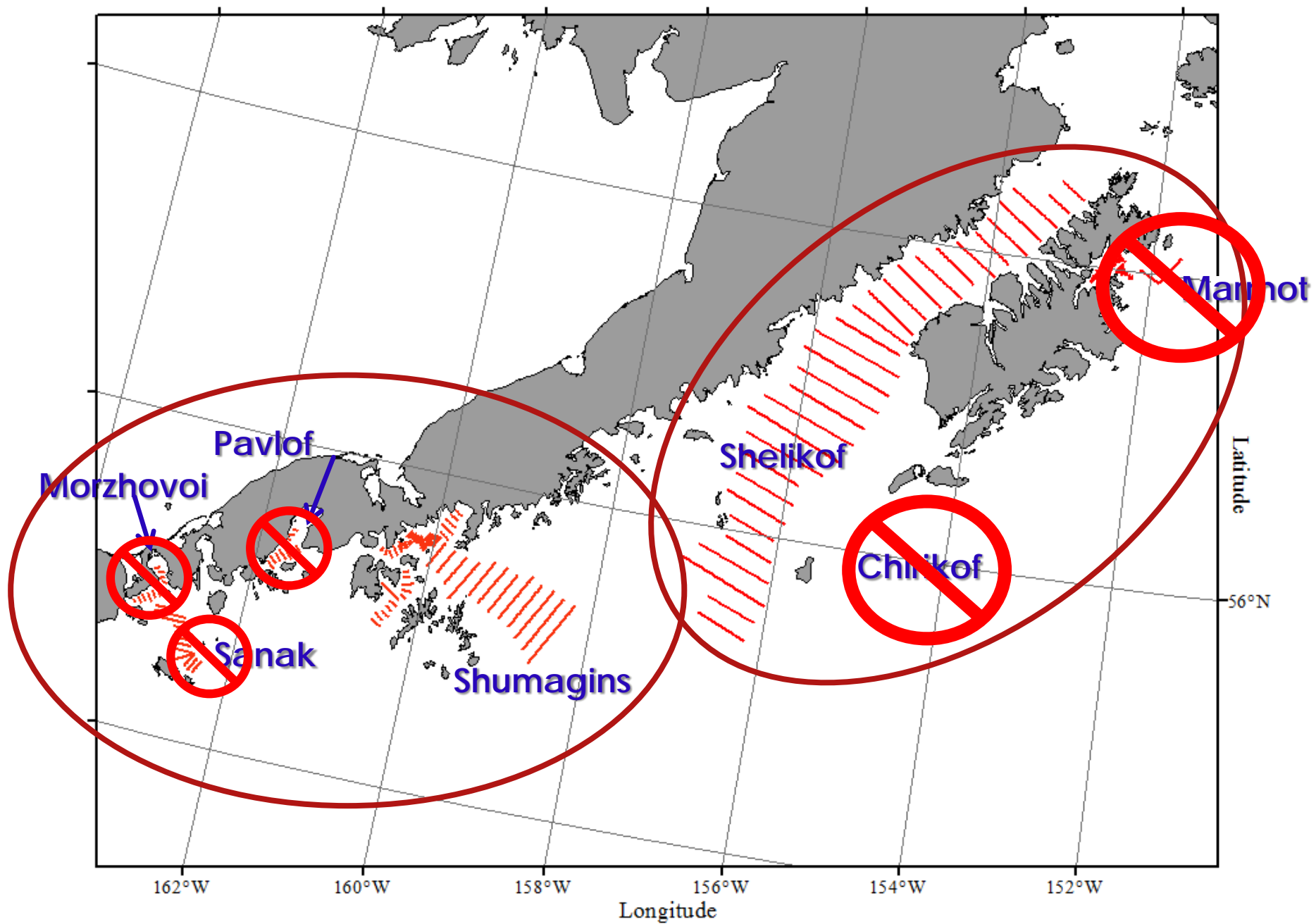


# Results of the winter 2020 Acoustic-Trawl Surveys of Walleye Pollock in the Gulf of Alaska



**Abigail McCarthy, Mike Levine & MACE Staff  
Midwater Assessment and Conservation Engineering  
Alaska Fisheries Science Center**





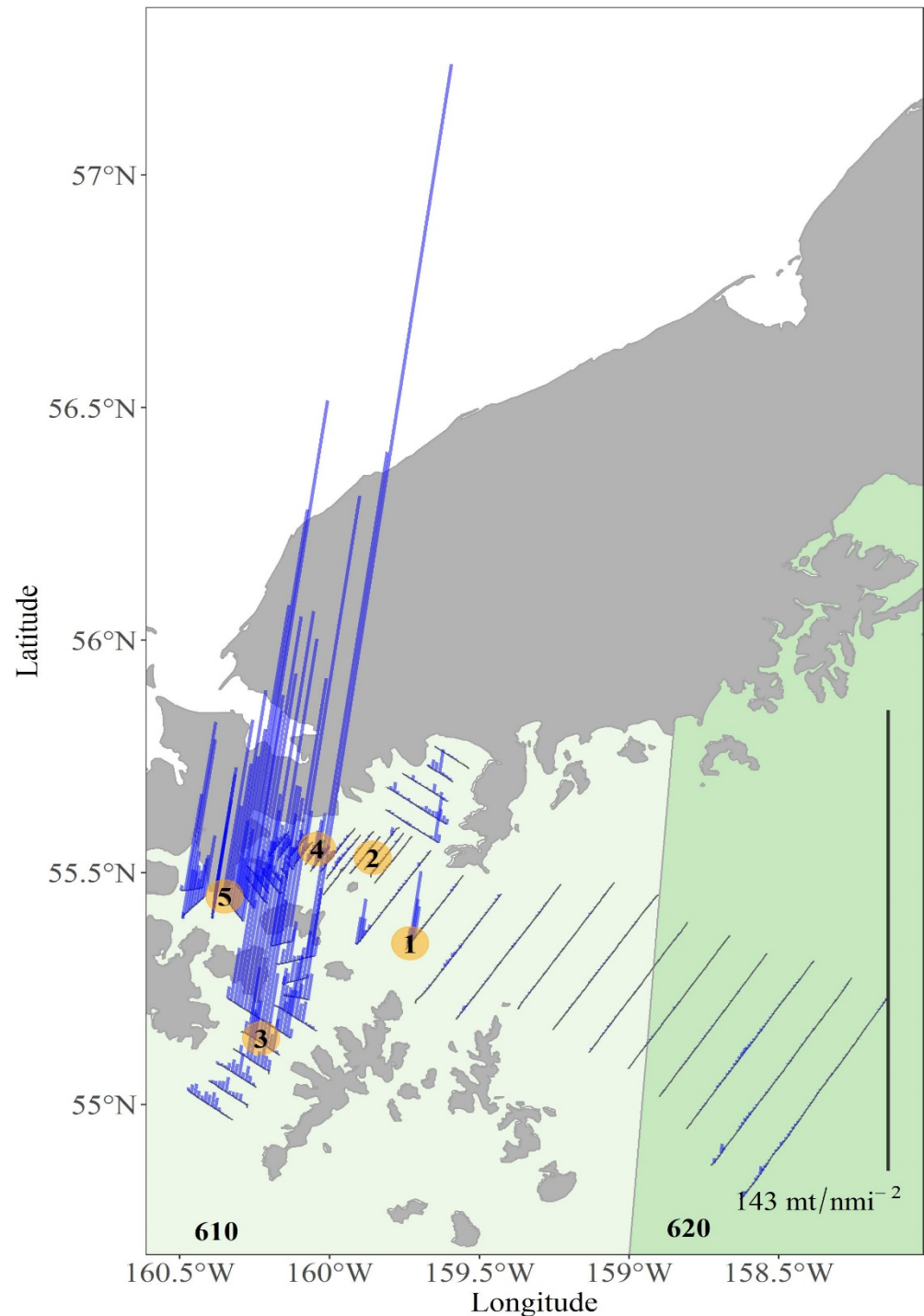




# Shumagin Islands pollock biomass estimates

Feb 11-18

5 LFS tows, 468 nmi of  
trackline

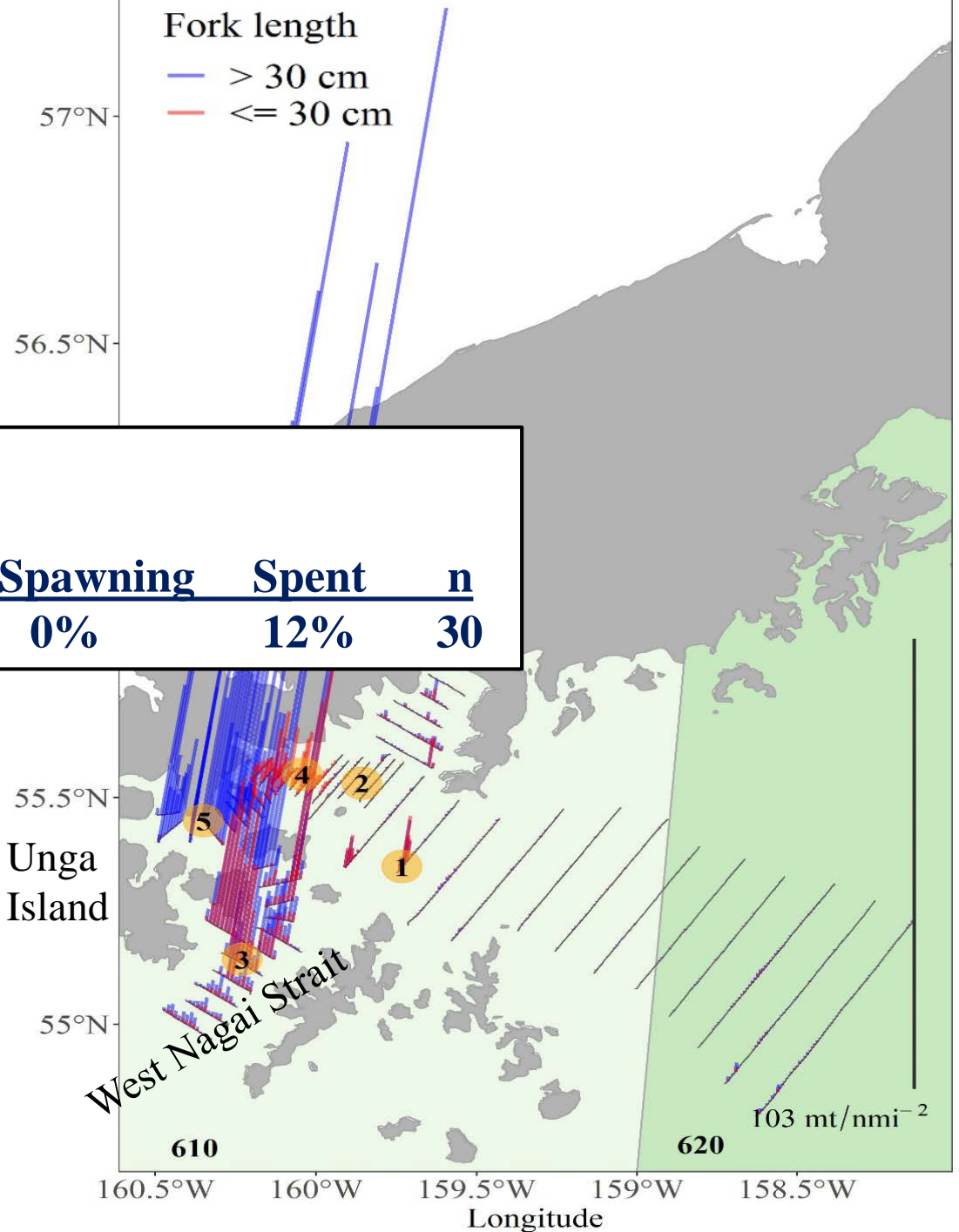




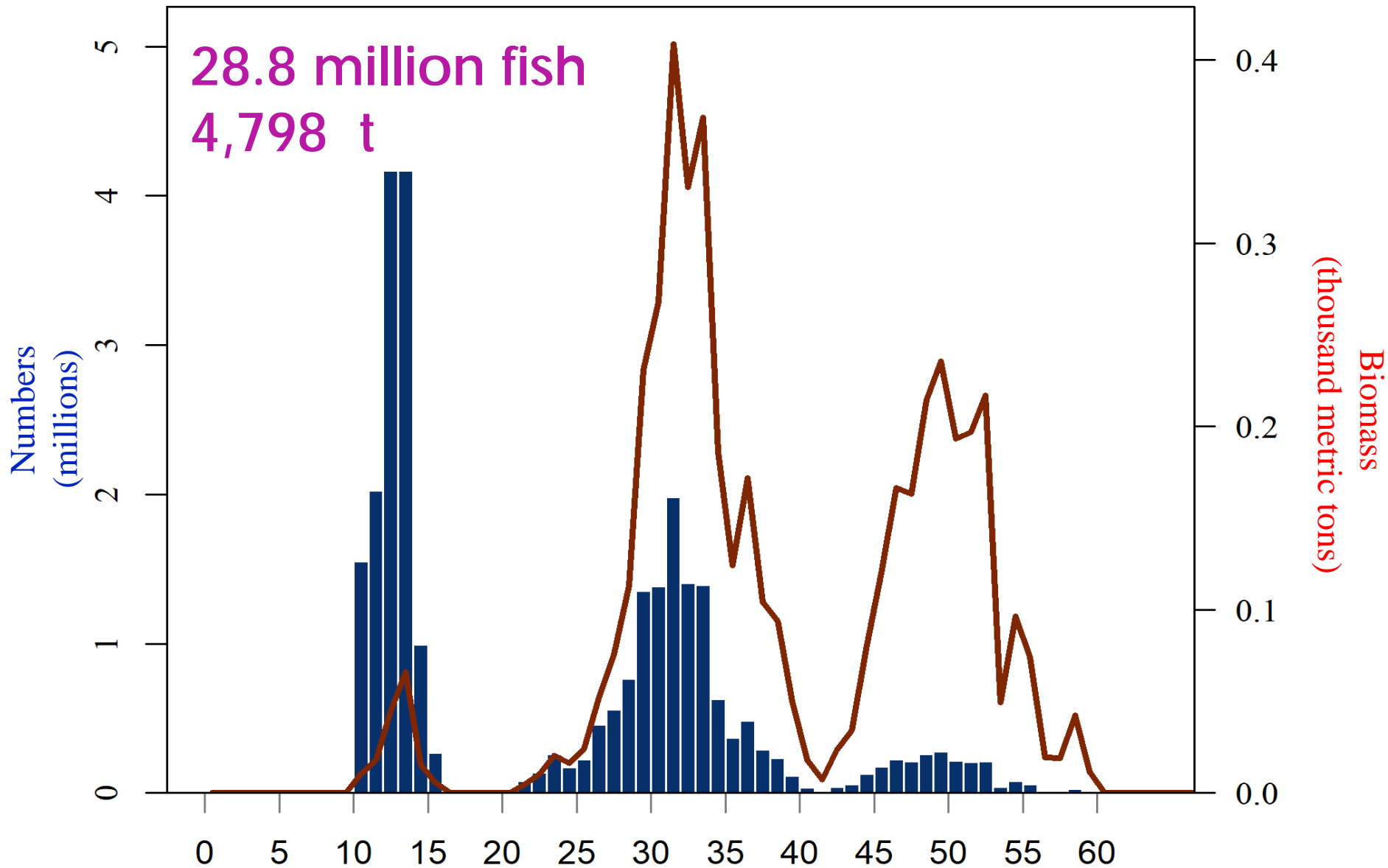
# Shumagins Biomass by size class

## Maturities (females > 40cm)

	<u>Prespawning</u>	<u>Spawning</u>	<u>Spent</u>	<u>n</u>
Shumagins	52%	0%	12%	30

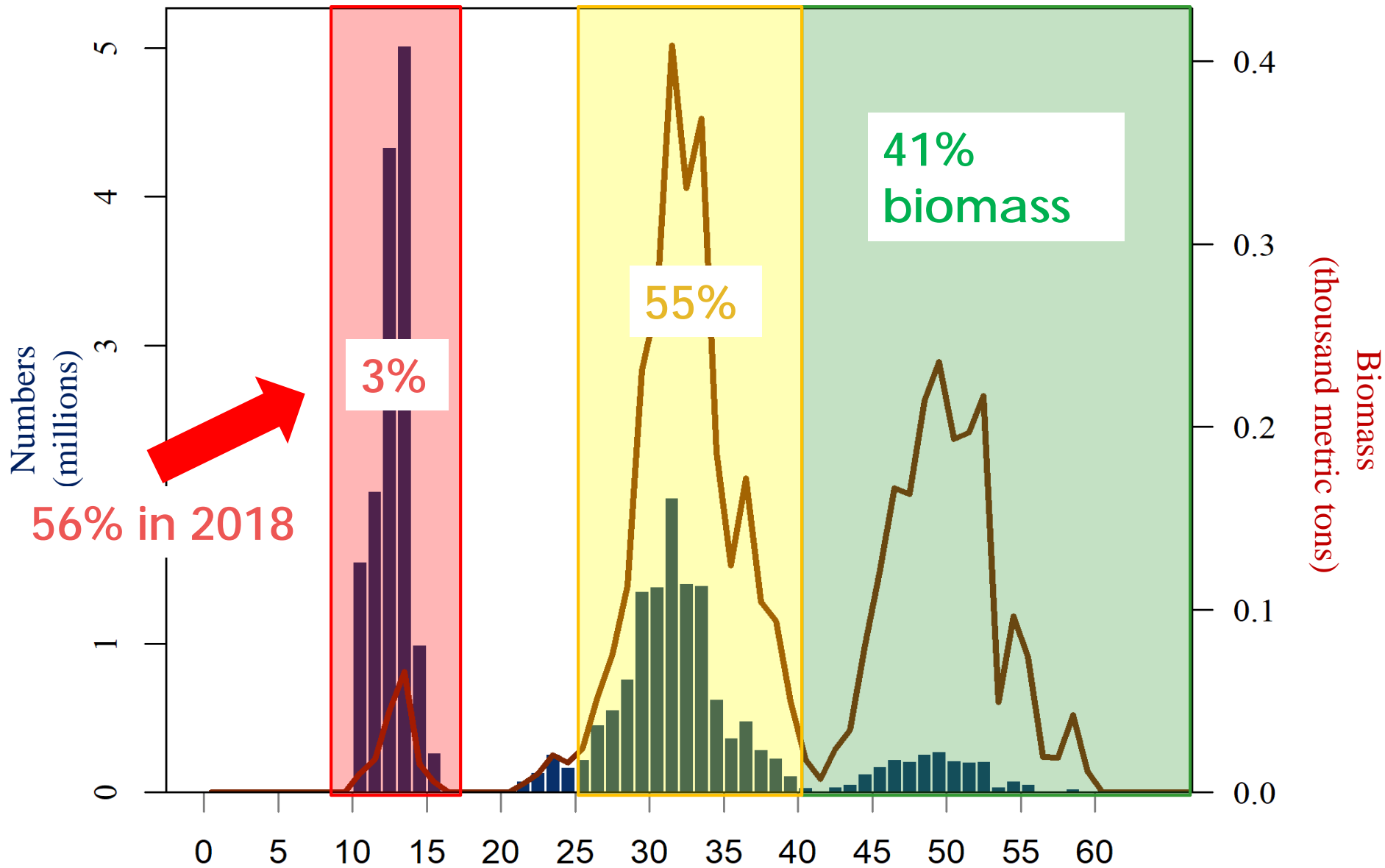


# Length Distributions





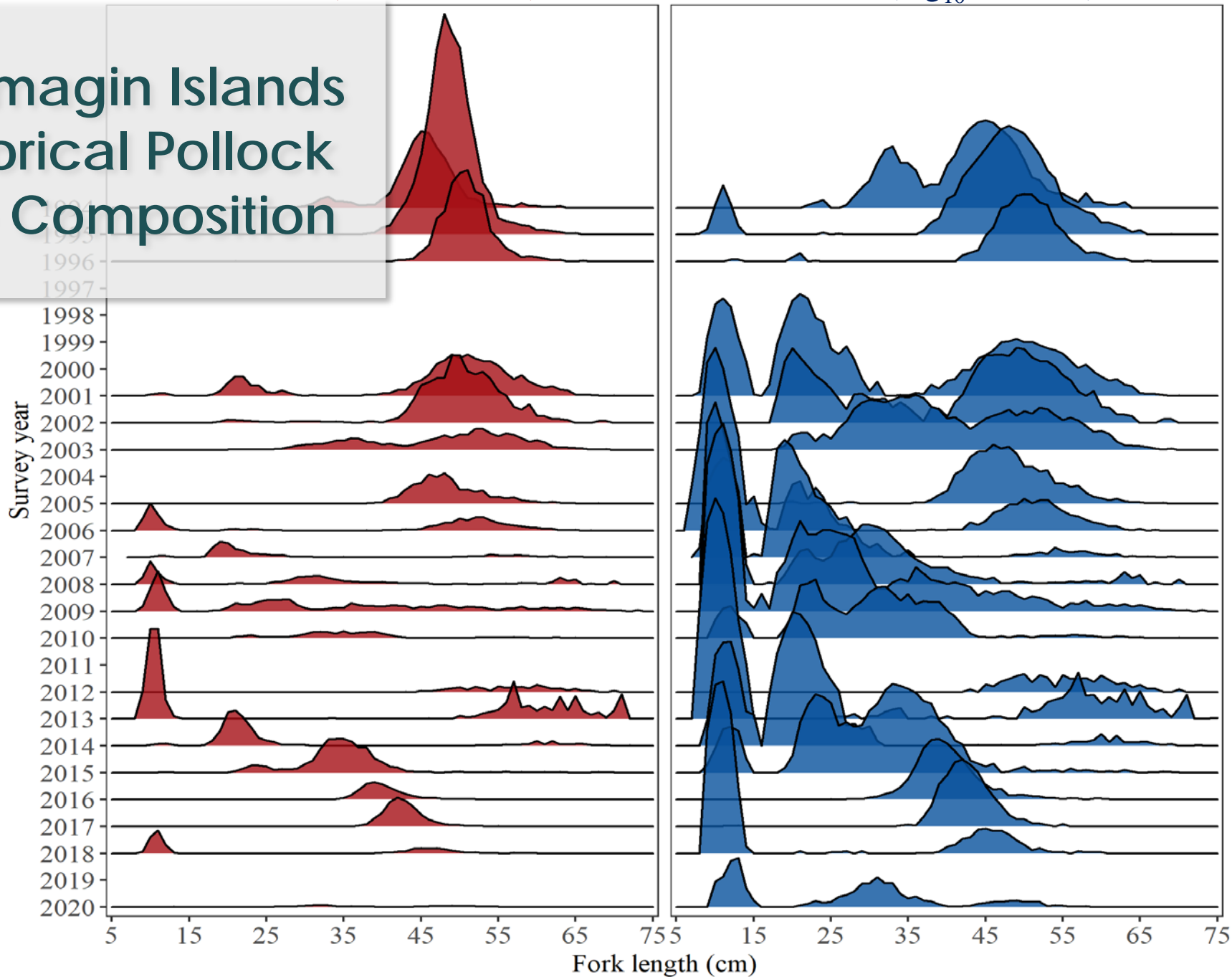
# Length Distributions



Biomass (thousand tons)

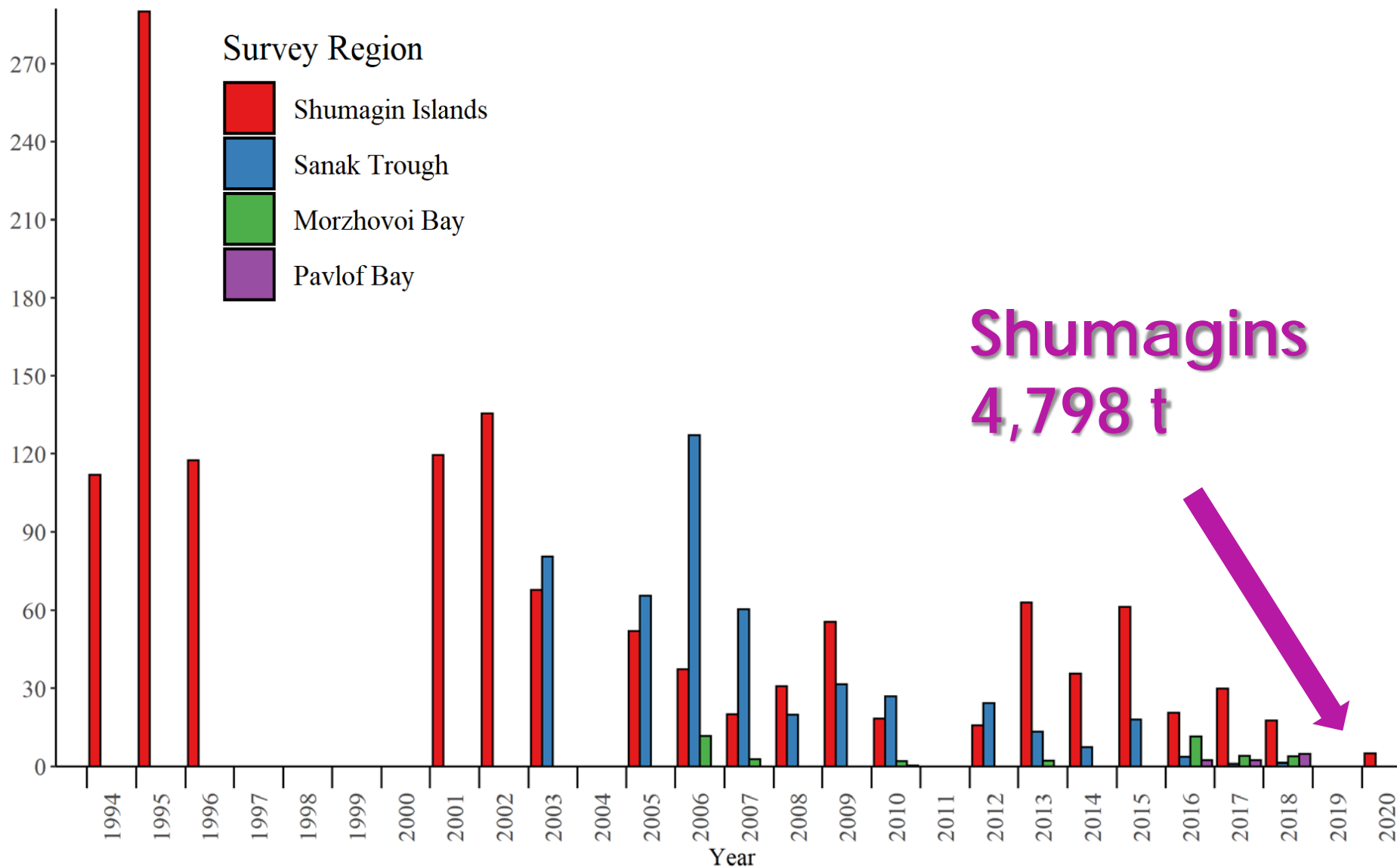
Numbers ( $\log_{10}$  millions)

# Shumagin Islands Historical Pollock Size Composition





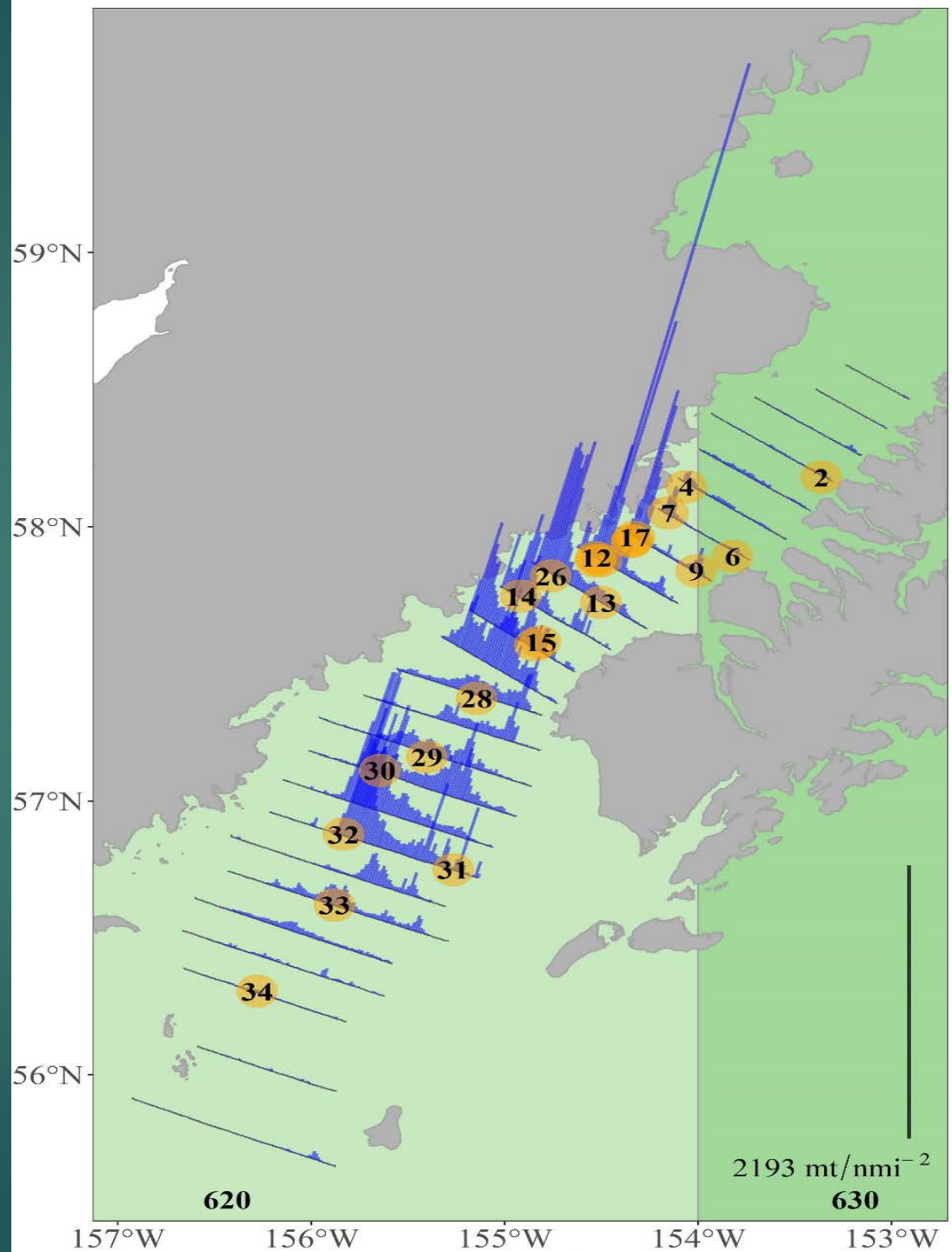
# Pollock Biomass Estimates: Time Series



# Shelikof Strait pollock biomass estimates

Mar 6-15

23 LFS tows, 11 AWTs,  
770 nmi of trackline



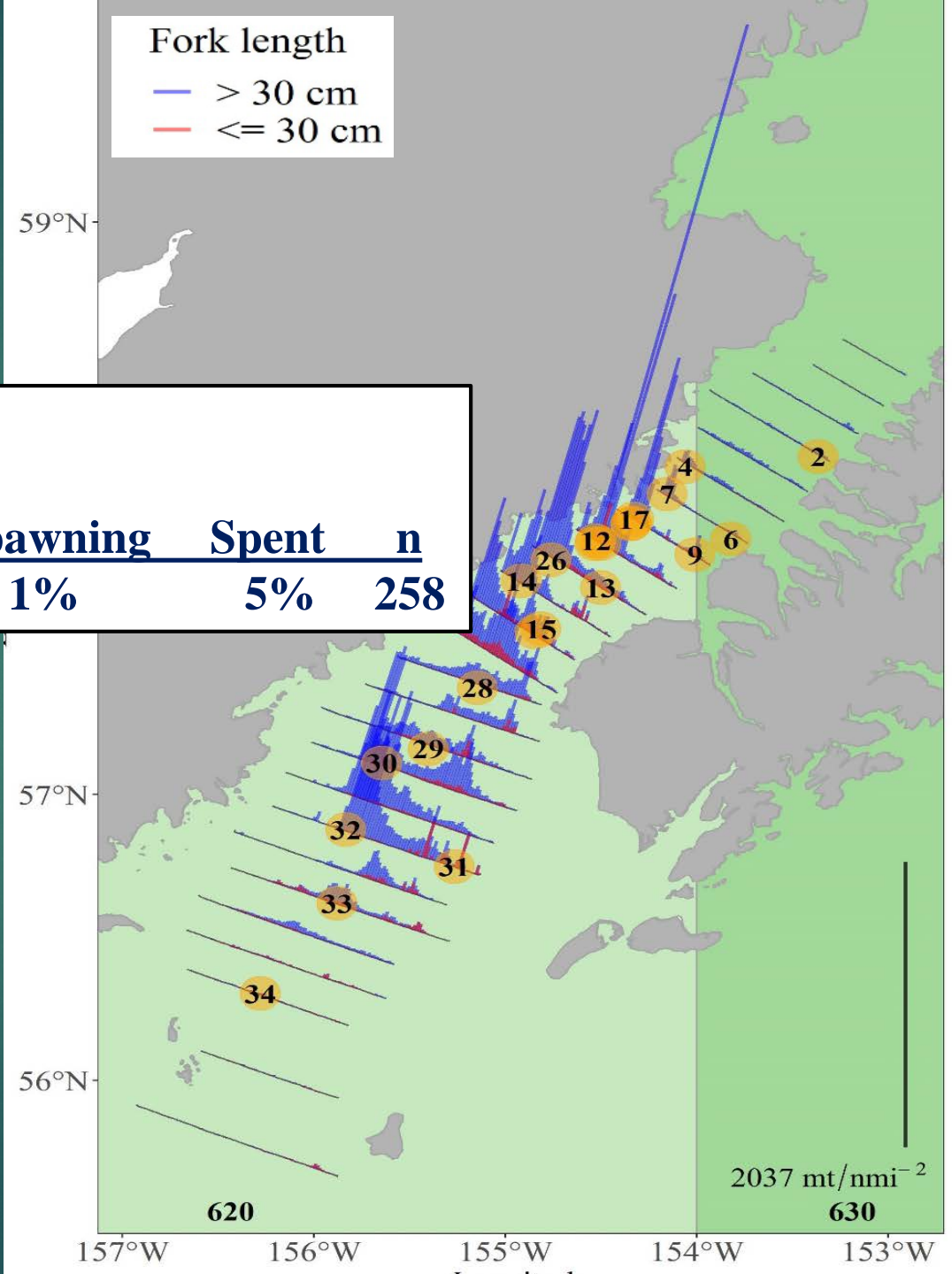


# Shelikof Strait biomass by size class

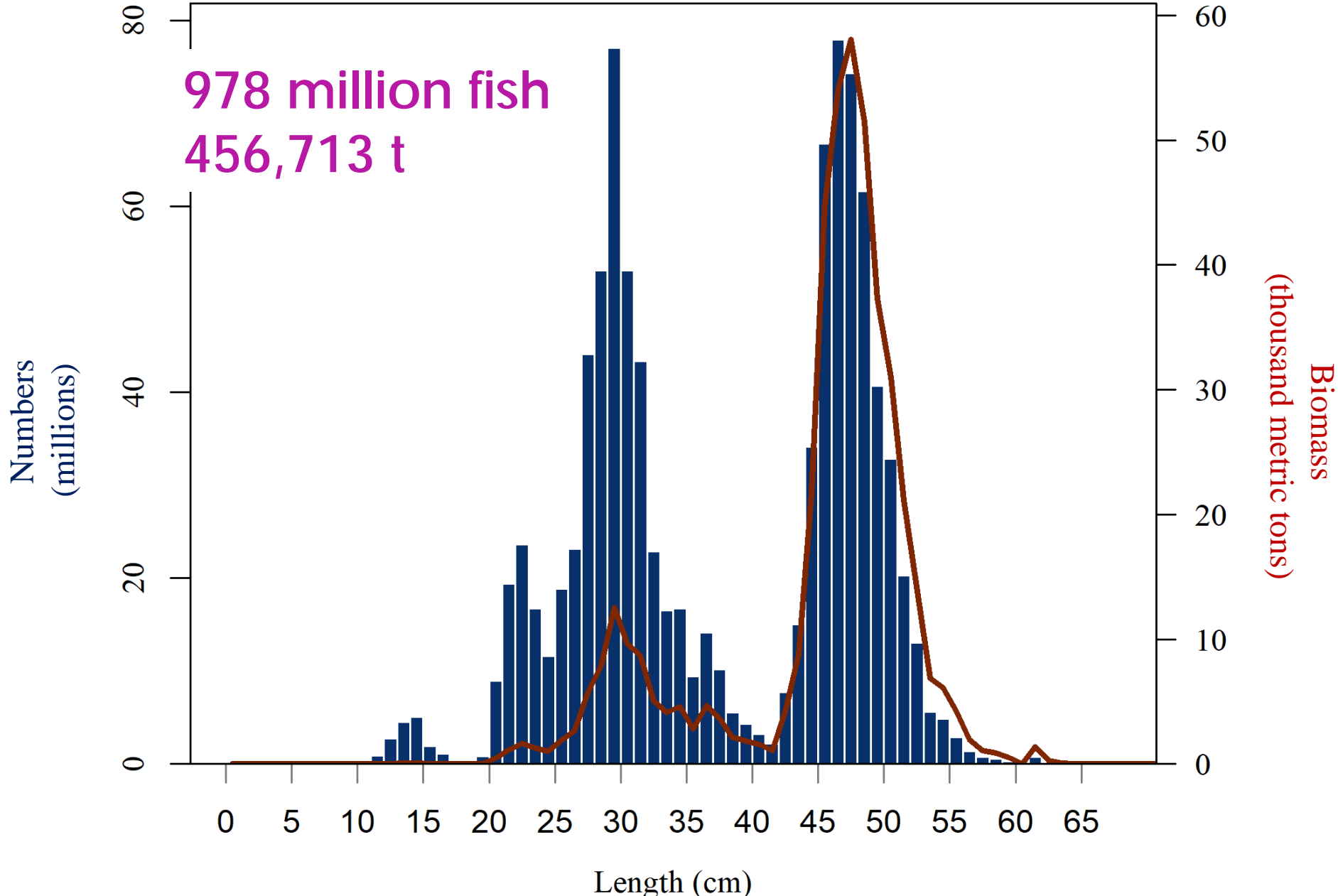
Fork length  
 — > 30 cm  
 — ≤ 30 cm

## Maturities (females > 40cm)

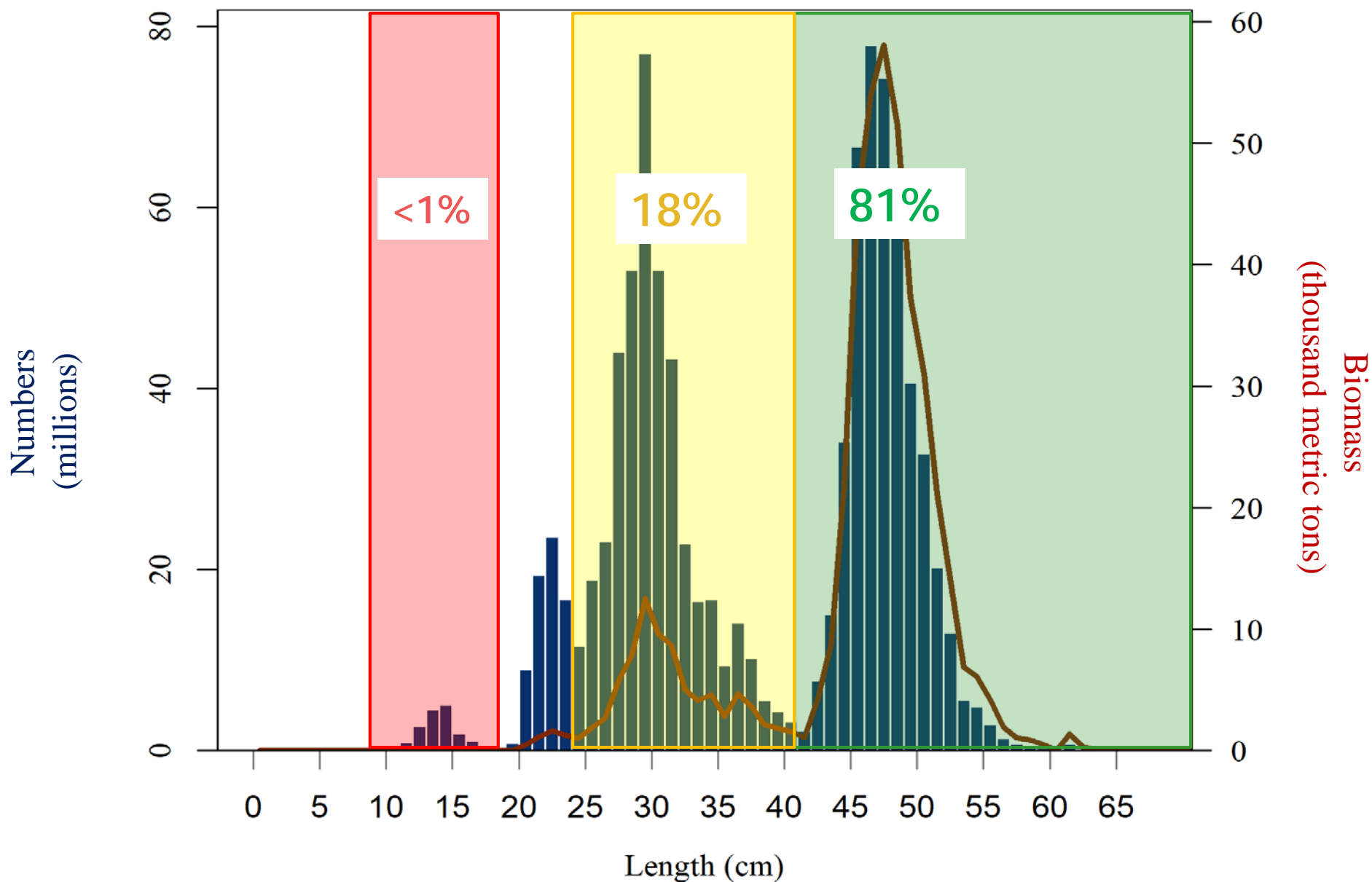
	<u>Prespawning</u>	<u>Spawning</u>	<u>Spent</u>	<u>n</u>
Shelikof	88%	1%	5%	258



# Shelikof Length Distributions



# Length Distributions

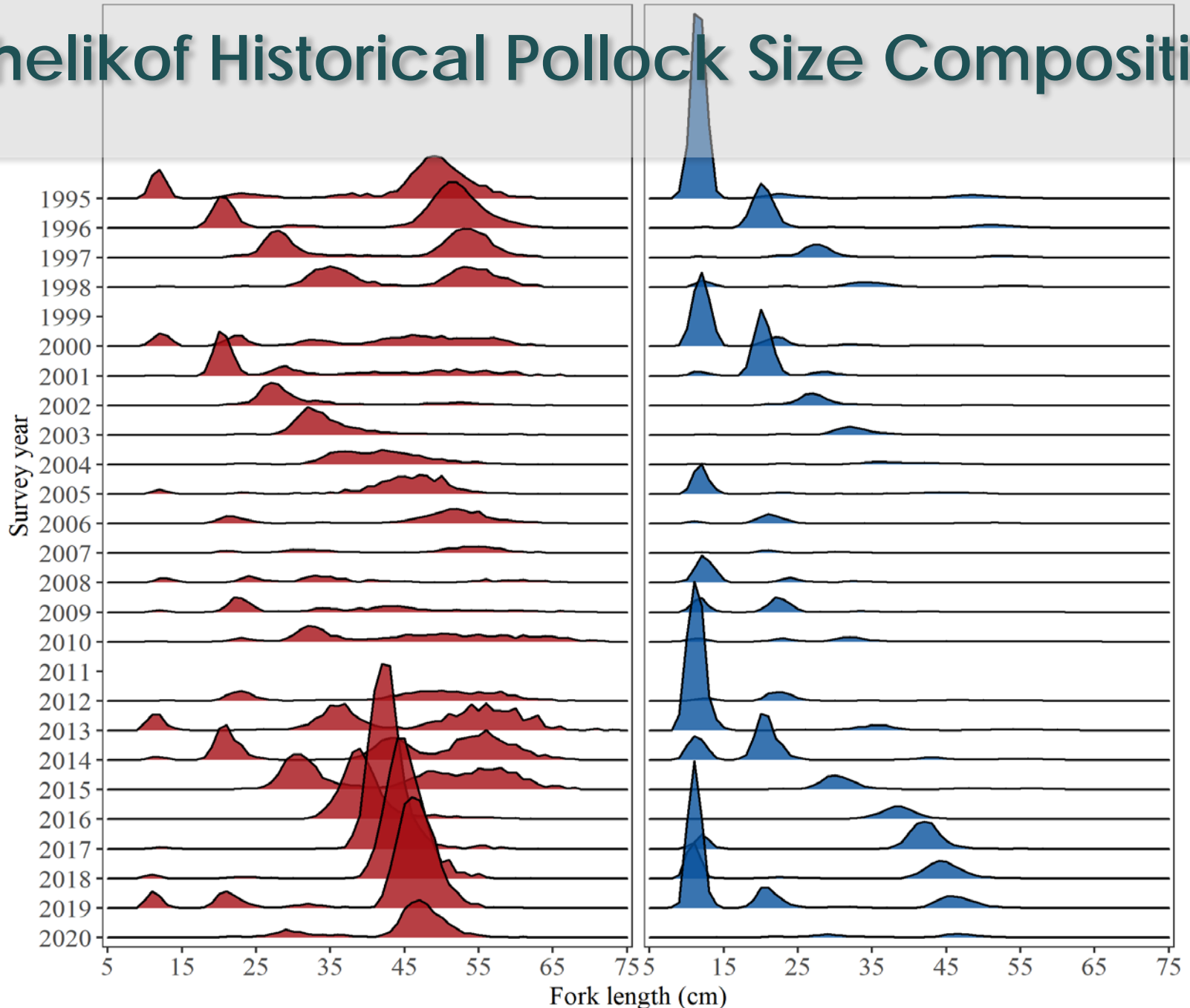




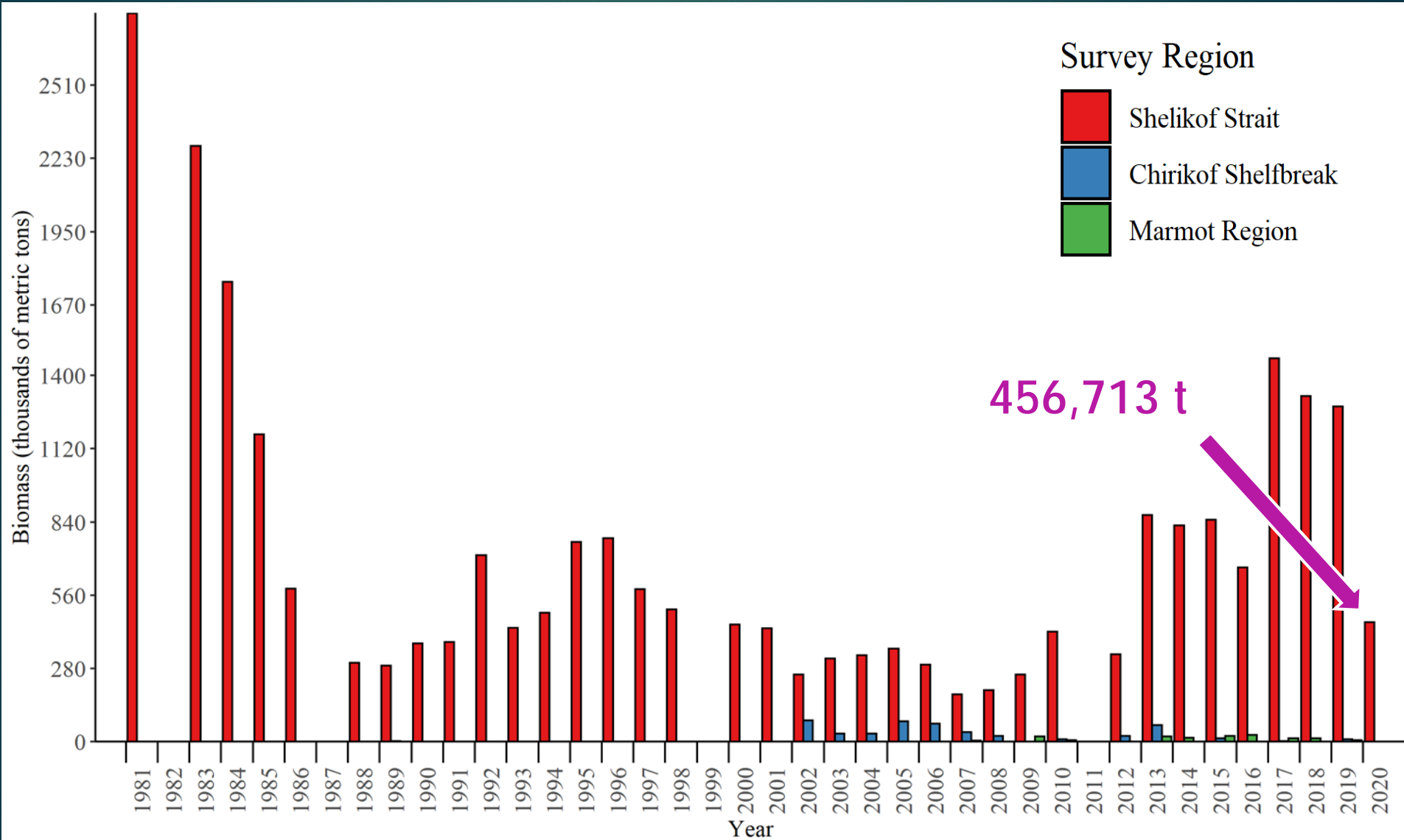
Biomass (thousand tons)

Numbers (million fish)

# Shelikof Historical Pollock Size Composition



# Pollock Biomass Estimates: Time Series

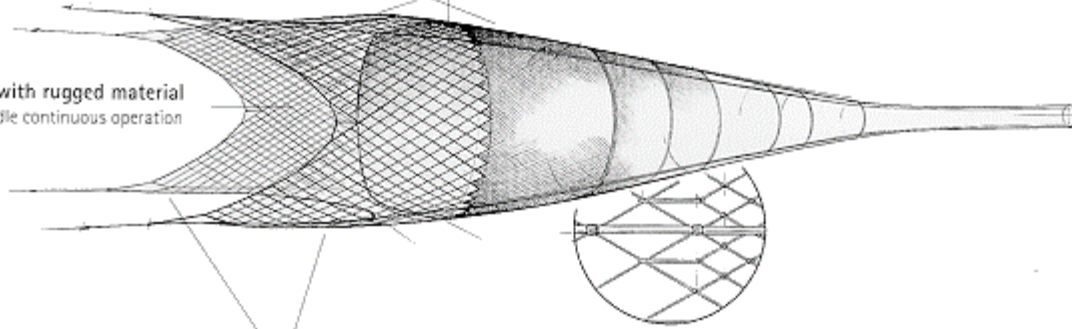


# AWT

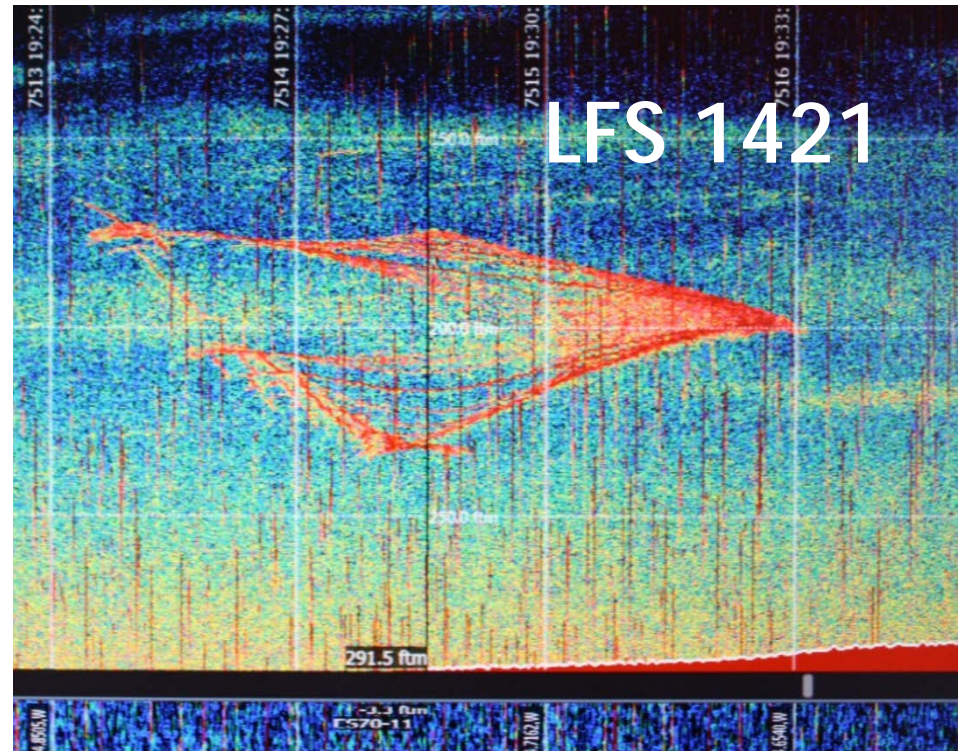
Large gore/heavy ribline  
to handle large codend load

Built with rugged material  
to handle continuous operation

Rugged smaller mesh bottom wings  
for added durability and fish herding ability



# LFS 1421







# Net selectivity corrections

-Shelikof 2008-2018 corrected for pollock escapement

-Shelikof 2019 eulachon & pollock

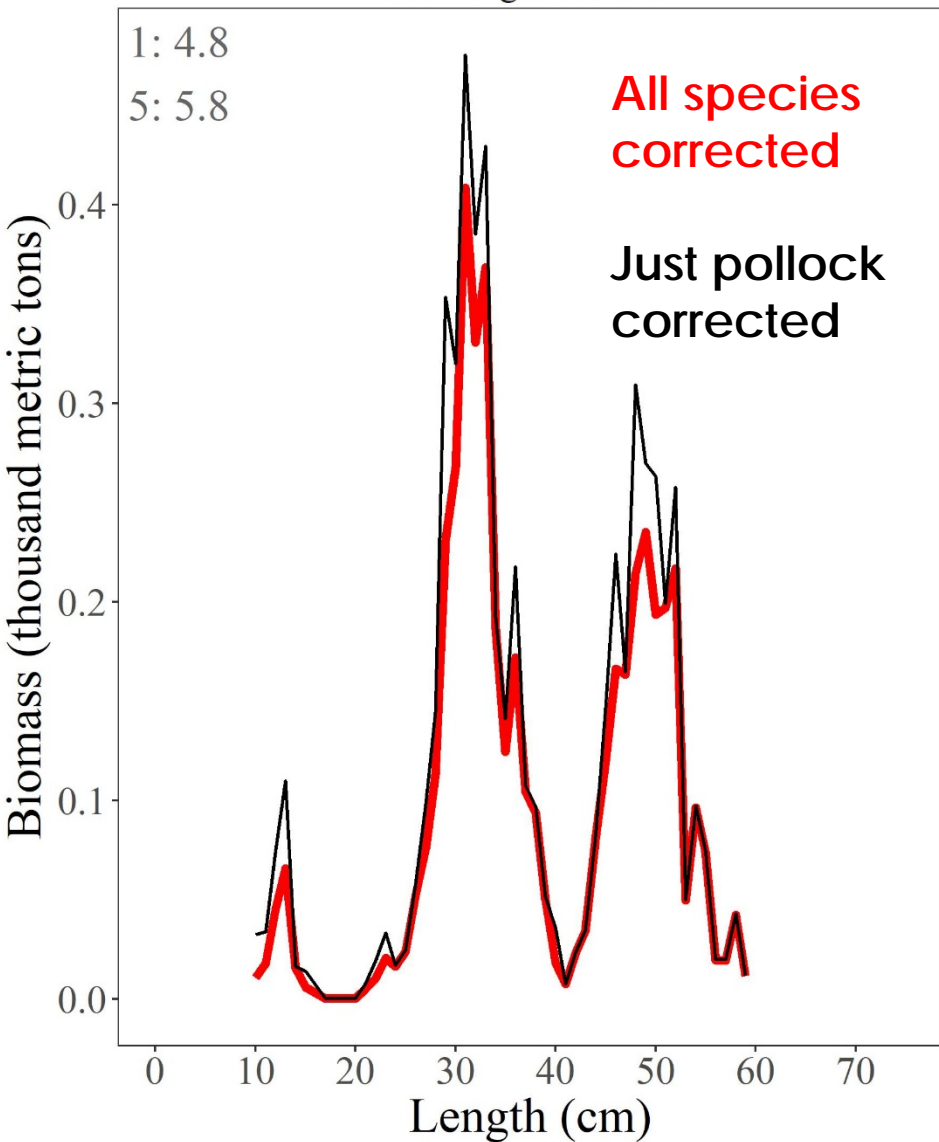
-Shumagins 2009-2018 pollock

-Shelikof & Shumagins 2020 corrected for all species



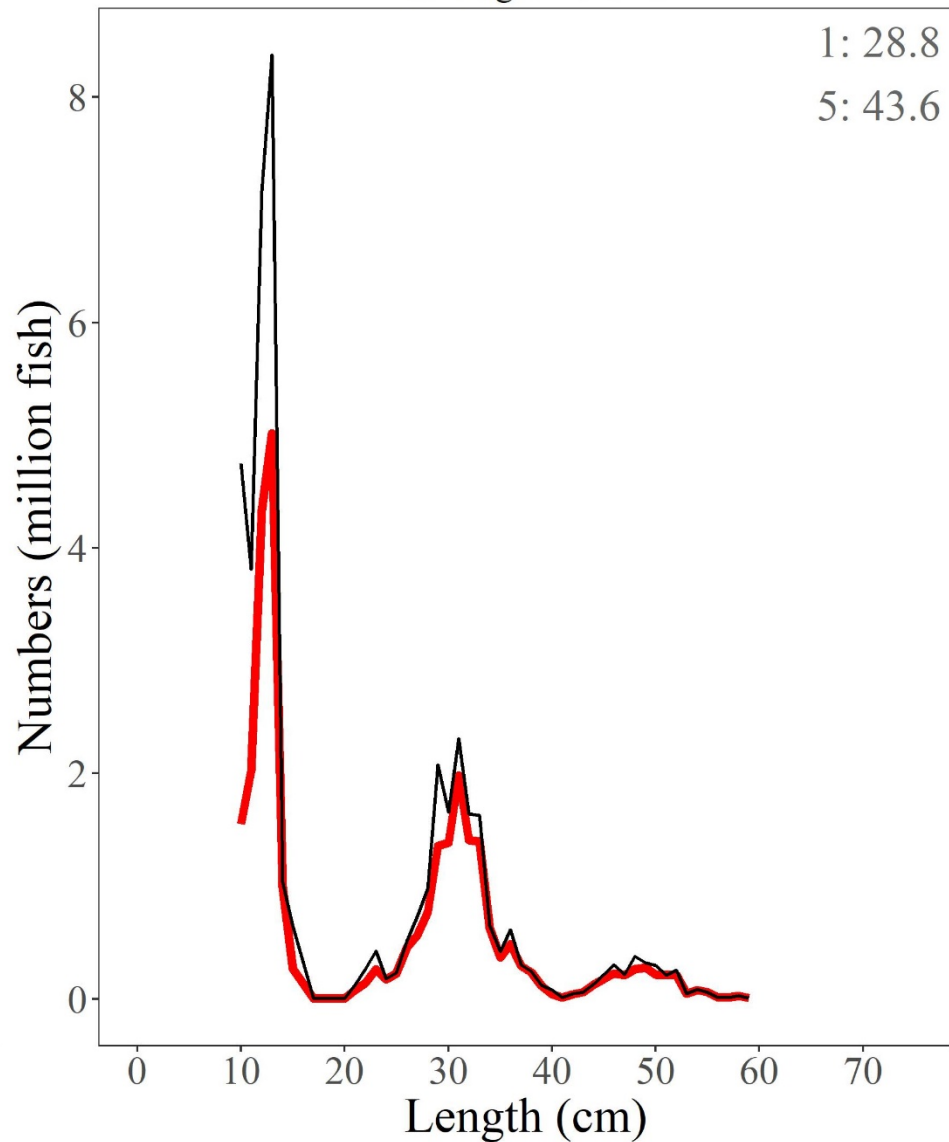
# Biomass

Shumagin Islands



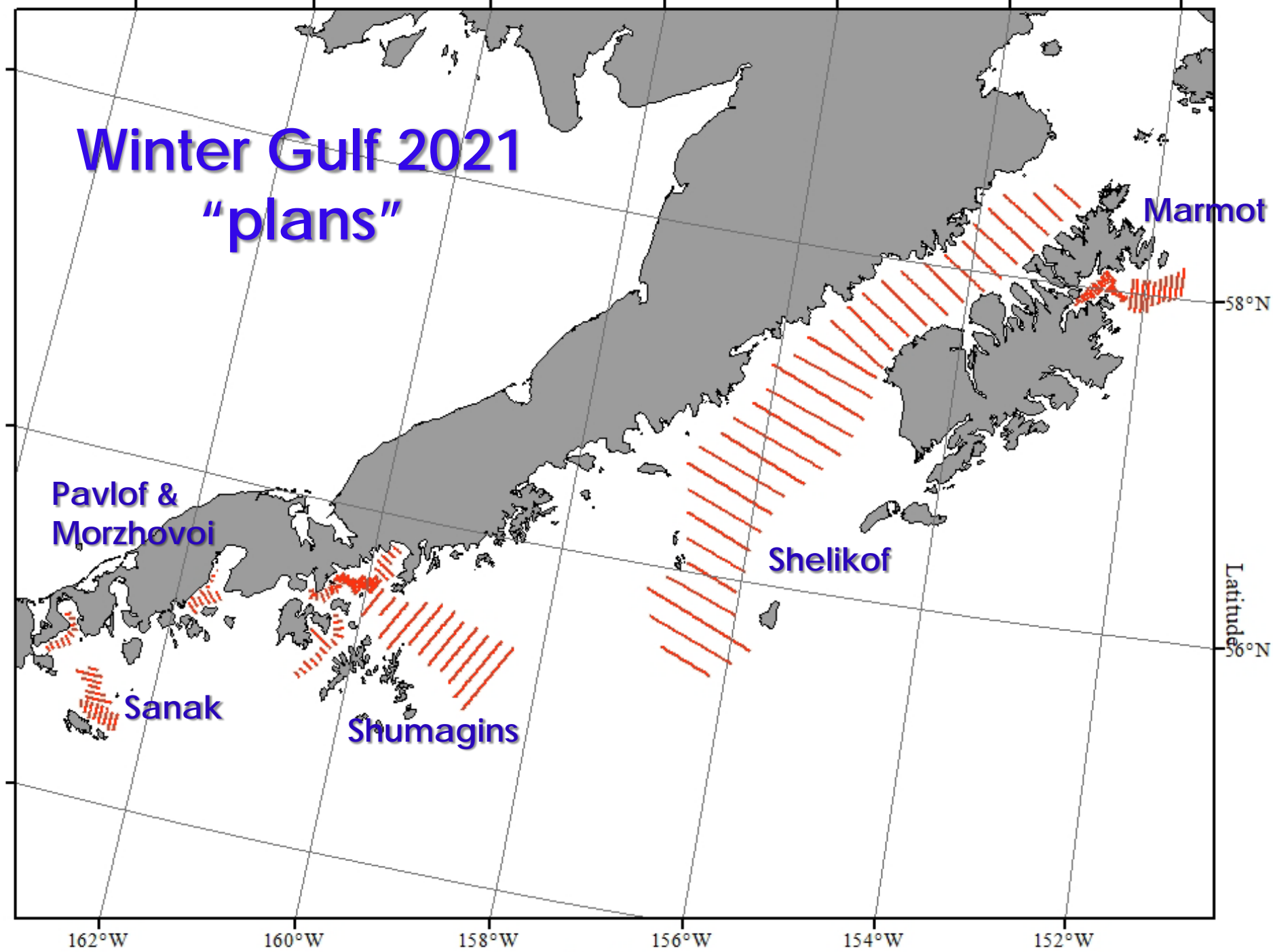
# Numbers

Shumagin Islands



Analysis Number — 1 — 5

# Winter Gulf 2021 "plans"



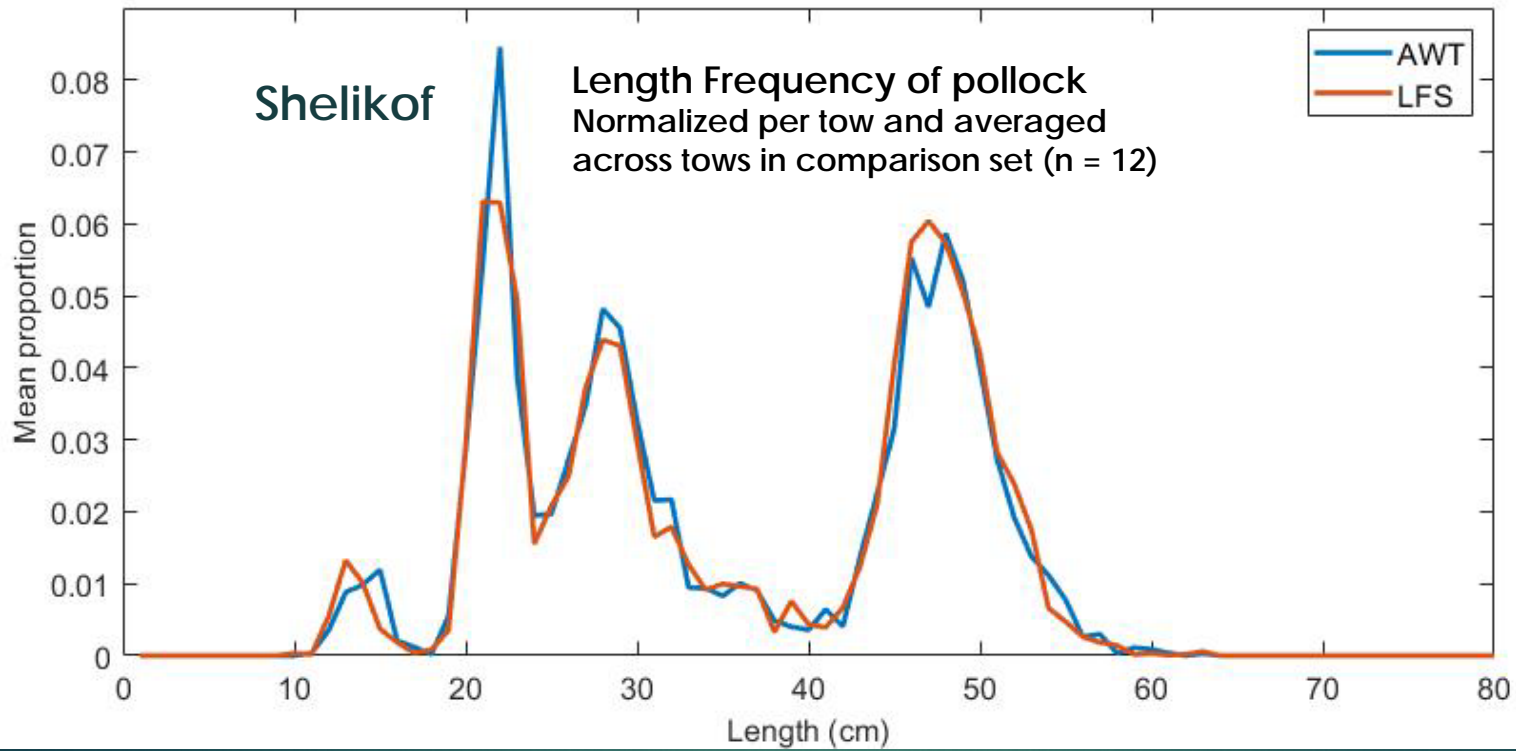


# Questions?

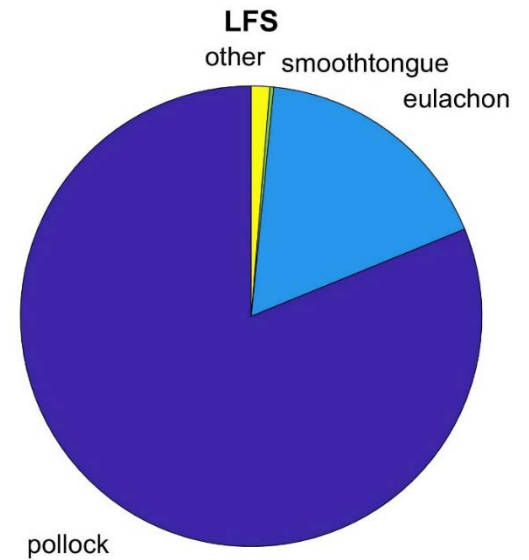
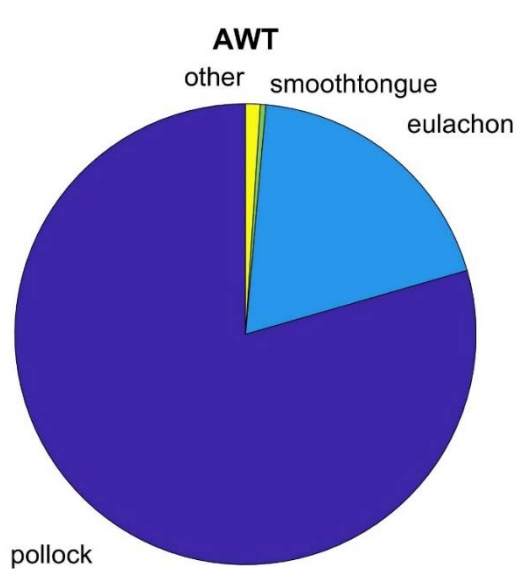


Photo credit: Matthew Phillips





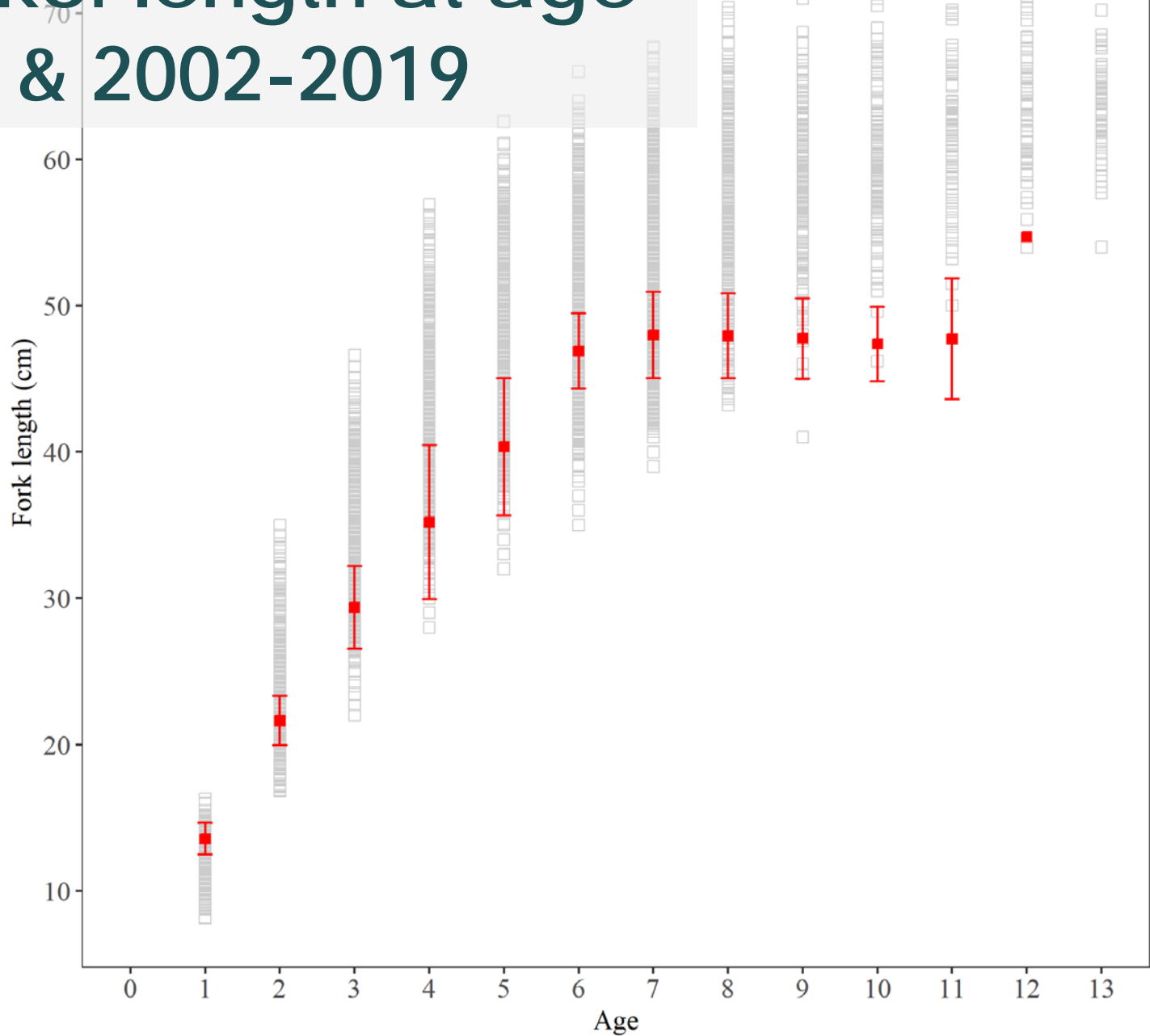
Cumulative catch composition by weight

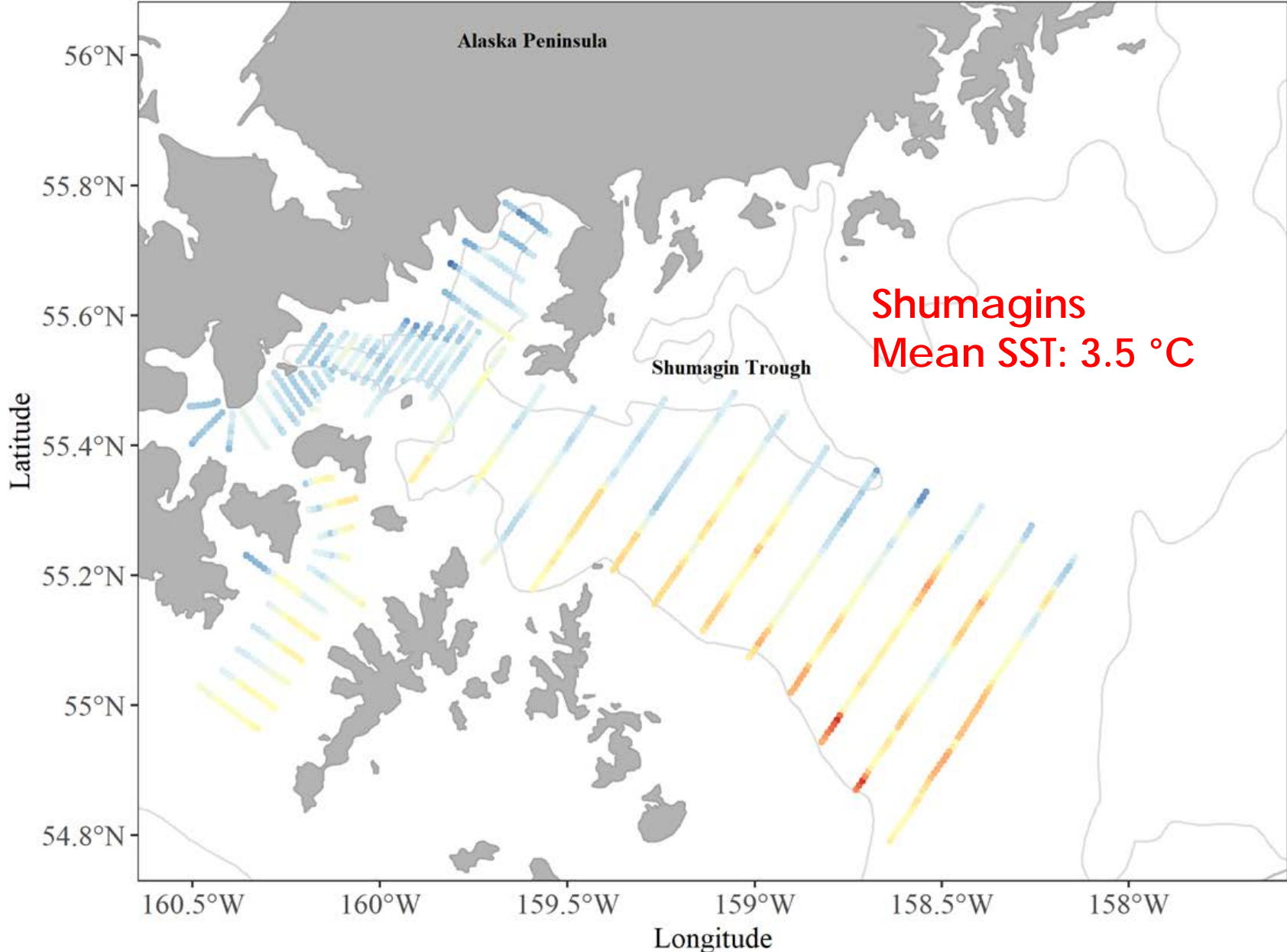


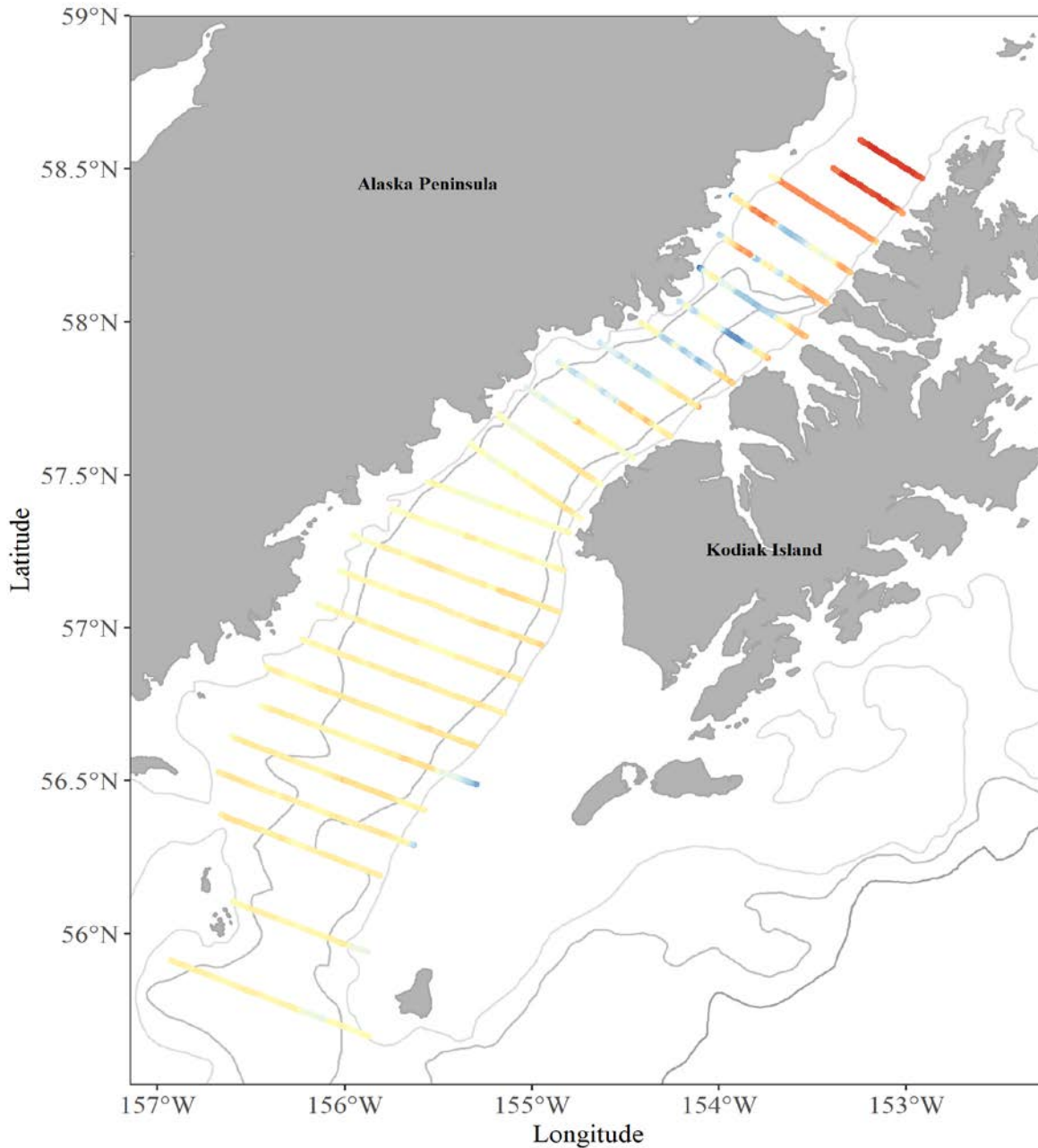




# Shelikof length at age 2020 & 2002-2019







**Shelikof**  
**Mean SST: 3.2 °C**



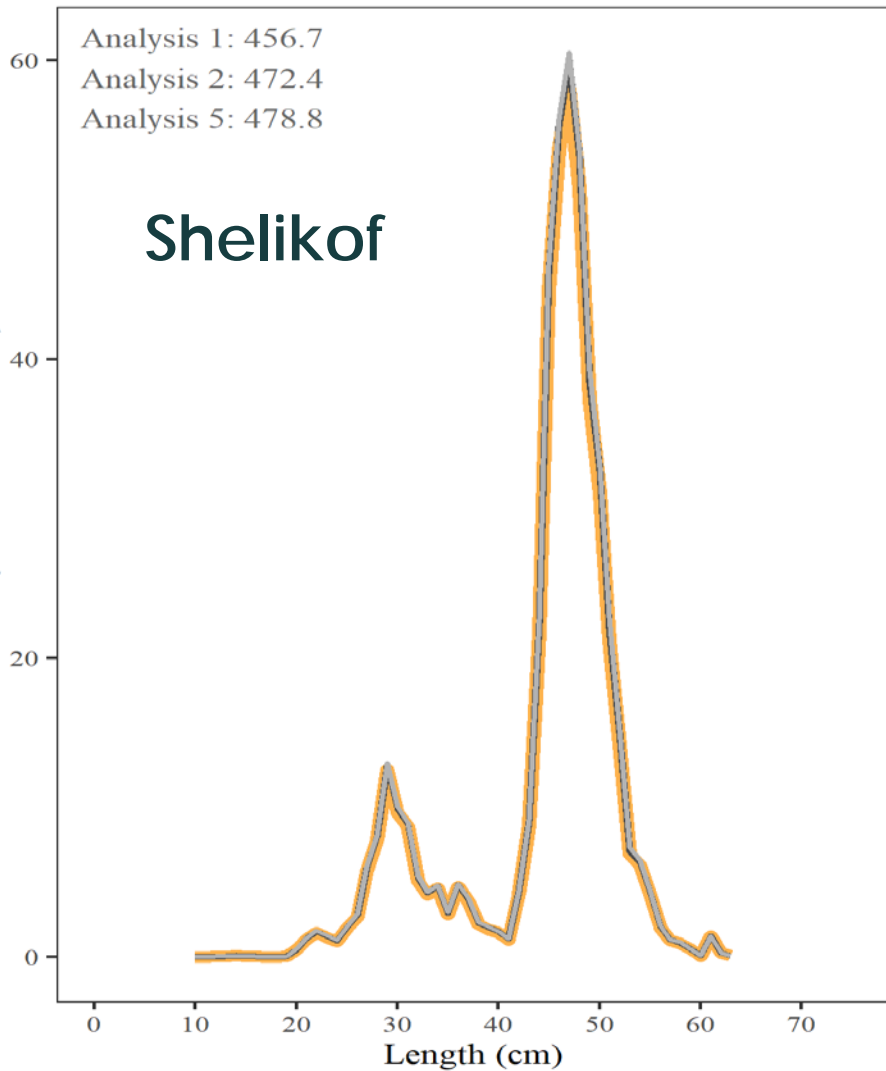
# Biomass

Shelikof Strait

Analysis 1: 456.7  
Analysis 2: 472.4  
Analysis 5: 478.8

## Shelikof

Biomass (thousand metric tons)

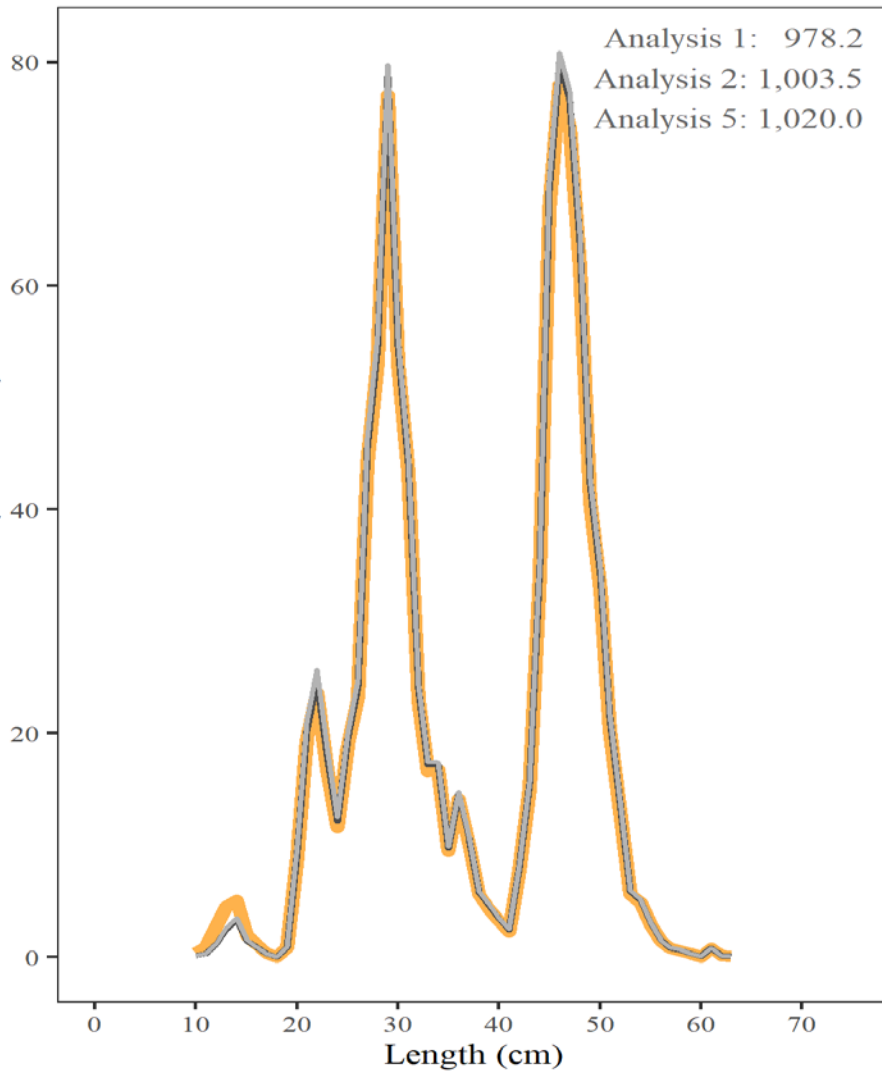


# Numbers

Shelikof Strait

Analysis 1: 978.2  
Analysis 2: 1,003.5  
Analysis 5: 1,020.0

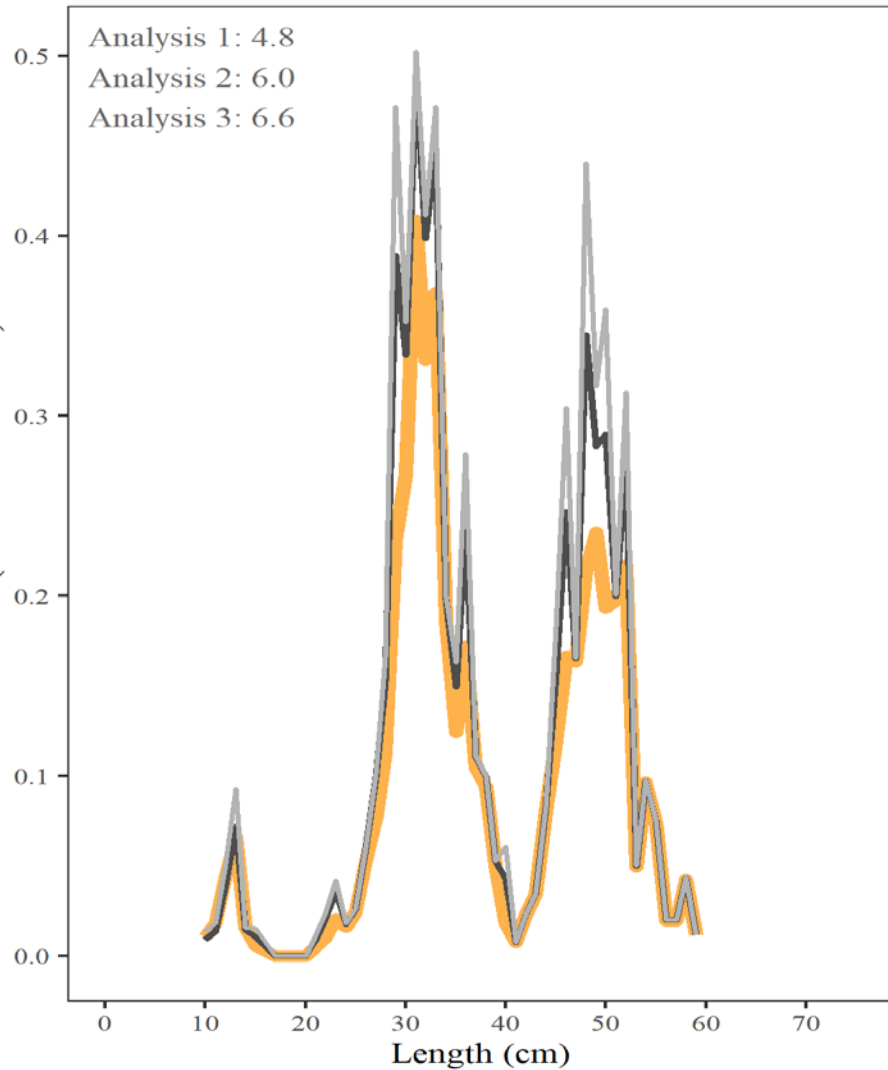
Numbers (million fish)



Analysis Number — 1 — 2 — 5

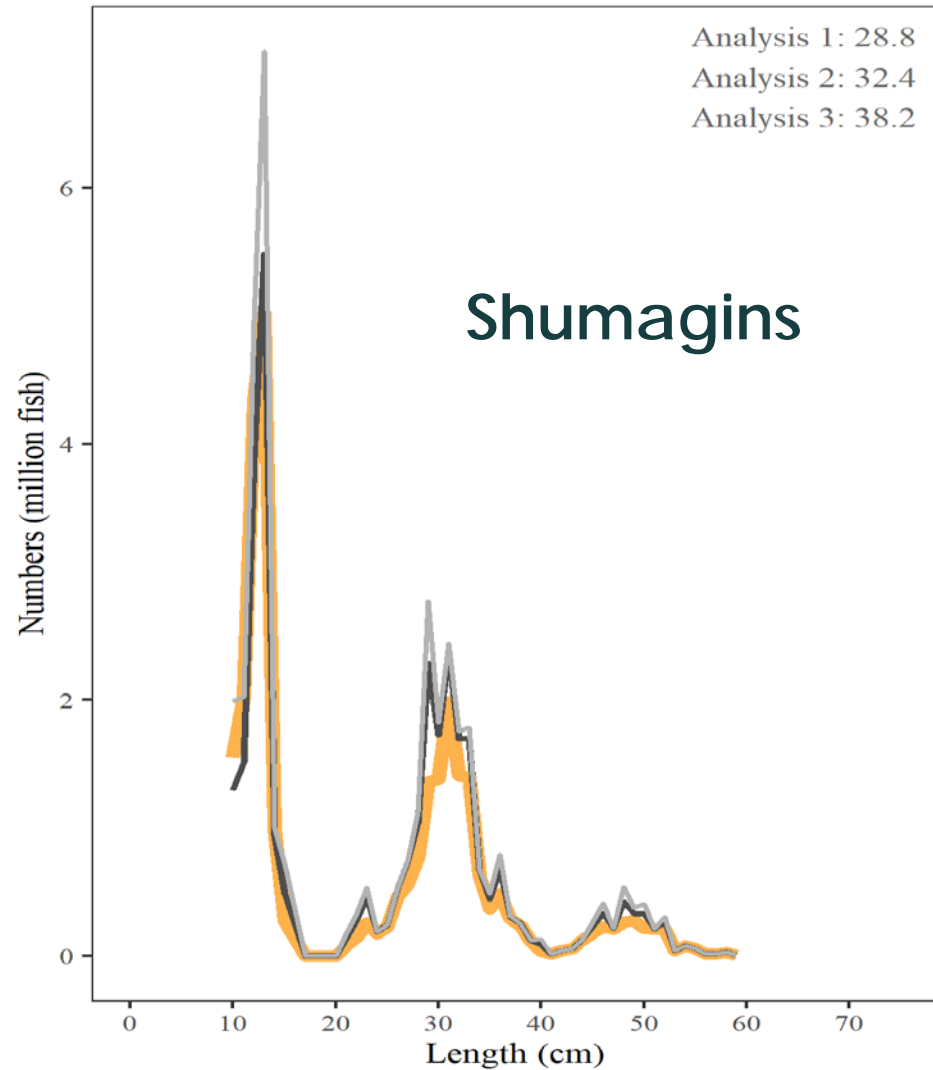
## Biomass

Shumagin Islands



## Numbers

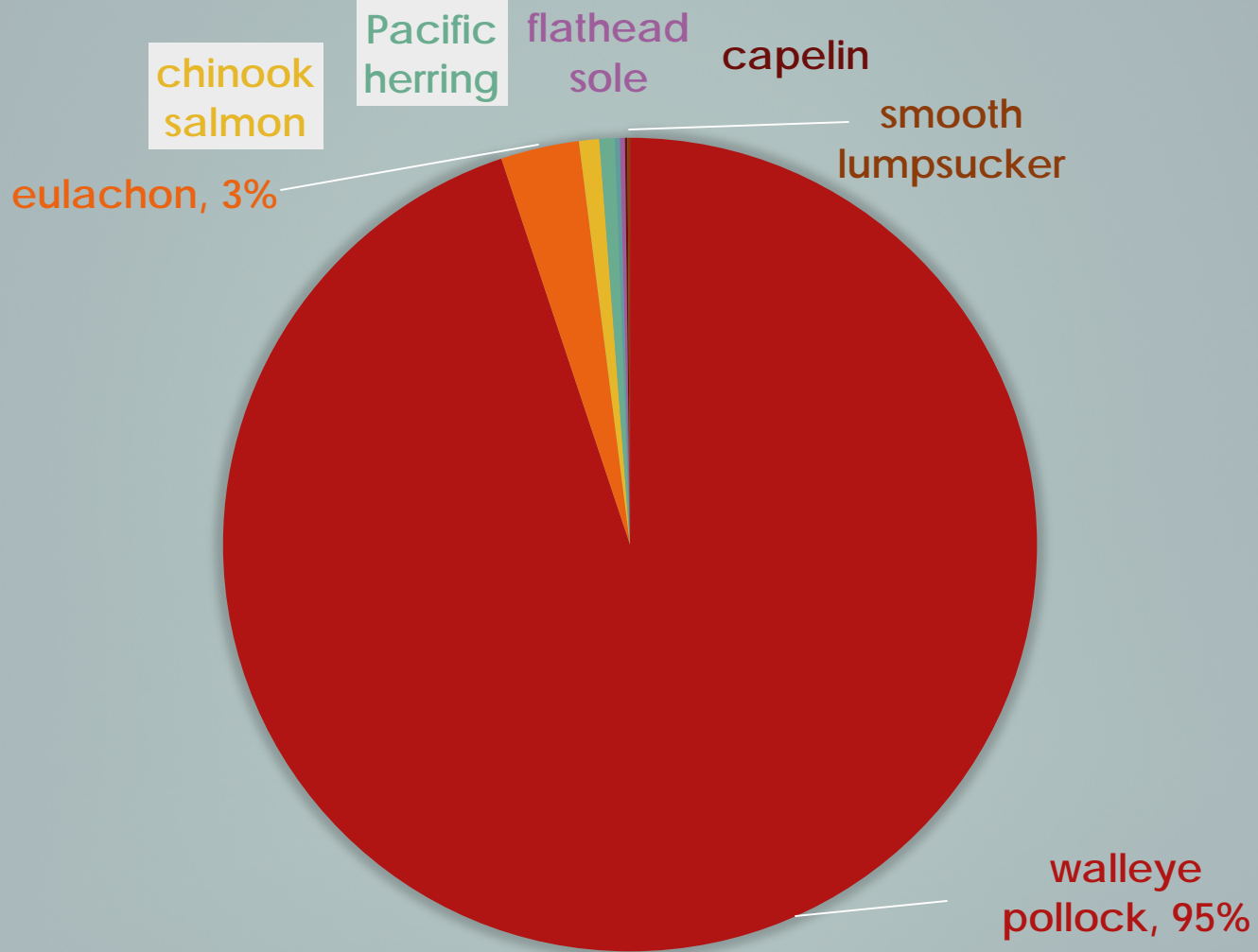
Shumagin Islands



Shumagins

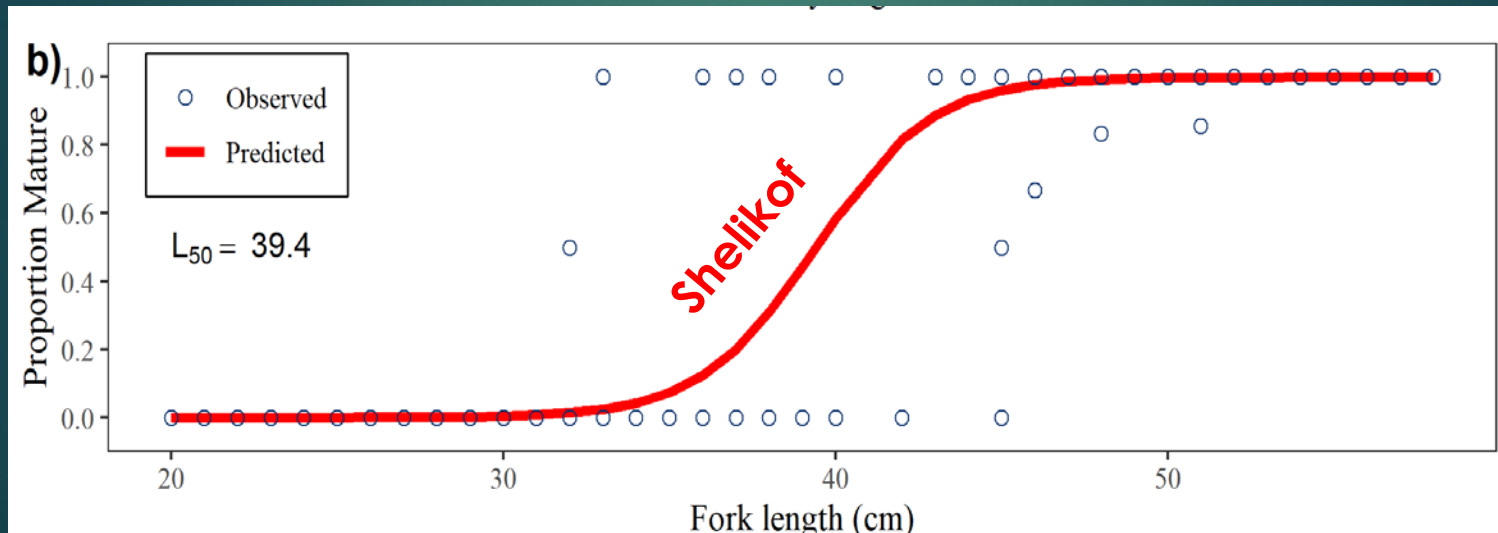
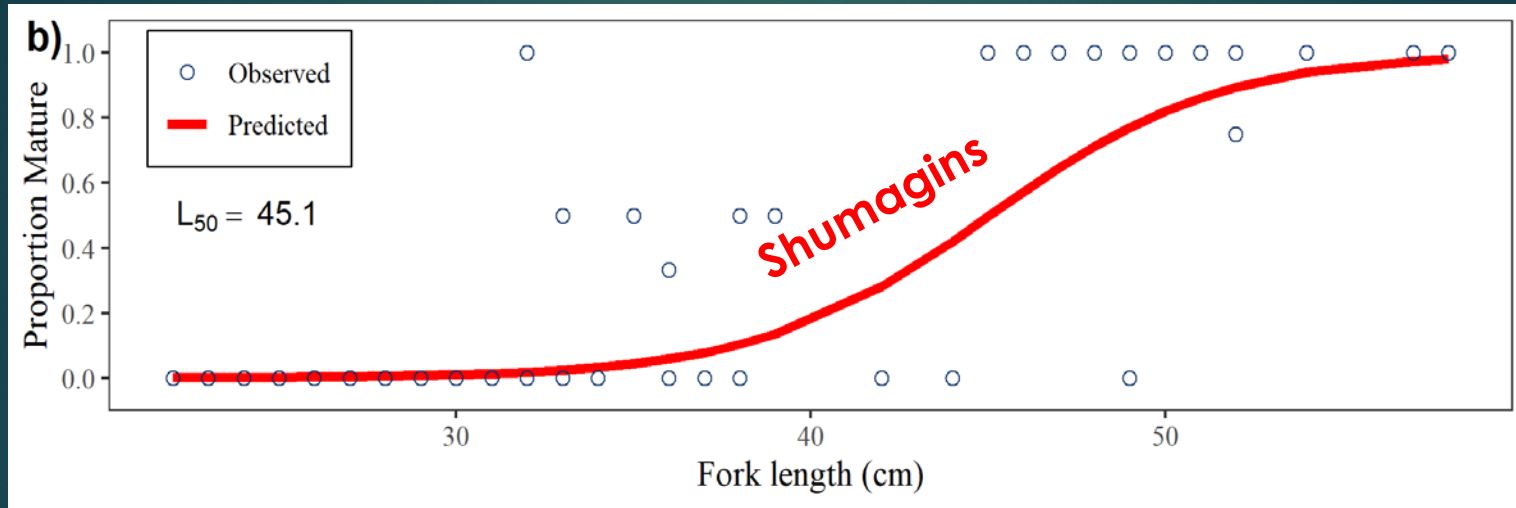
Analysis Number — 1 — 2 — 3

# Shumagins catch- % by weight





# Maturity



# Maturity weighted by abundance

Since 2019

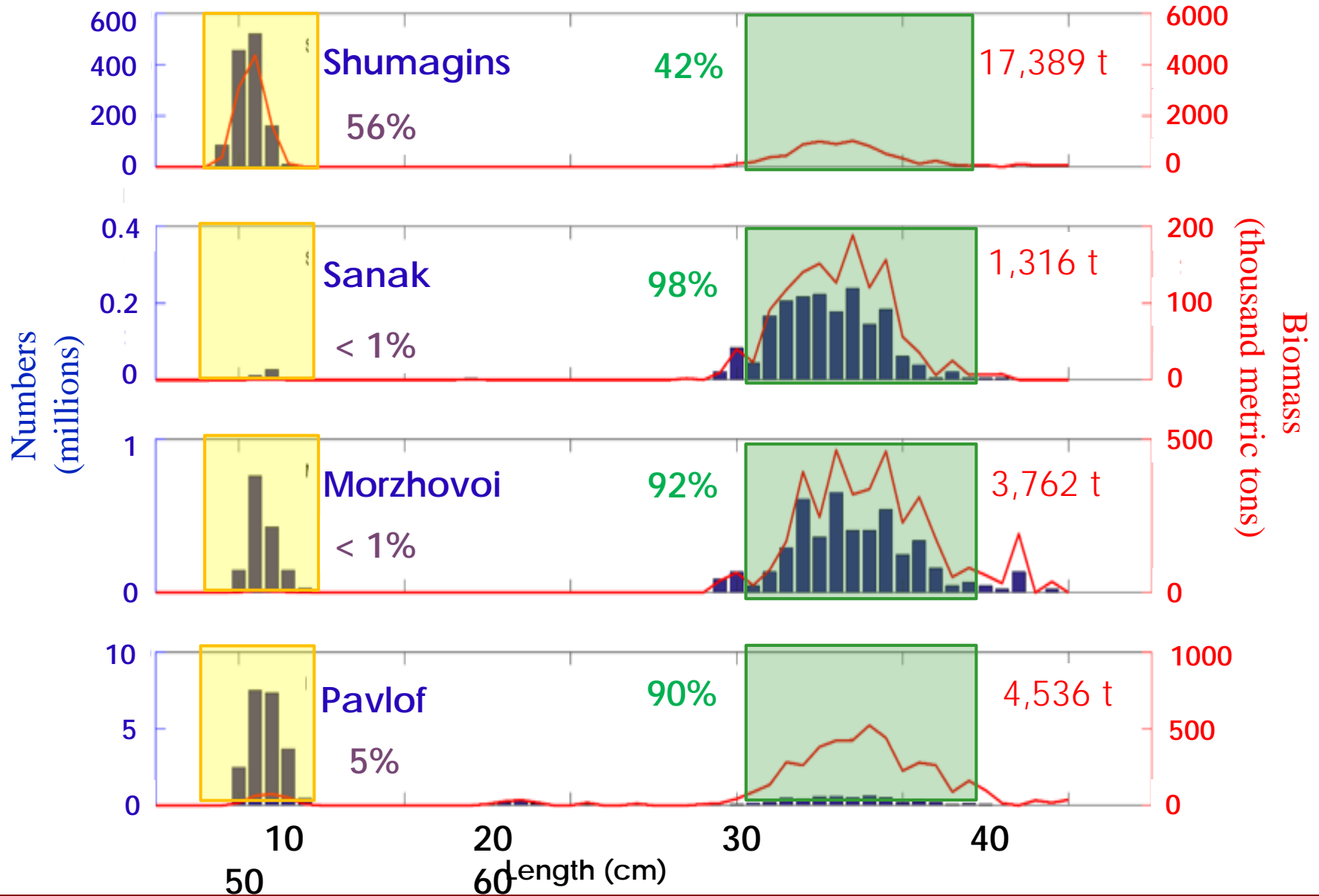
- Fit logistic regression using a generalized linear model
  - Dependent variable is the binomial spawning state (0 immature, 1 mature)
  - Independent variable is the fork length
  - Weight each haul based on aggregated acoustically-derived adult pollock abundance of nearest sampling intervals to that haul
- Weights are computed from pollock abundance ( $A$ ) of  $>30$  cm fish for  $n$  total number of hauls  $h$   
(historical average 5% mature is 30 cm)

$$W_h = \frac{\sum A_h}{\left(\frac{\sum A}{n_h}\right)}$$

- The primary model derived metric for maturity is the length at 50% maturity derived from the ratio of the regression parameters:

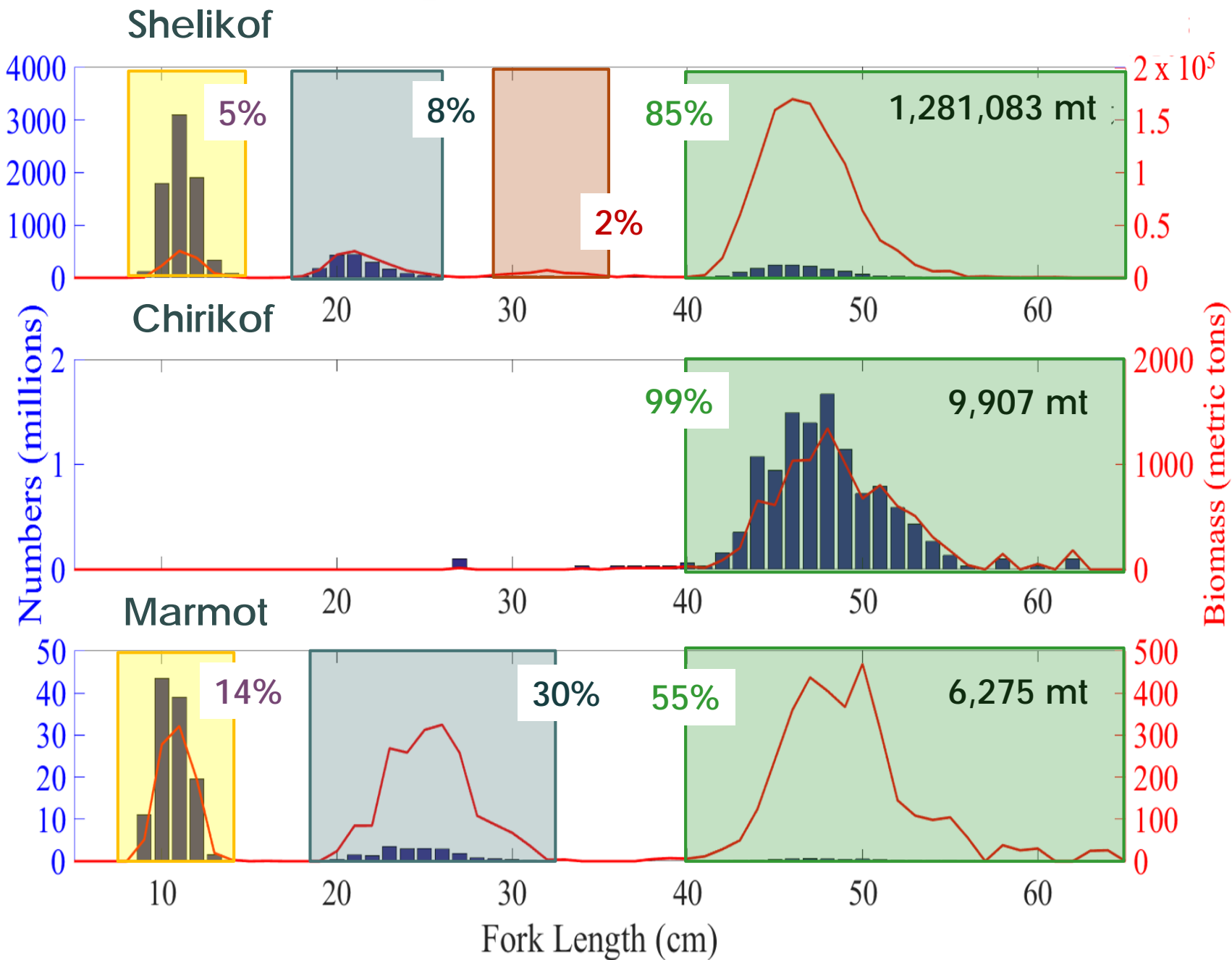
$$L_{50} = -\frac{\beta_0}{\beta_1}$$

# Length Distributions 2018

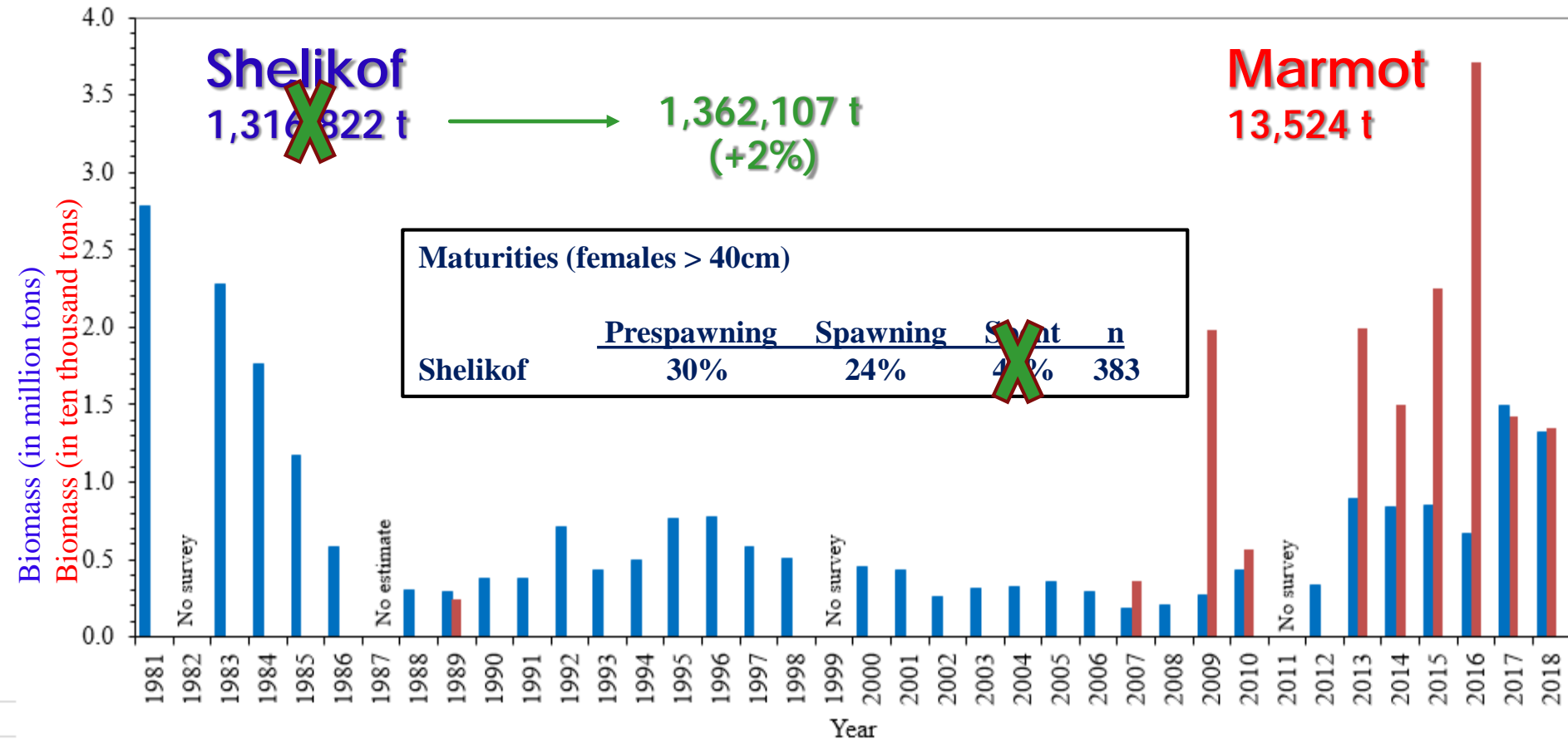




# Length Distribution



# Survey Timing of Shelikof Strait



# Shumagins, Sanak, Morzhovoi, and Pavlof

1 tow, 69 nmi of trackline

Feb 11

Feb 12

2 tows, 41 nmi of trackline

Feb 11

1 tow, 89 nmi of trackline

Feb 7-10

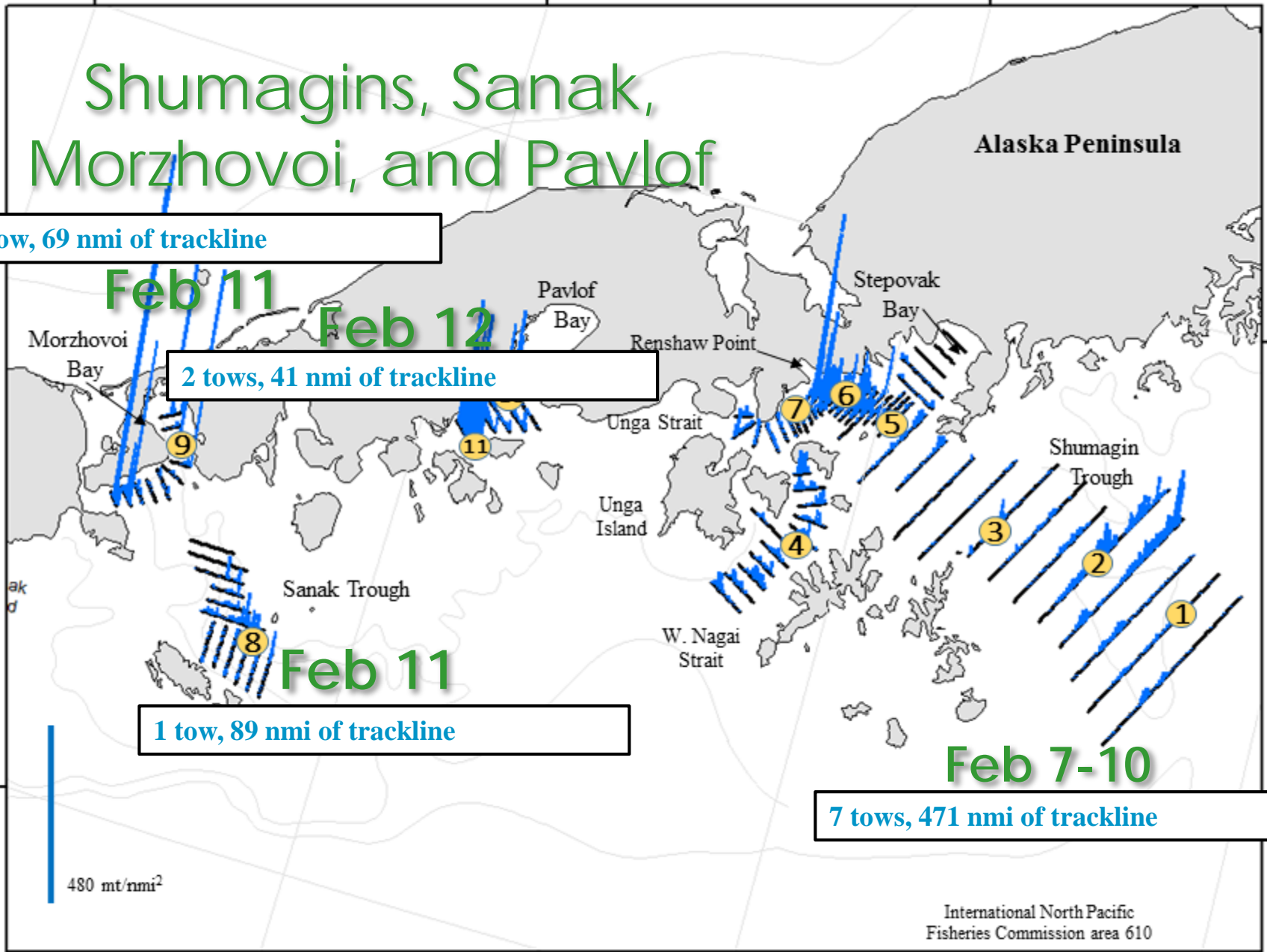
7 tows, 471 nmi of trackline

480 mt/nmi<sup>2</sup>

International North Pacific  
Fisheries Commission area 610

Longitude

Latitude





# Shumagins, Sanak, Morzhovoi, and Pavlof

