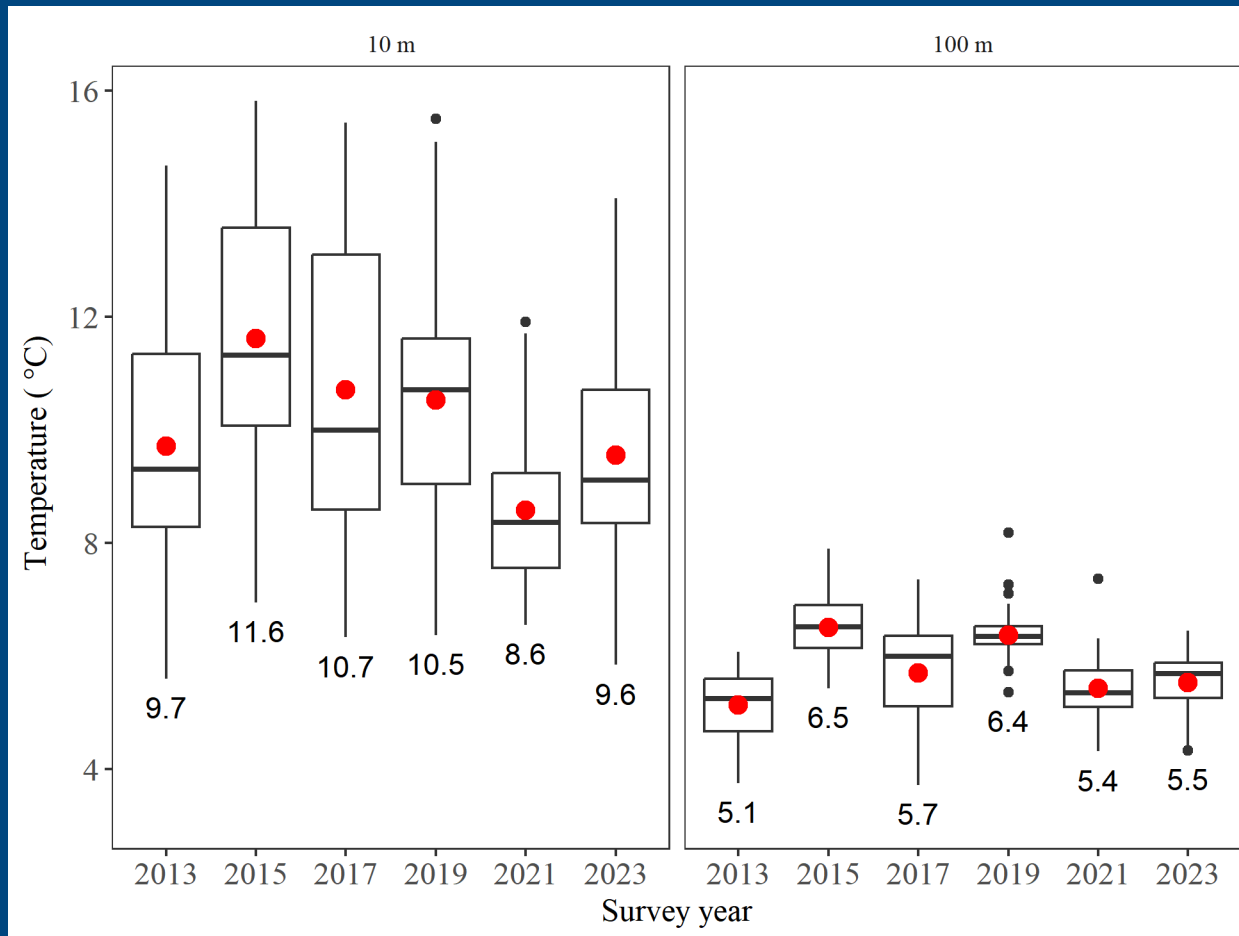


# Temperature -> avg. conditions (survey)

Mean SST on-transect = 10.0° C in 2023 (9.0–12.0° C, 2013–2021)

Temperature at fishing locations: 10 m = 9.6° C (8.6–11.6° C, 2013–2021)

100 m = 5.5° C (5.1–6.5° C, 2013–2021)



# Acknowledgements

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**NRC Post-doc:** Karuna Agarwal

**Teacher-at-Sea:** Laura Guertin, Germaine Thomas

**AIS observer:** James Gossom

**DriX Consultants:** Marc Gini, Mathieu Kerjean

**NOAA Ship *Oscar Dyson*:** CDR Emily Rose and crew

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# DriX USV testing

(Photo by Bryan Begun)



## What we did

- Evaluated uncrewed surface vehicle as a 'force multiplier' for acoustic surveys
- Instrumented with 4-frequency EK80
- Developed shipboard procedures to safely deploy, recover, and refuel
- Controlled the USV over a satellite link
- Side-by-side testing to evaluate data and fish reactions to vessel

## Future goals

- Reduce propeller cavitation to improve sonar performance. Currently produces good data to 150 m
- Increase weather window for launch/recovery

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