Results of the winter 2019 Acoustic-Trawl Survey of Walleye Pollock in the Gulf of Alaska

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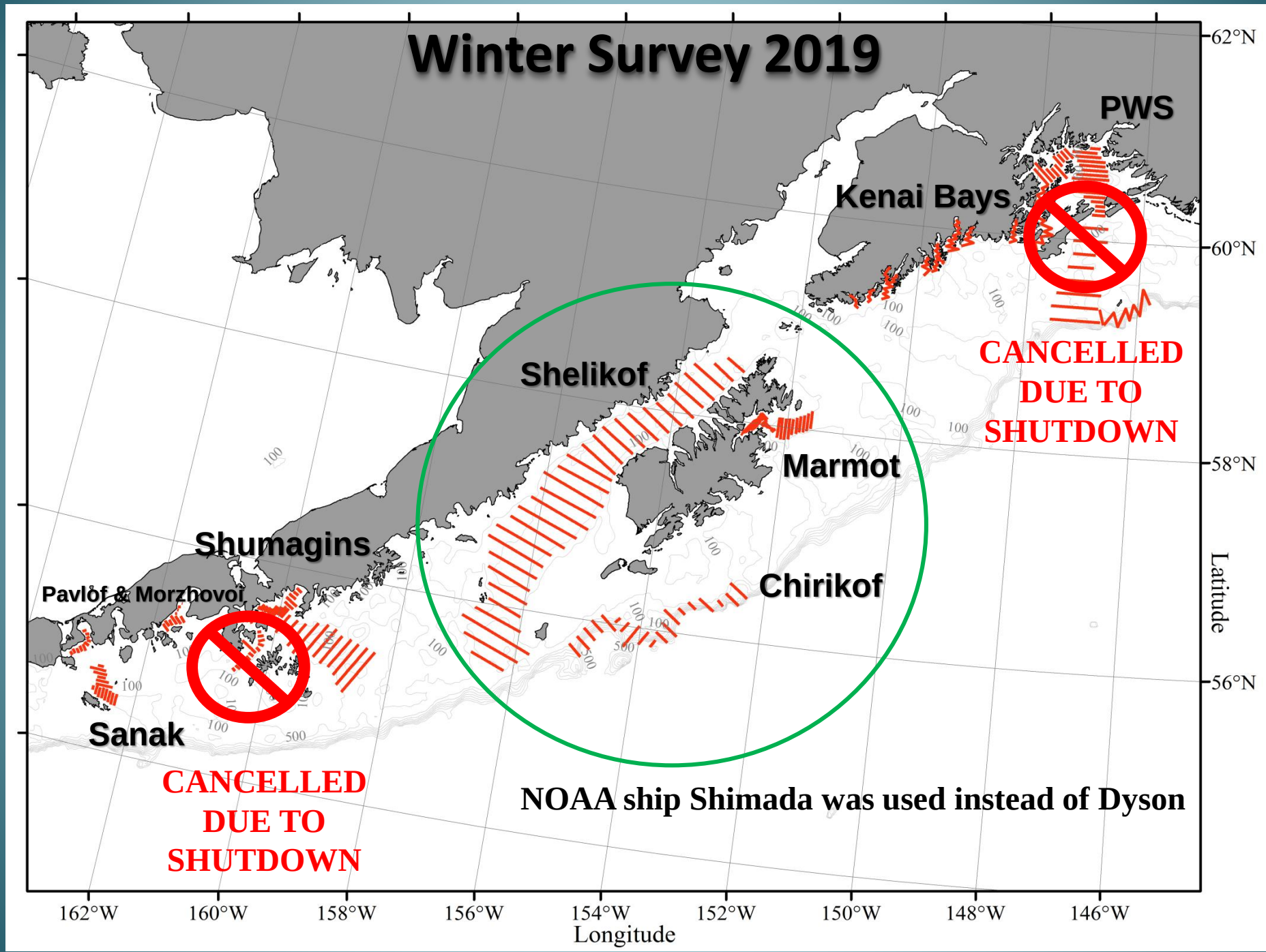

Winter Survey 2019
PWS
Kenai Bays
CANCELLED
DUE TO
SHUTDOWN
Shelikof
Marmot
Chirikof
Shumagins
Pavlof & Morzhovoi
Sanak
CANCELLED
DUE TO
SHUTDOWN
NOAA ship Shimada was used instead of Dyson
62°N
60°N
58°N
56°N
Latitude
162°W
160°W
158°W
156°W
154°W
152°W
150°W
148°W
146°W
Longitude

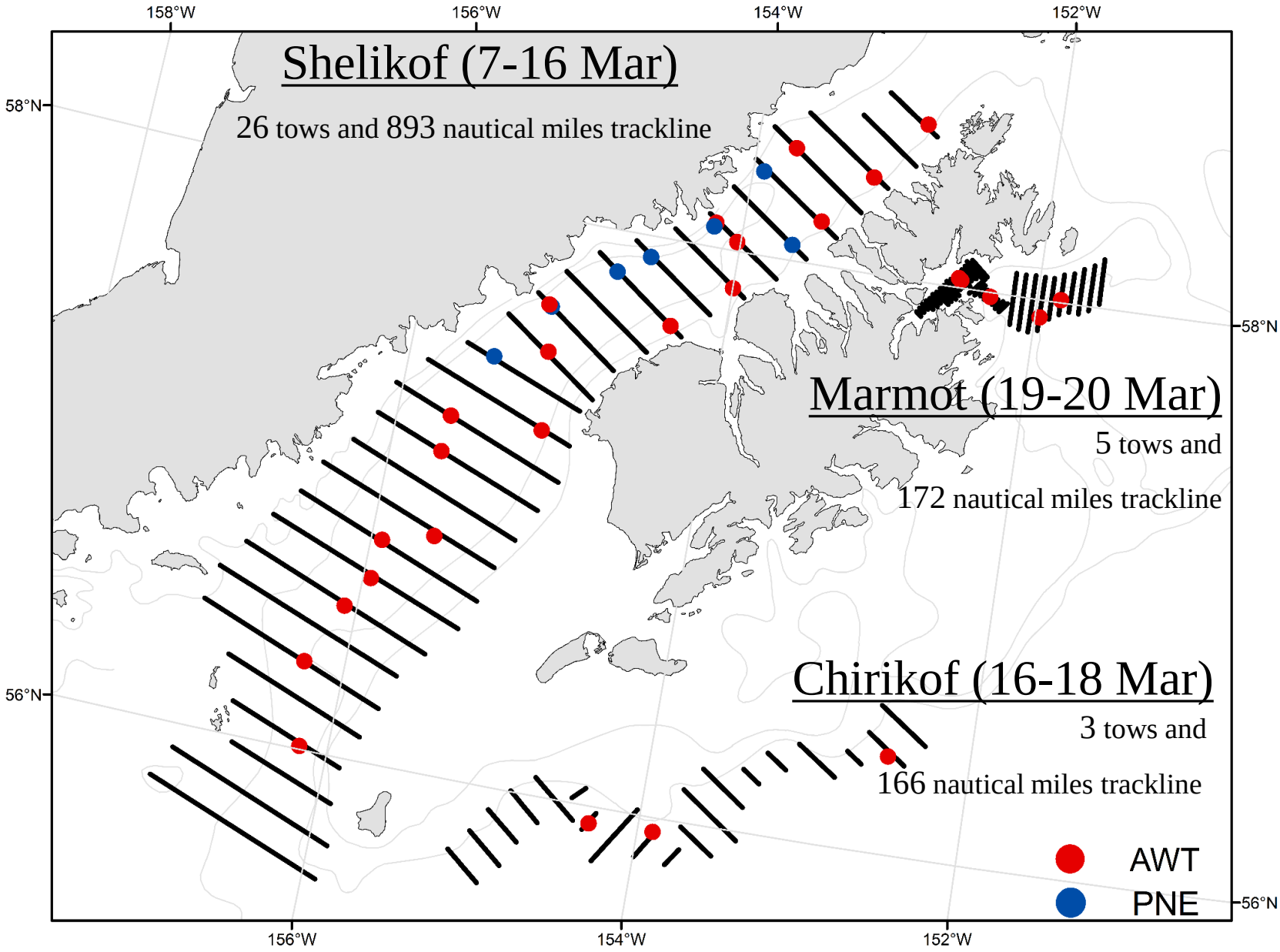
Winter Survey 2019

- Survey timing took place a week early than 2018 to target sampling during peak spawning (Shelikof: Mar 7-16 compared to Mar 15-21 in 2018)

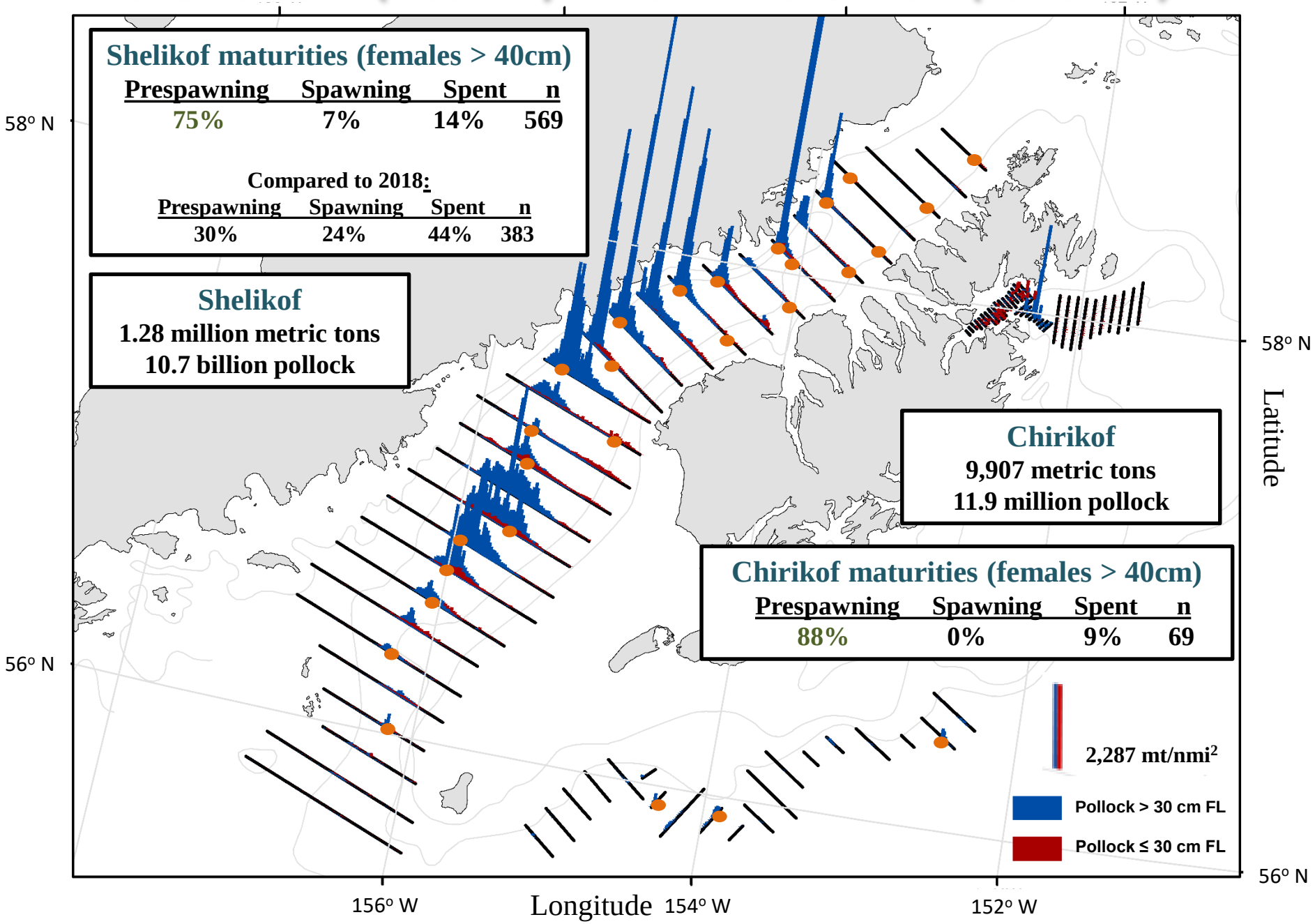
- As has been done in the past, selectivity correction was applied for juvenile escapement using recapture nets

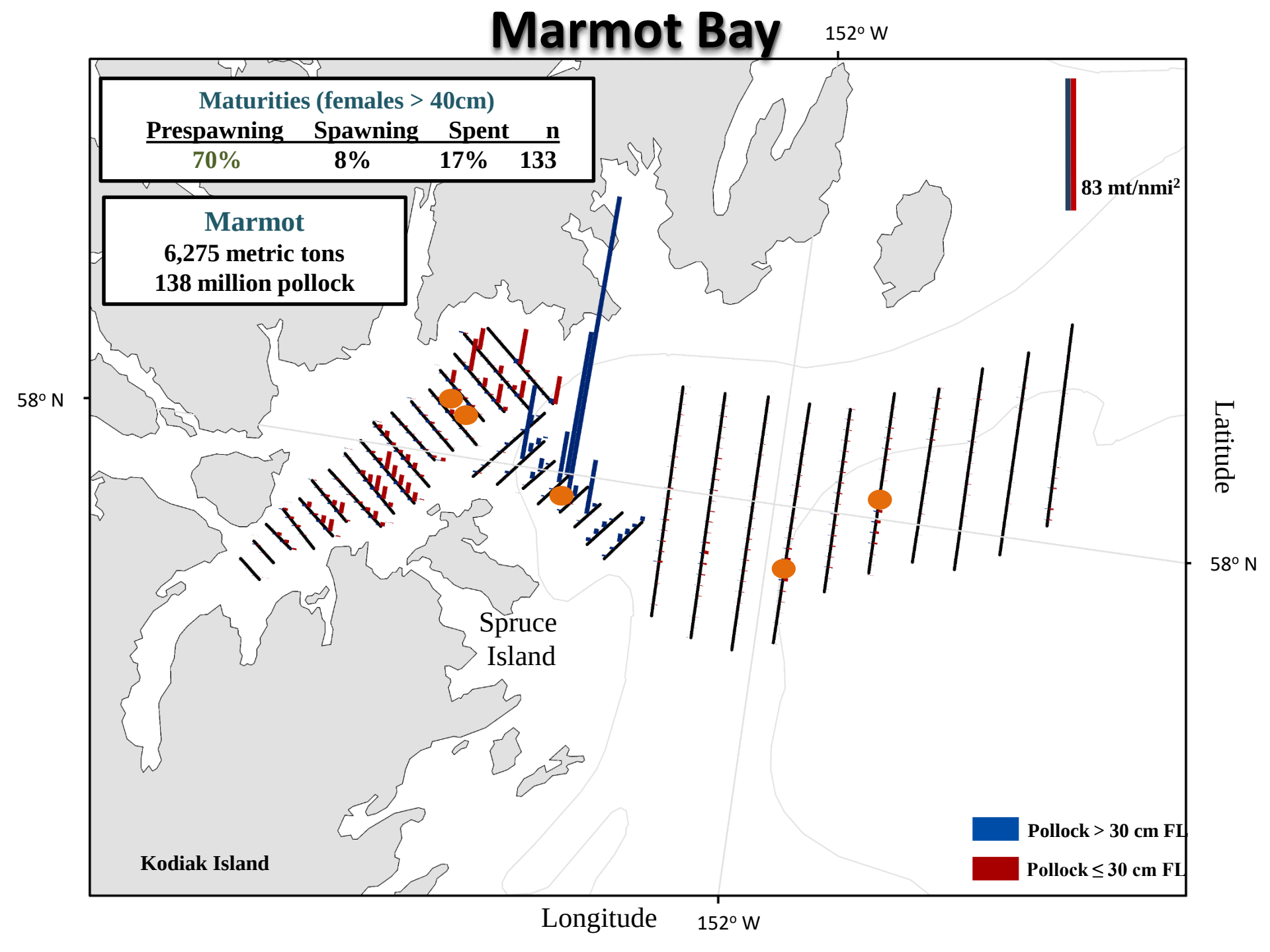
- New maturity weighted by abundance will be provided this year

Winter Survey 2019

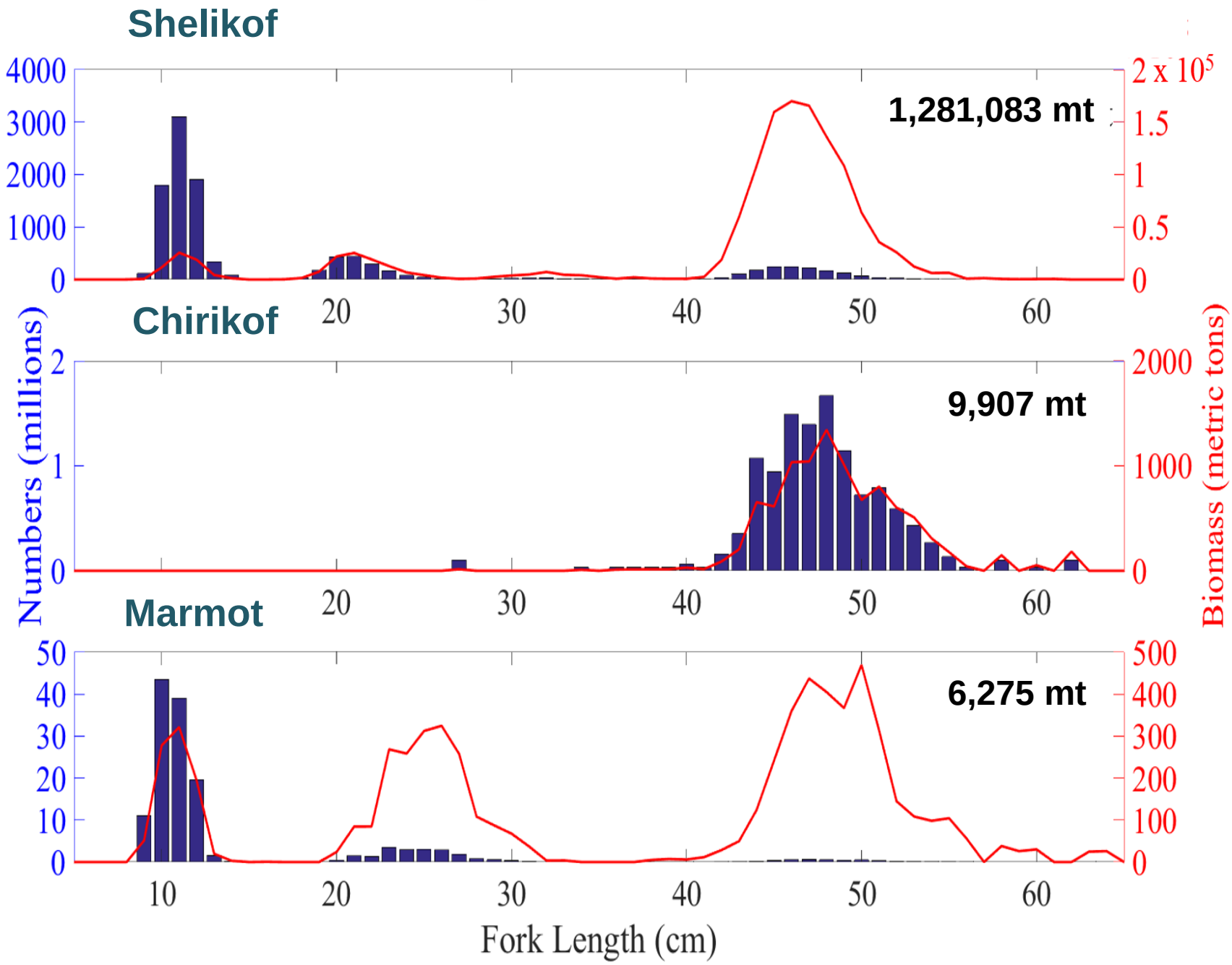


Shelikof Strait (7-16 Mar) and Chirikof Shelfbreak (16-18 Mar)

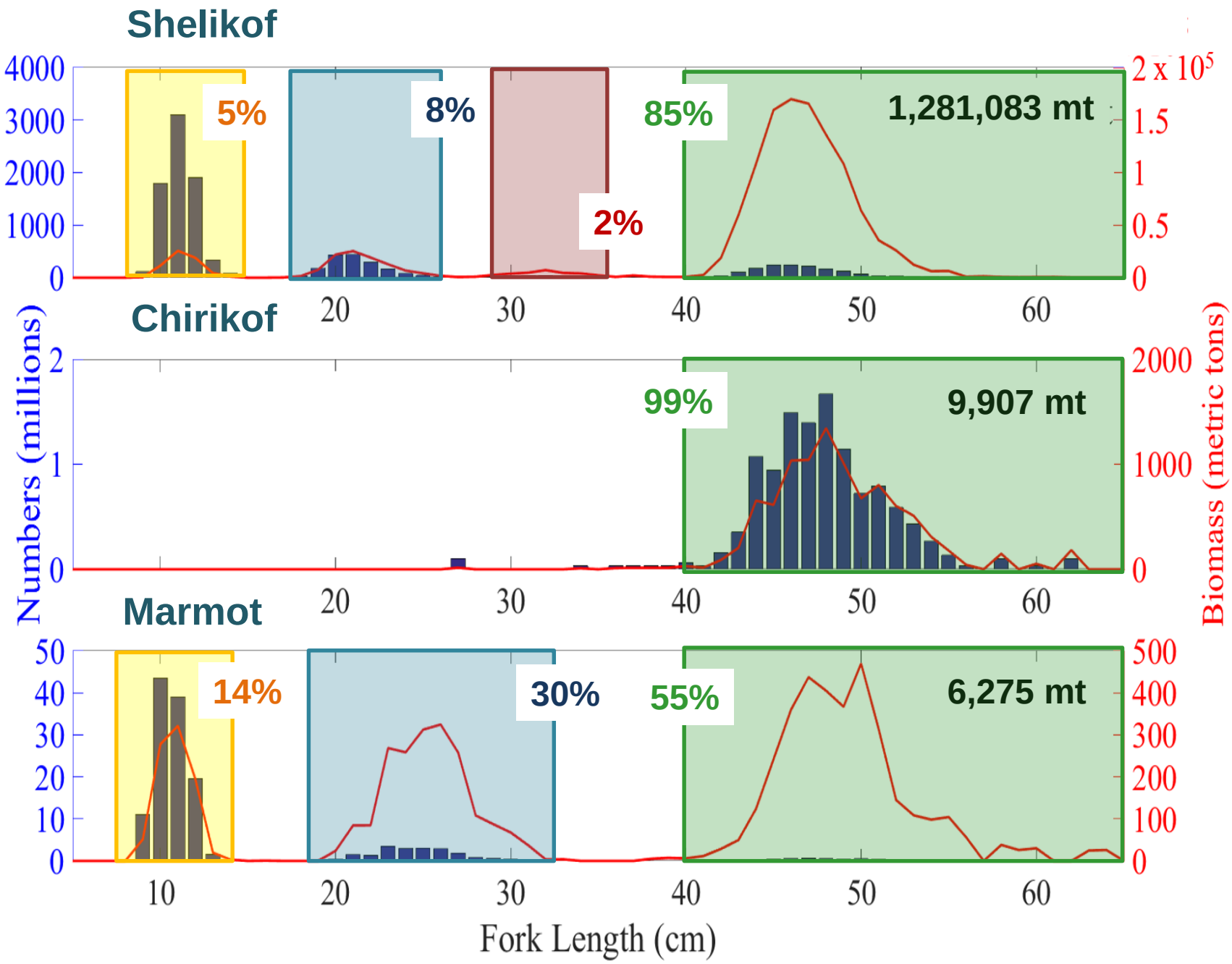



Marmot Bay
152° W
Maturities (females > 40cm)
Prespawning Spawning Spent n
70% 8% 17% 133
Marmot
6,275 metric tons
138 million pollock
83 mt/nmi²
58° N
Latitude
58° N
Spruce
Island
Kodiak Island
Pollock > 30 cm FL
Pollock ≤ 30 cm FL
Longitude
152° W

Length Distribution



Length Distribution



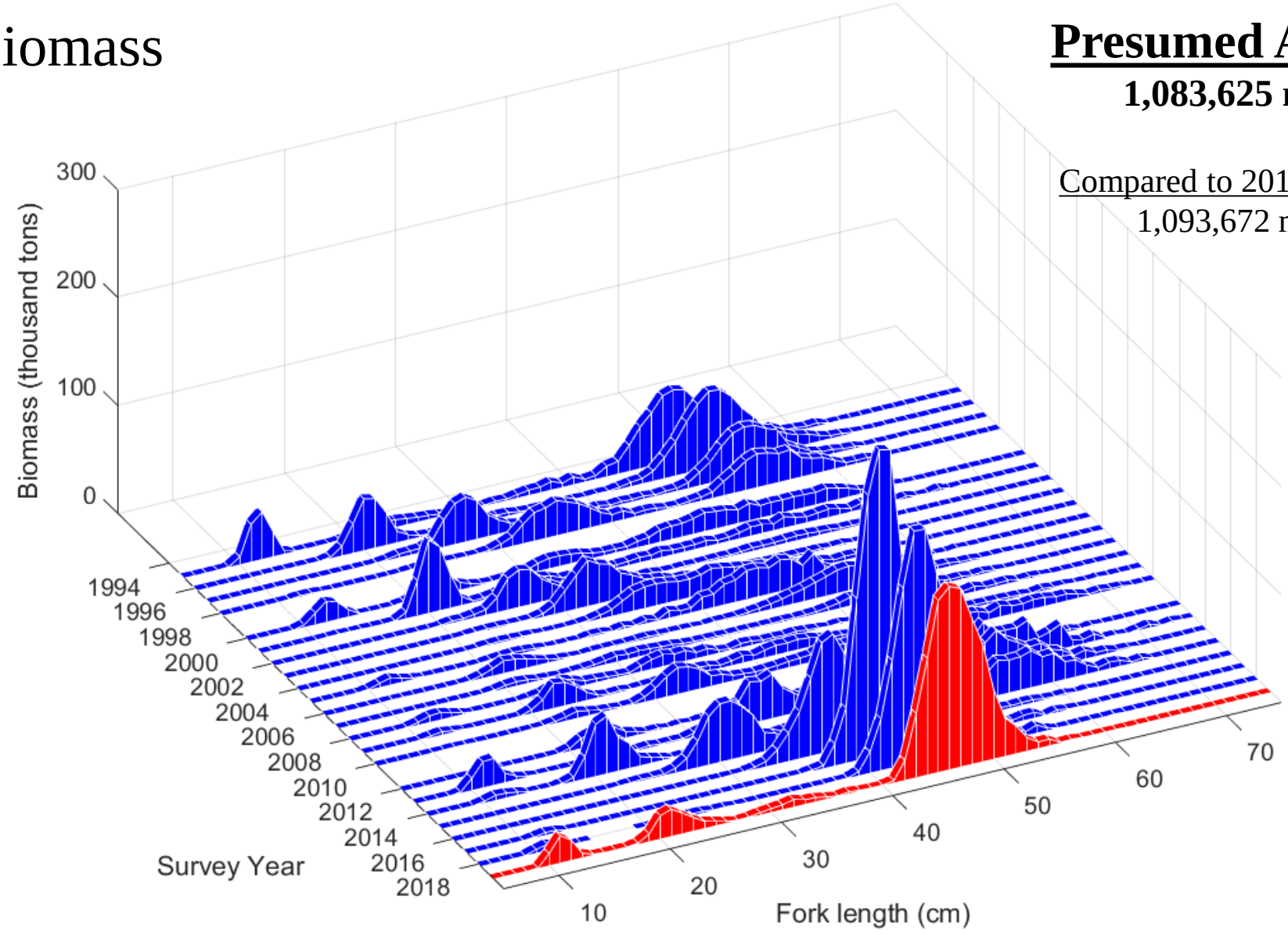
Shelikof Historical Pollock Size Composition

Biomass

Presumed Age-7

1,083,625 mt

Compared to 2018 age-6
1,093,672 mt



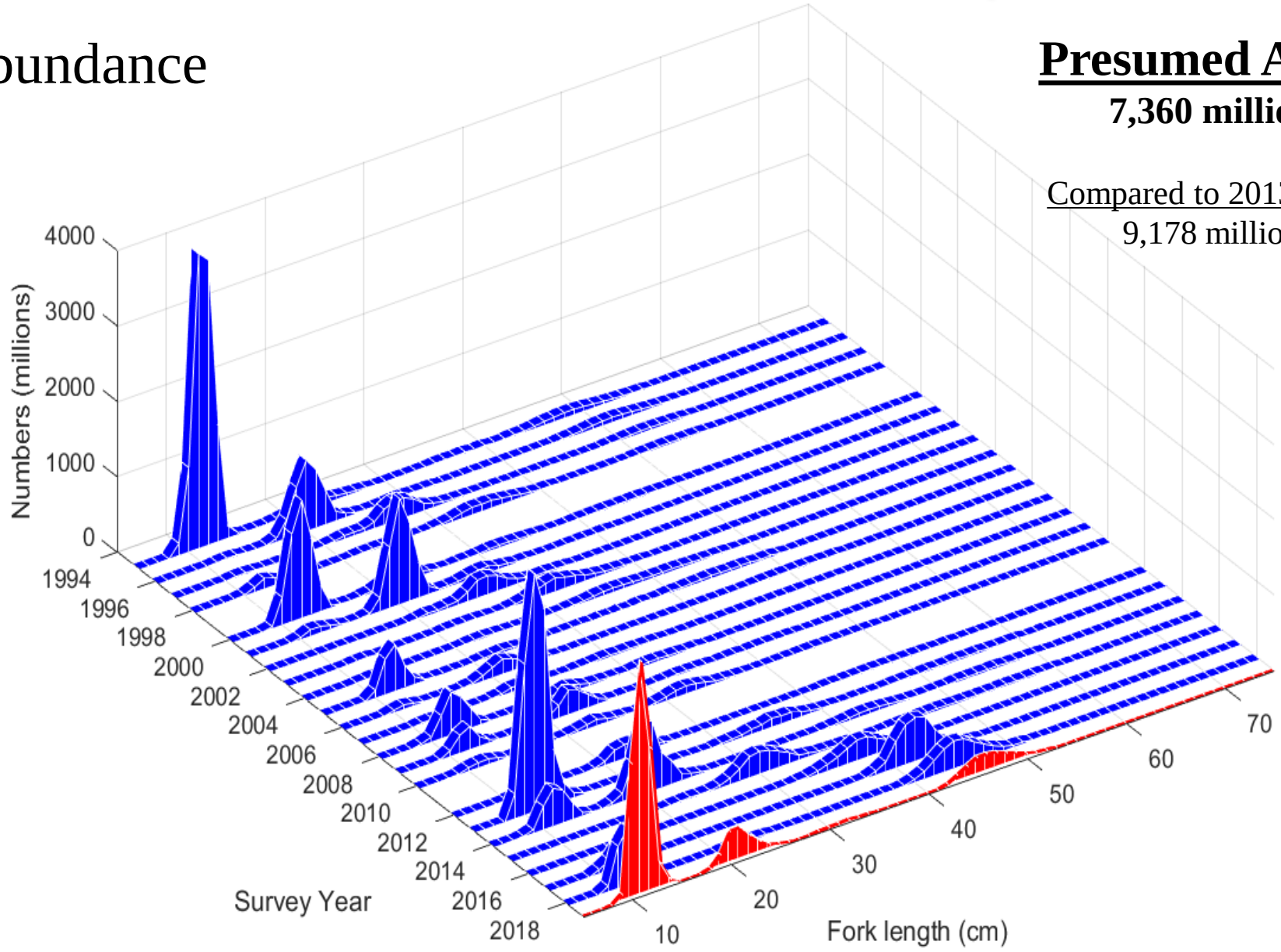
Shelikof Historical Pollock Size Composition

Abundance

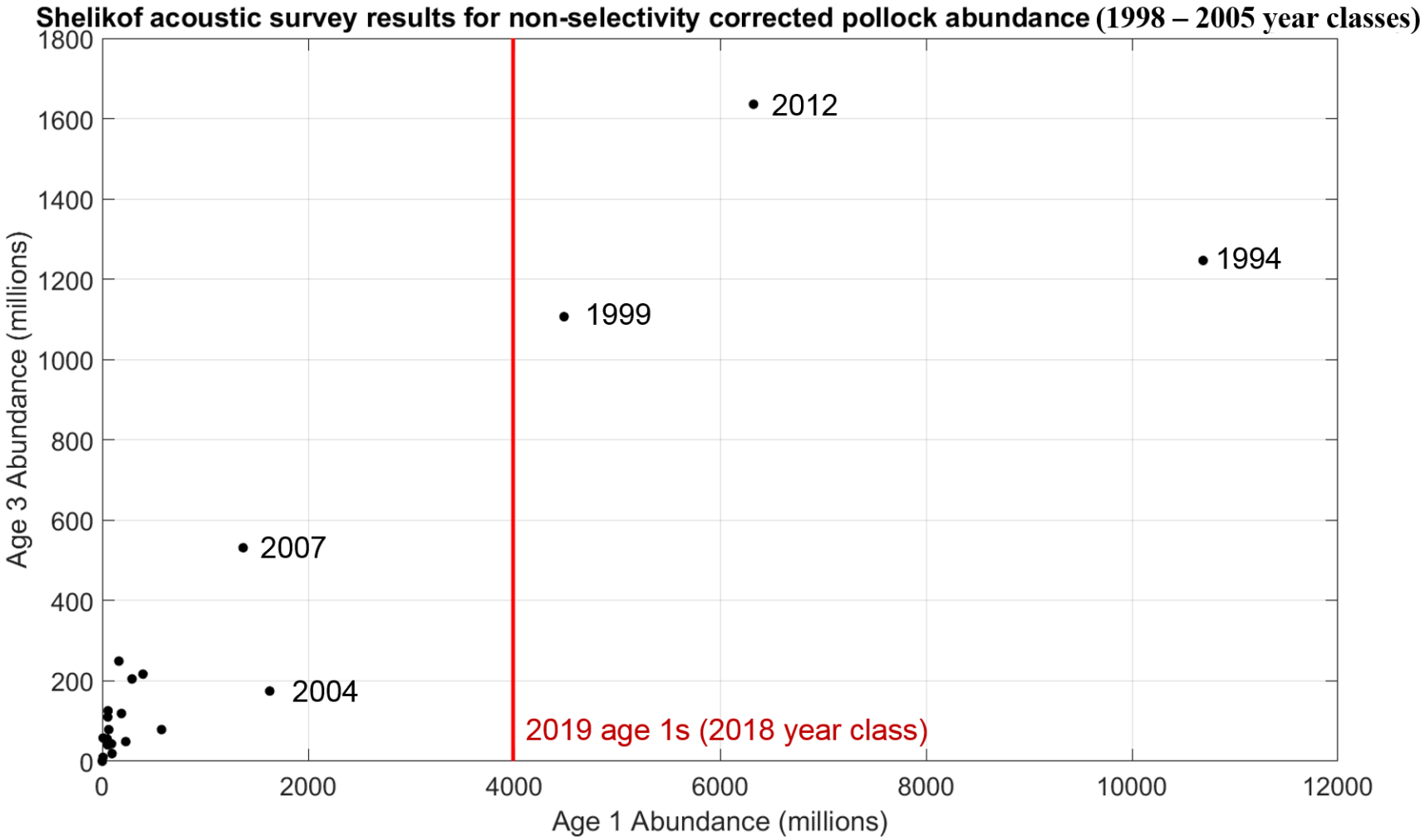
Presumed Age-1

7,360 million

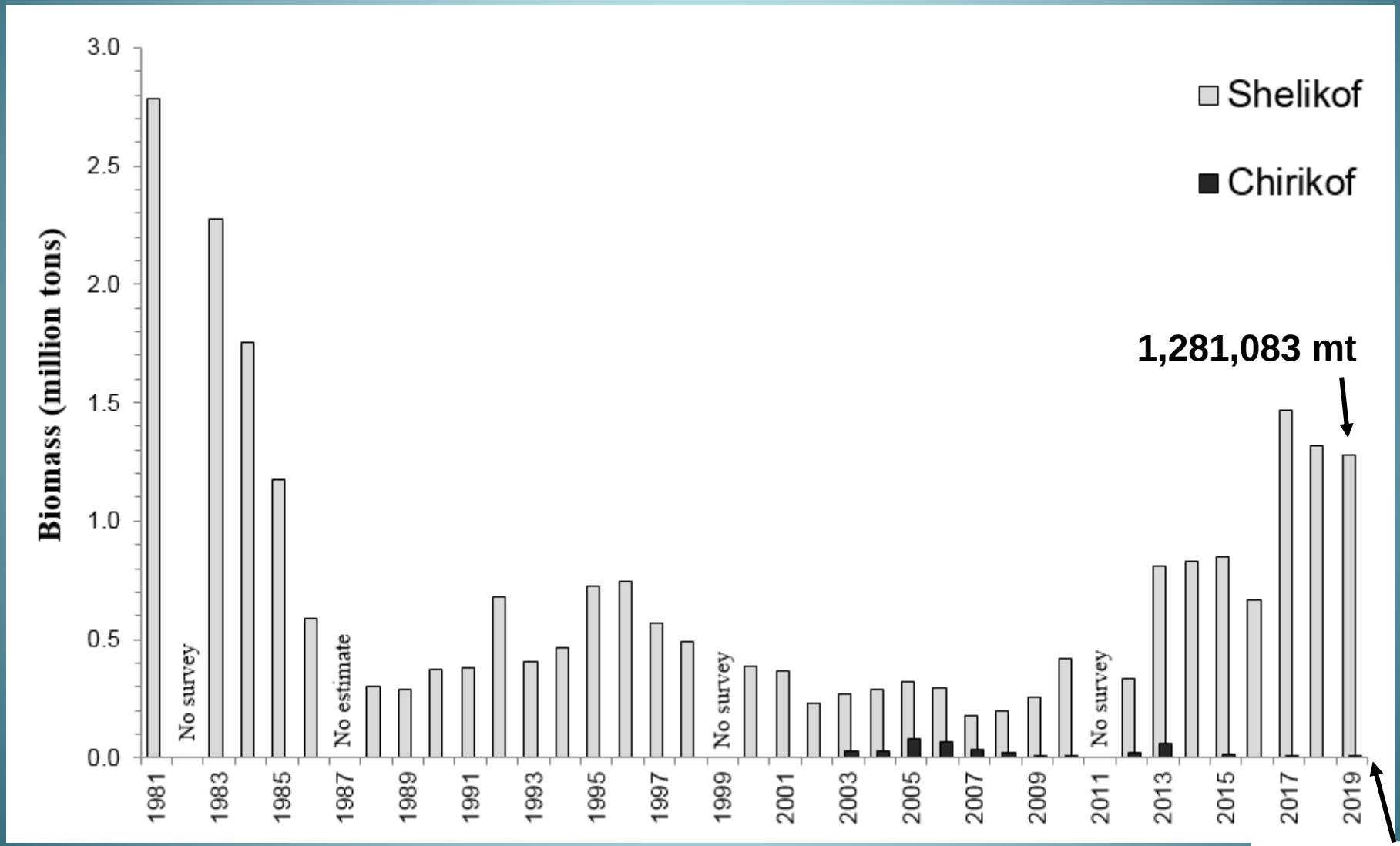
Compared to 2013 age-1
9,178 million



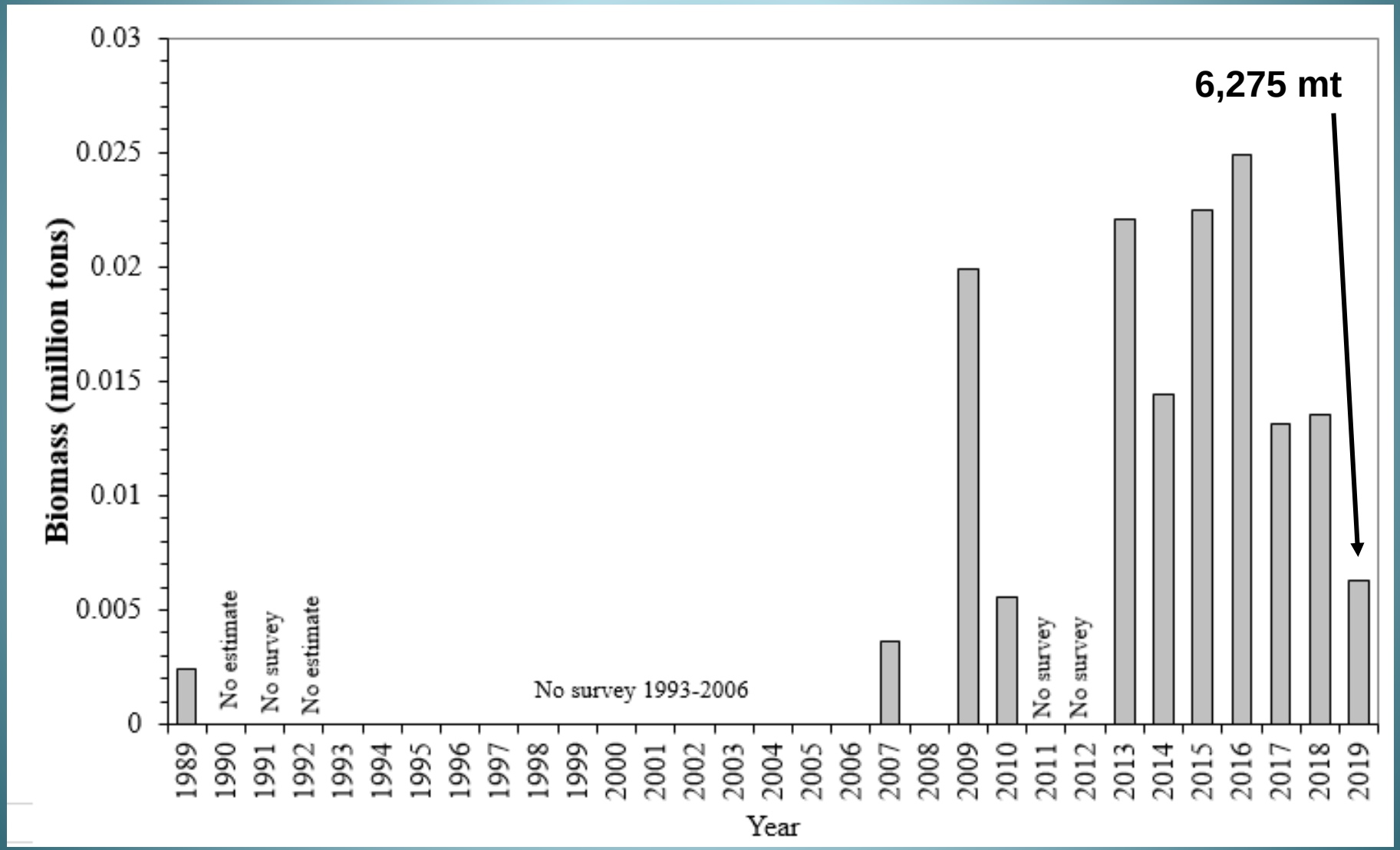
Age 1 and Age 3 survey abundances

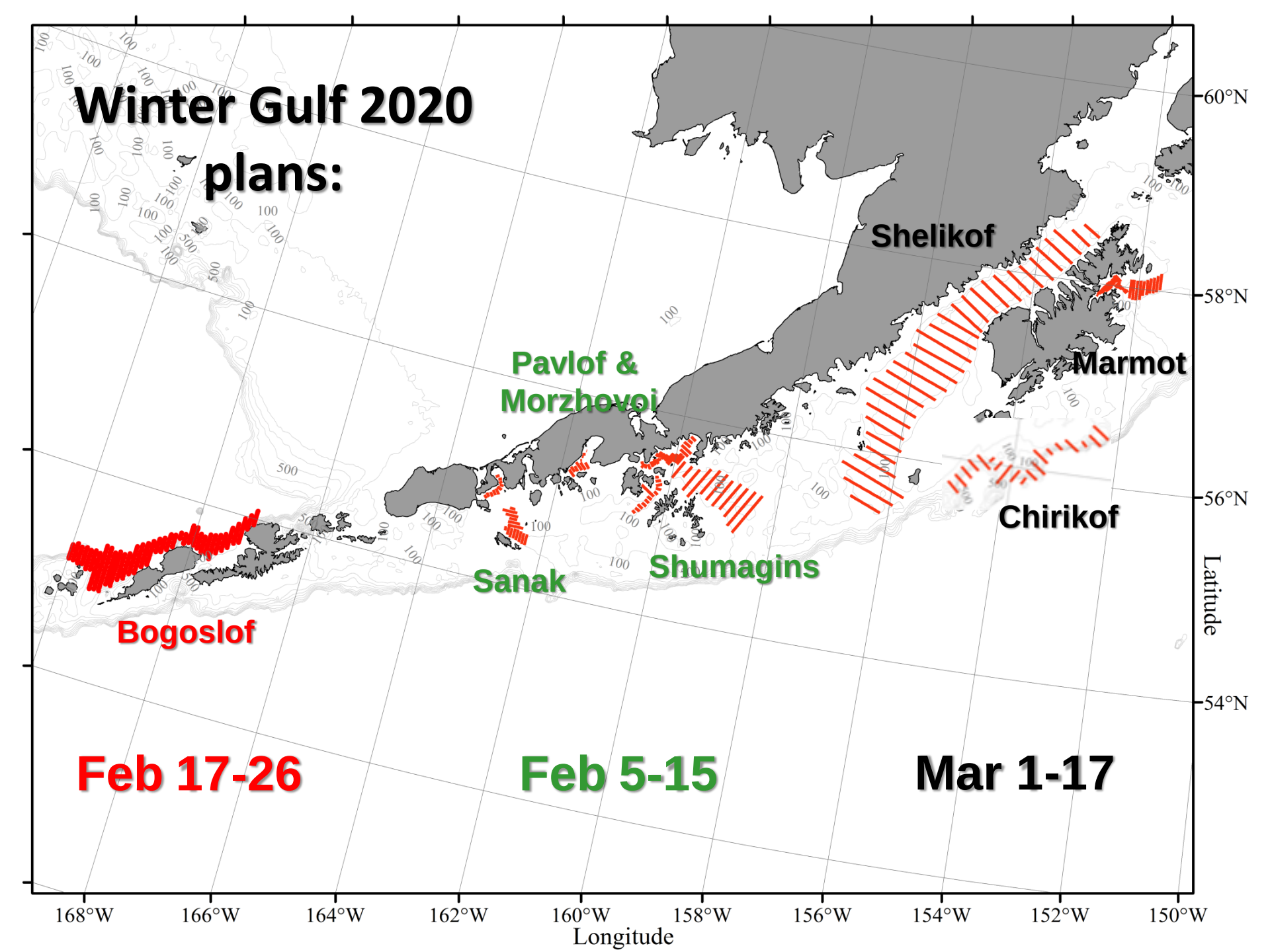


Shelikof and Chirikof Historical Biomass



Marmot Historical Biomass




Winter Gulf 2020 plans:
Shelikof
Marmot
Pavlof & Morzhovoi
Chirikof
Sanak
Shumagins
Bogoslof
Feb 17-26
Feb 5-15
Mar 1-17
60°N
58°N
56°N
54°N
Latitude
168°W
166°W
164°W
162°W
160°W
158°W
156°W
154°W
152°W
150°W
Longitude

Maturity weighted by abundance

Motivation

- Current practice is to pool maturity data from all trawl samples and fit a logistic function representing proportion mature as a function of length- determine ogive.

- However, the acoustically estimated local abundance near trawl locations vary substantially over the survey area, suggesting a pool approach to maturity composition is not appropriate.

- If there is a change in maturity stage based on abundance, maturity compositions in higher densities will be under-weighted in the pooled approach, but should not be.

Approach

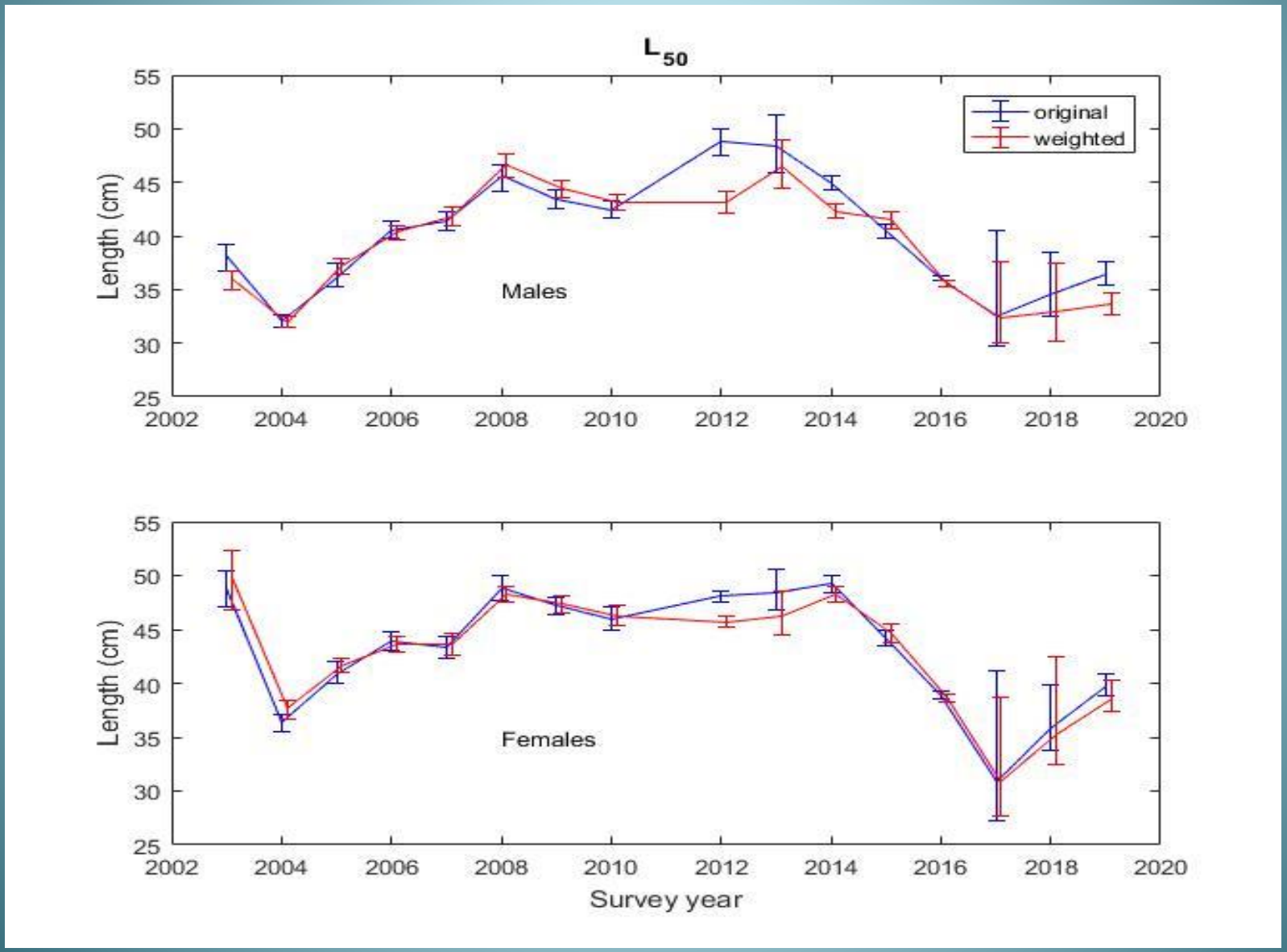
- Fit logistic regression using a generalized linear model as usual

- **Weight each haul based on aggregated acoustically-derived adult pollock abundance of nearest sampling intervals to that haul**

- Determine the usual metric for maturity: the length at 50% maturity, L_{50}

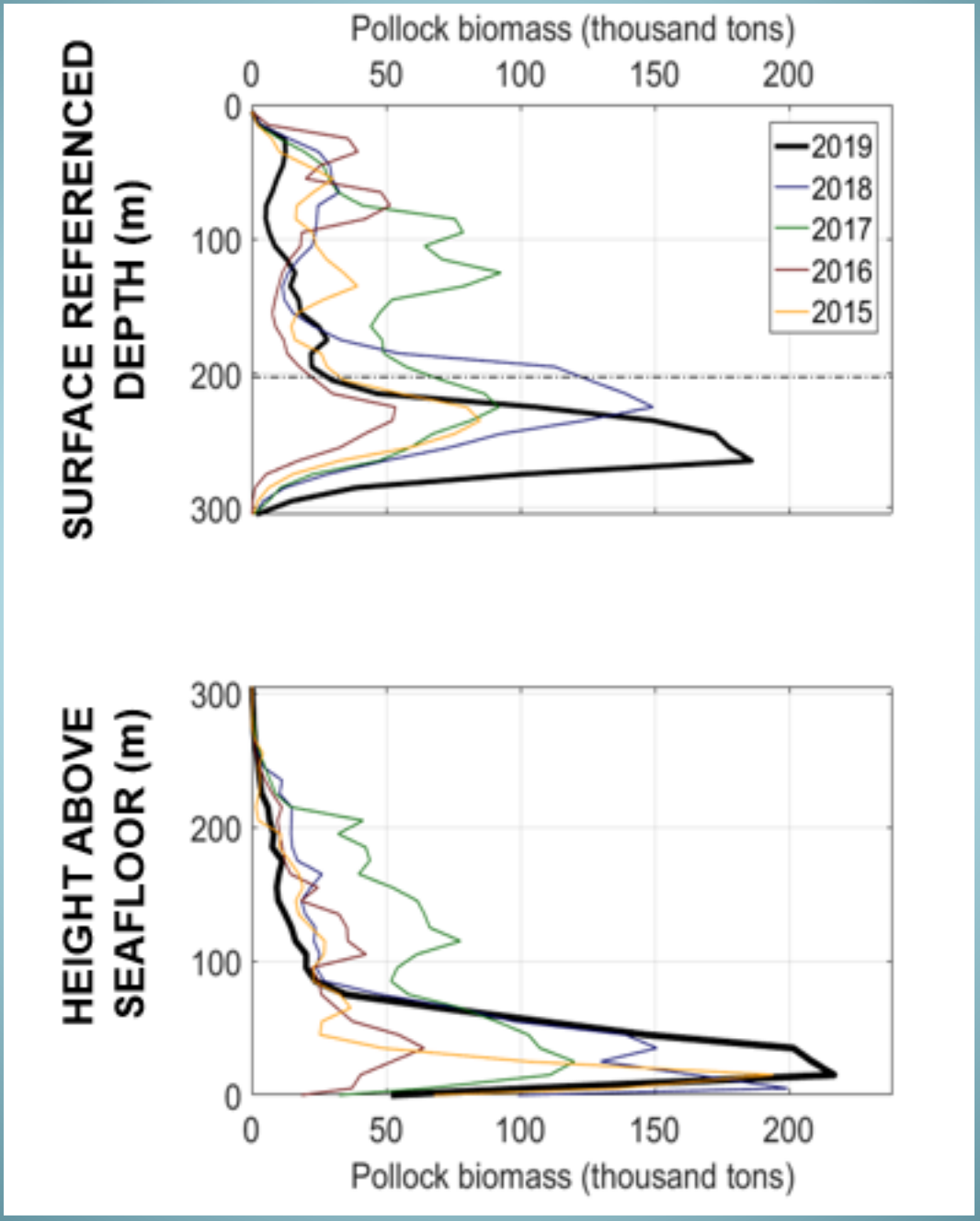
Maturity weighted by abundance

Impact on Shelikof L_{50} time series:

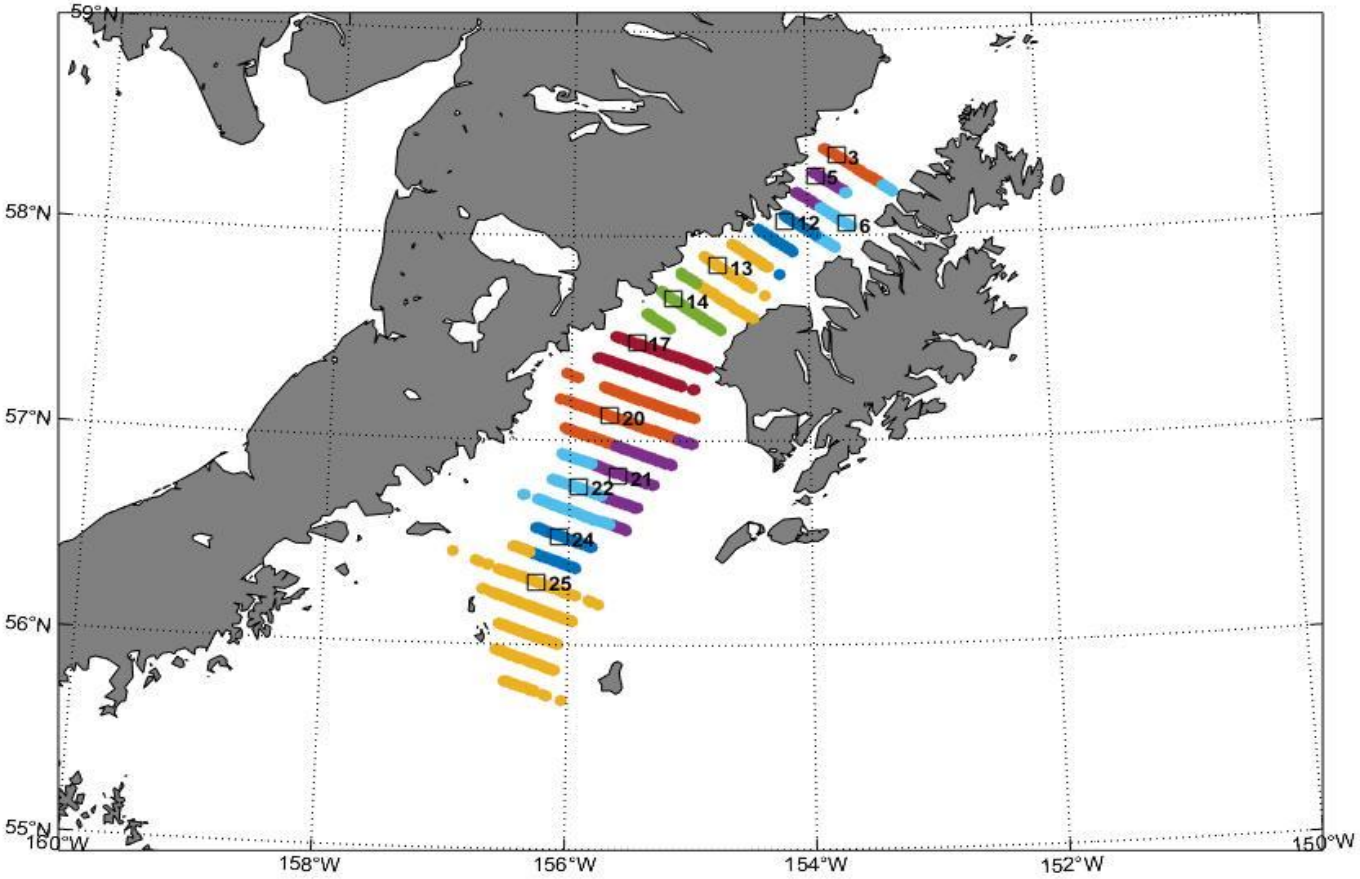


Questions?

Shelikof vertical distribution



Maturity weighted by abundance



Maturity weighted by abundance

New Approach

- 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

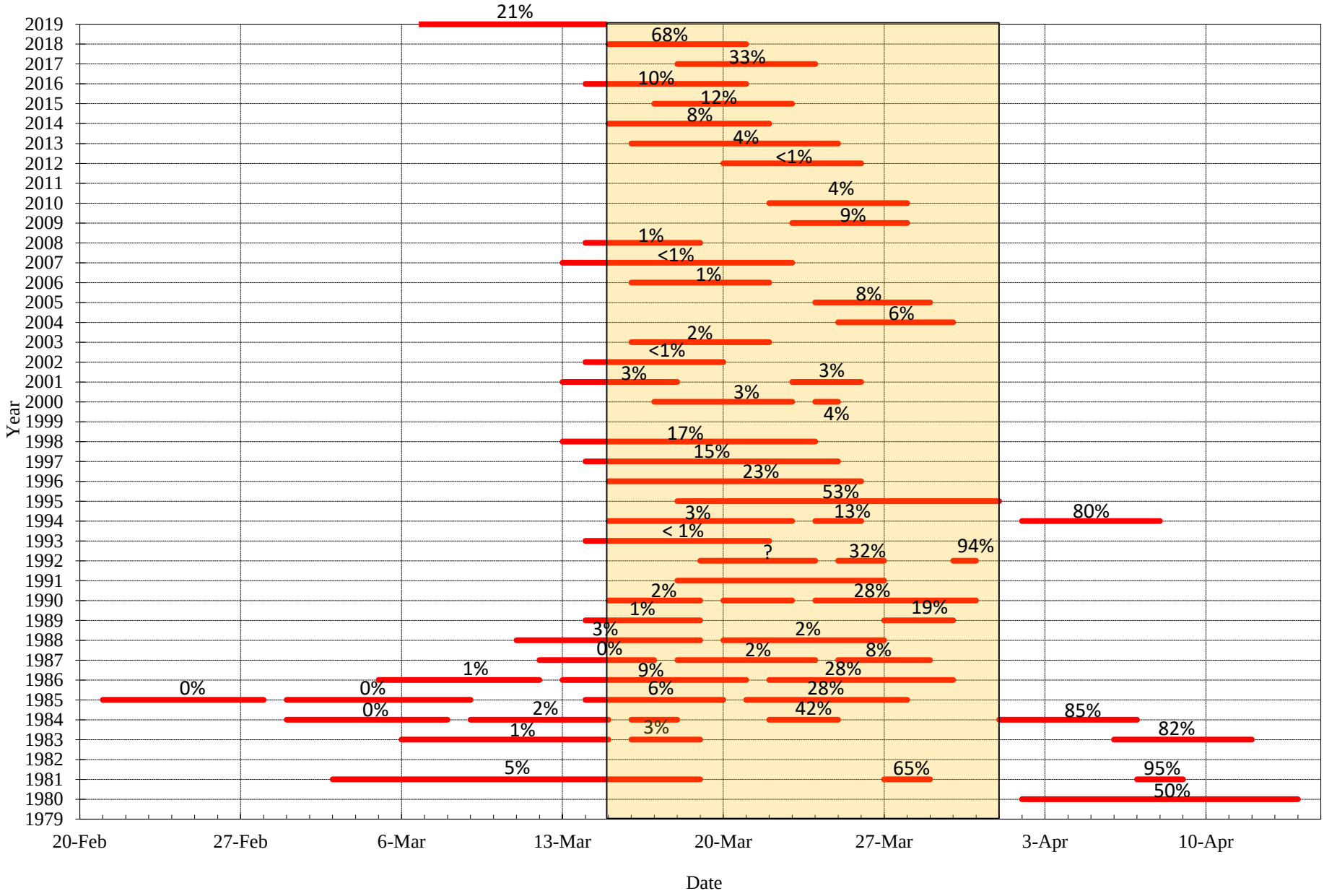
  - Weights are computed from pollock abundance (*A*) of >30 cm fish for *n* total number of hauls *h*

(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:

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