What's at the end of the rainbow? Management implications of an extraordinary recruitment event

Jonathon Peros[1], Sam Asci[1], David B. Rudders[2], and Sally Roman[2]

[1]New England Fishery Management Council, Newburyport, Massachusetts, USA
[2]Virginia Institute of Marine Science, Gloucester Point, Virginia, USA

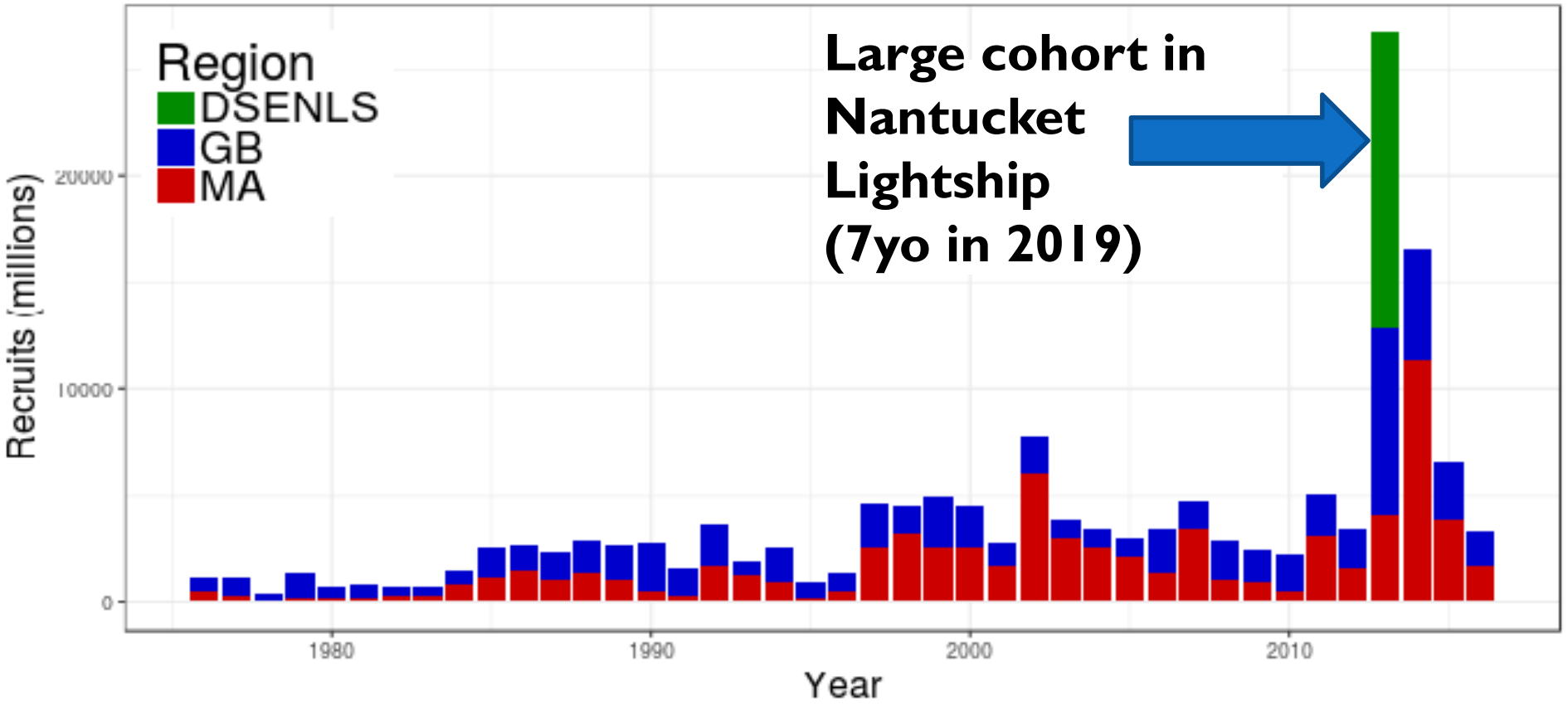
2019 International Pectinid Workshop
April 24, 2019
Santiago de Compostela, Spain

Atlantic sea scallop (*Placopecten magelanicus*)

New England Fishery Management Council

- One of eight US regional FMC's
- Federal waters (about 3-200 nautical miles)
- 18 voting members from 5 regional states.
  - Appointed members serve 3 year terms
  - Harvesters (fishermen), industry representatives, academics

Extraordinary Recruitment:



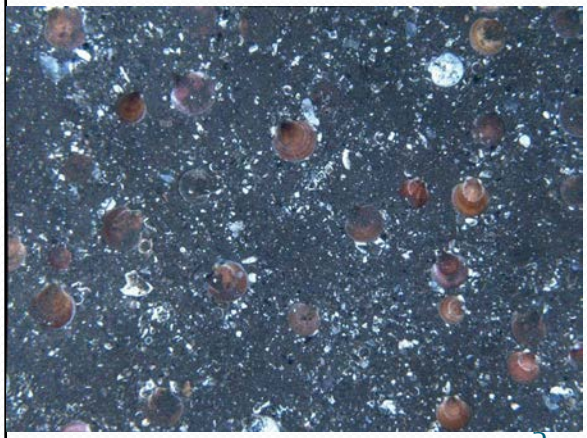
- Animals settled from south of Nantucket to Hague Line in a range of habitats.
- Estimated 31 Billion Recruits in 2014 (Bethoney et al. 2016)

Research Set-Aside

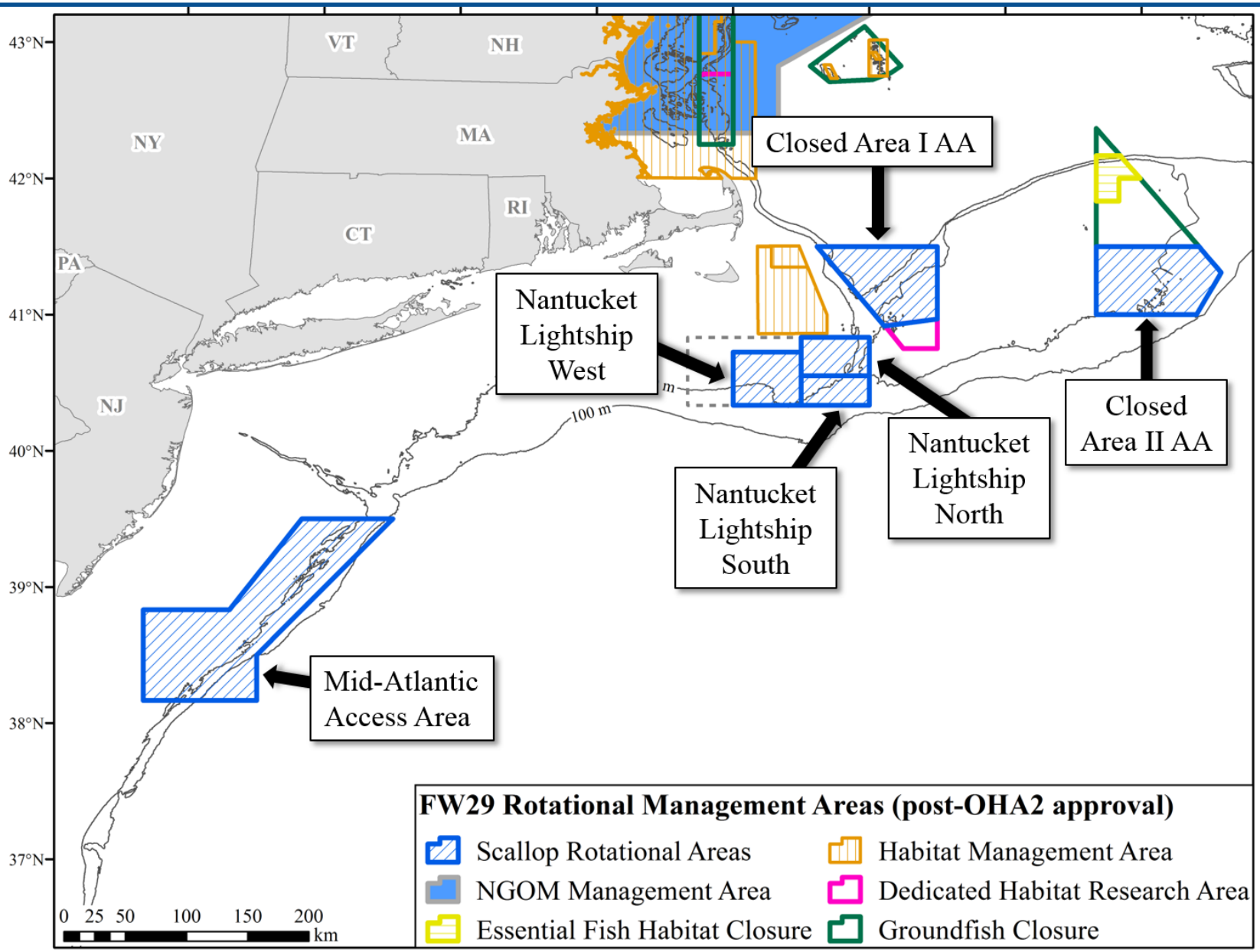
New England
Fishery Management Council

- Scallop RSA program began in 1999
- 1.25 million pounds (meat weight) of scallops set-aside each year to fund research projects
- About 10-15 projects are funded annually
- Process coordinated by US Government and Regional Fishery Council
- No federal funds – awards in pounds of scallop – allocated through competitive grants process
- Council recommends the research priorities that are used in the announcement of the competition

Resource Surveys:

Dredge	Drop Cam	HabCam
		
		

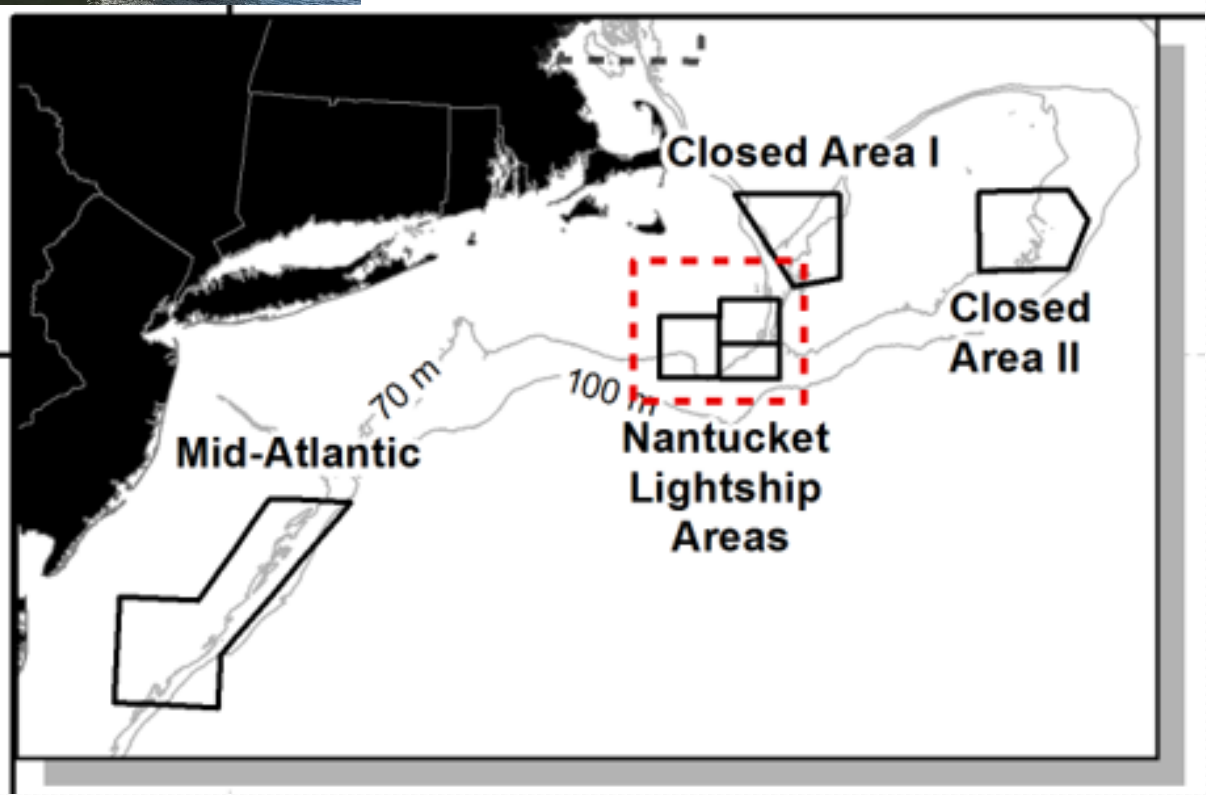
Rotational Management



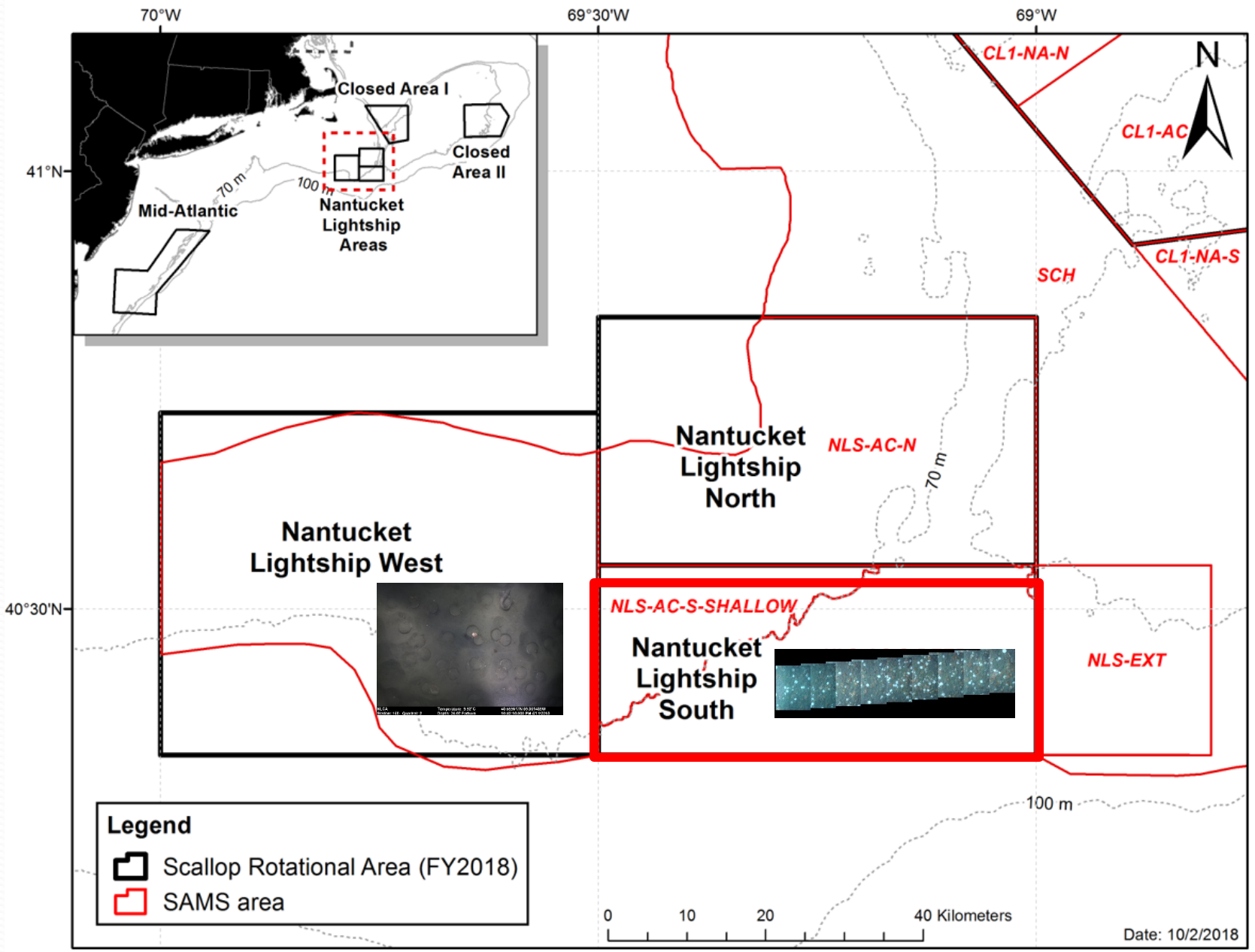
Opportunity, Unknowns

- Extraordinary recruitment → Unprecedented windfall
  - Several record harvests, strong fishery revenues
  - Contribute to subsequent recruitment events.
- Many unknowns → How to approach management if expected growth is not realized.

Atlantic Sea Scallop Fishery

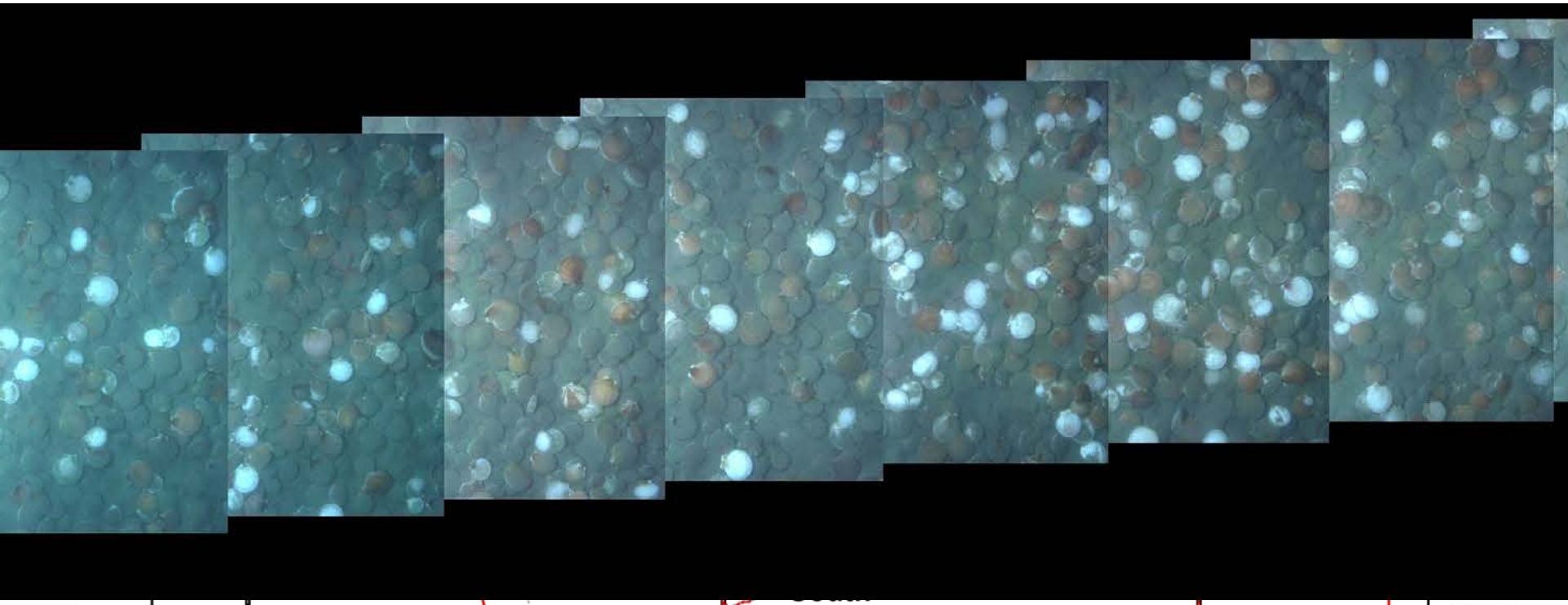


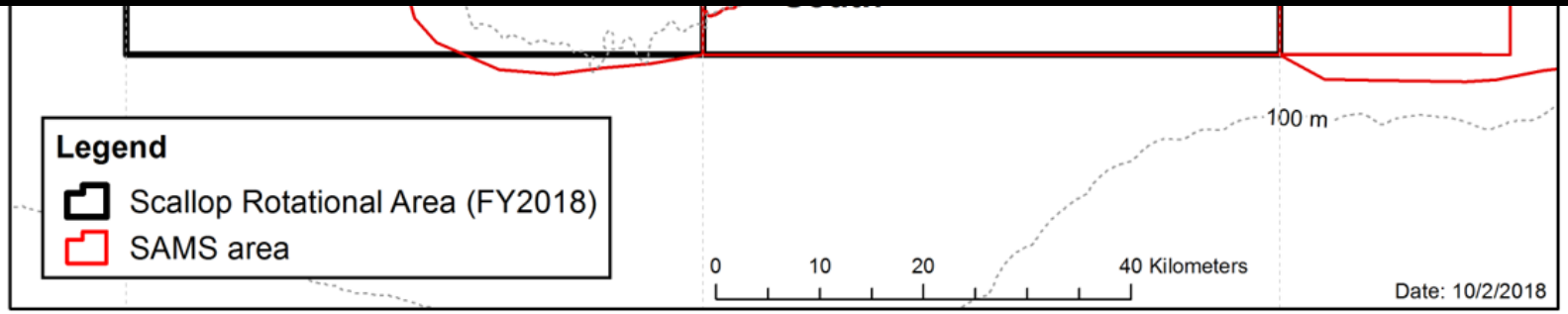
Nantucket Lightship Region



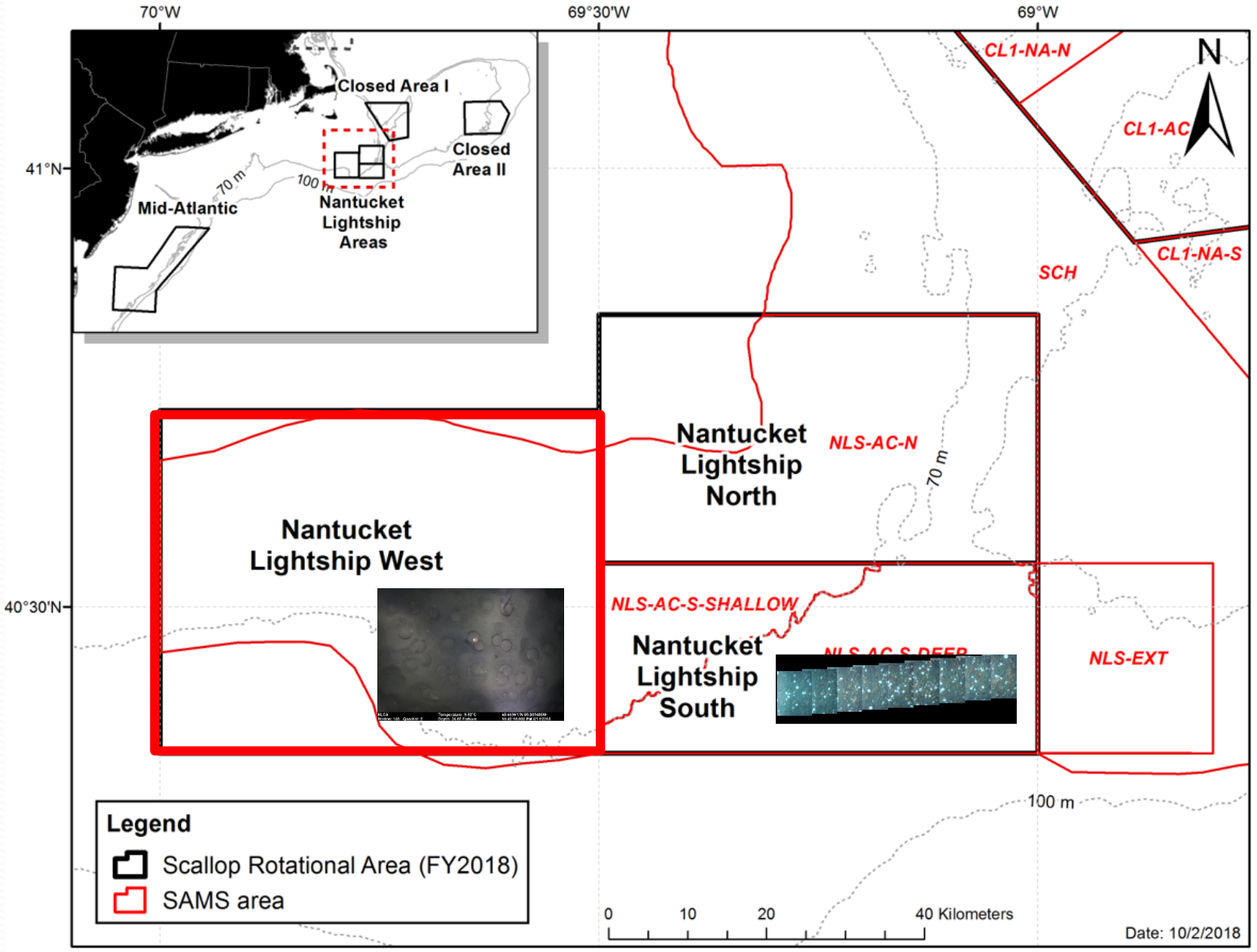
Nantucket Lightship Region

Mosaic of scallops in the deep water in the southern area in 2014 (Photo credit: Richard Taylor, HabCam)

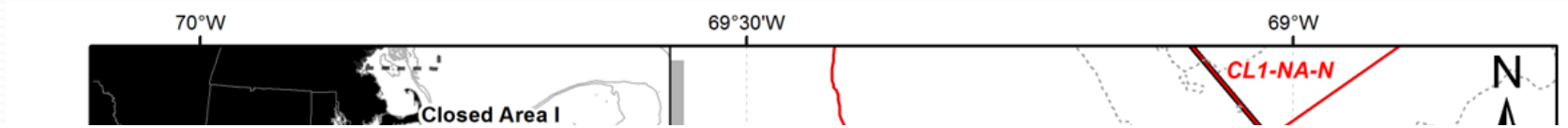




Nantucket Lightship Region

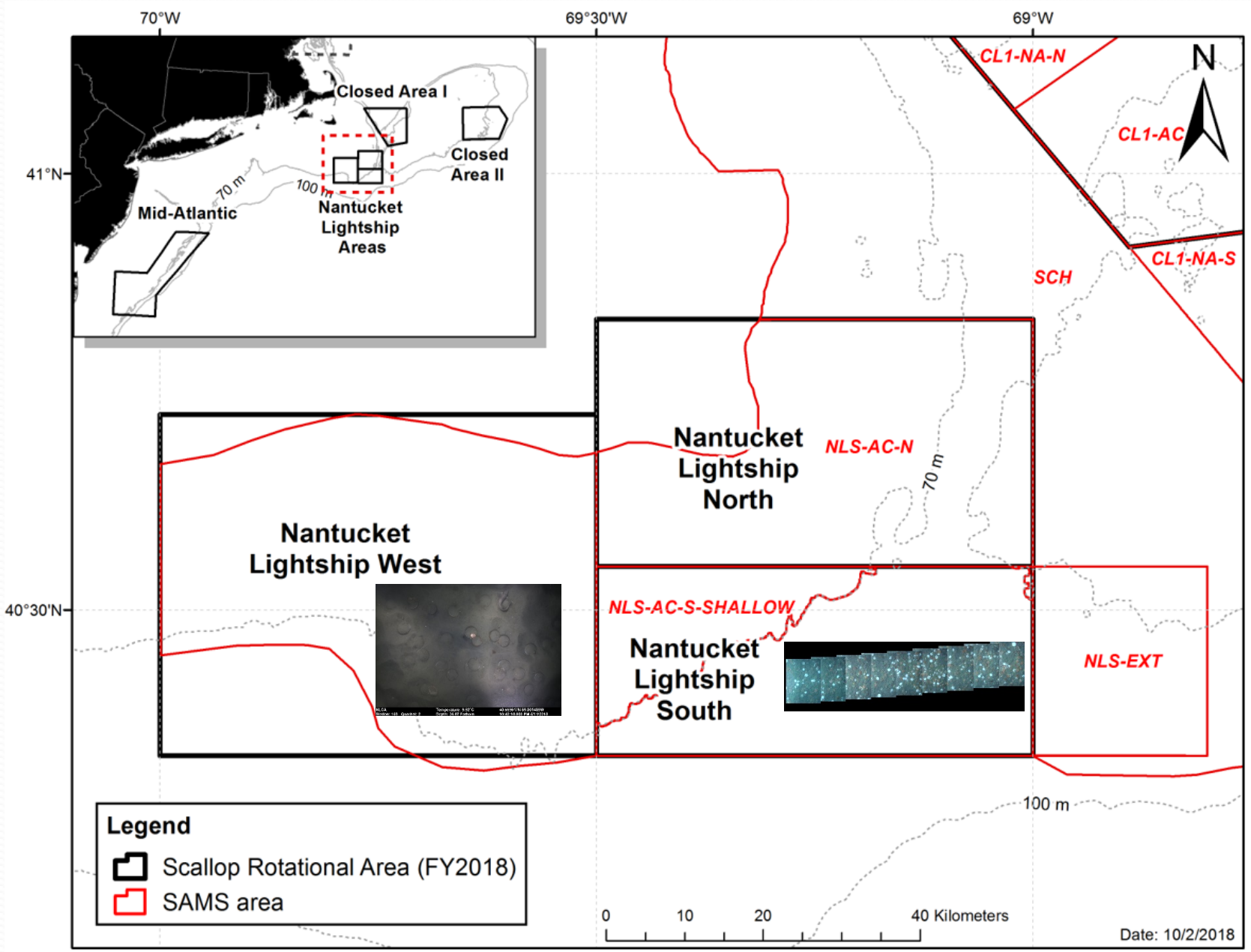


Nantucket Lightship Region

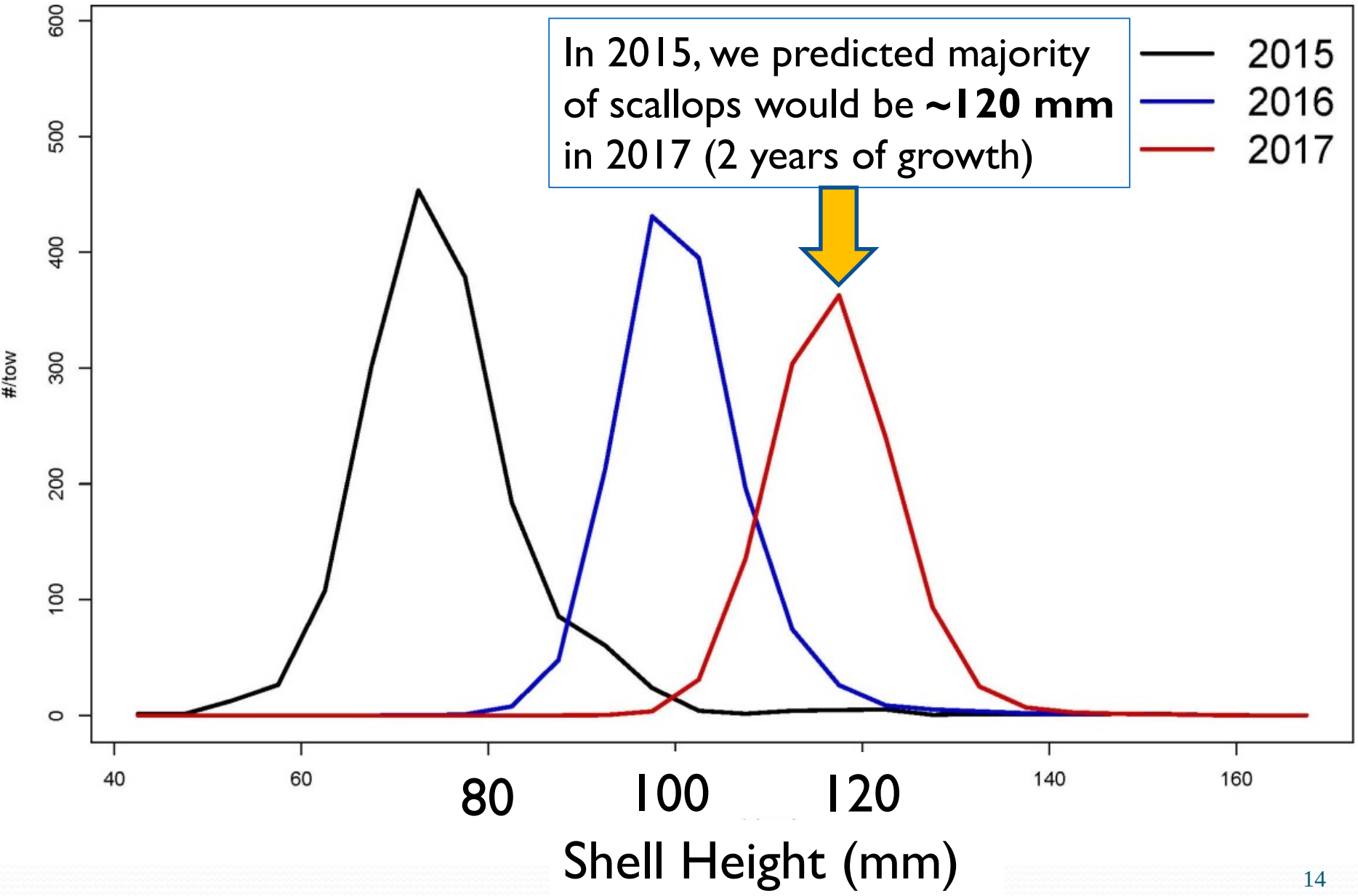


Scallops in the "West" in 2018 (Photo credit: SMAST)

Nantucket Lightship Region

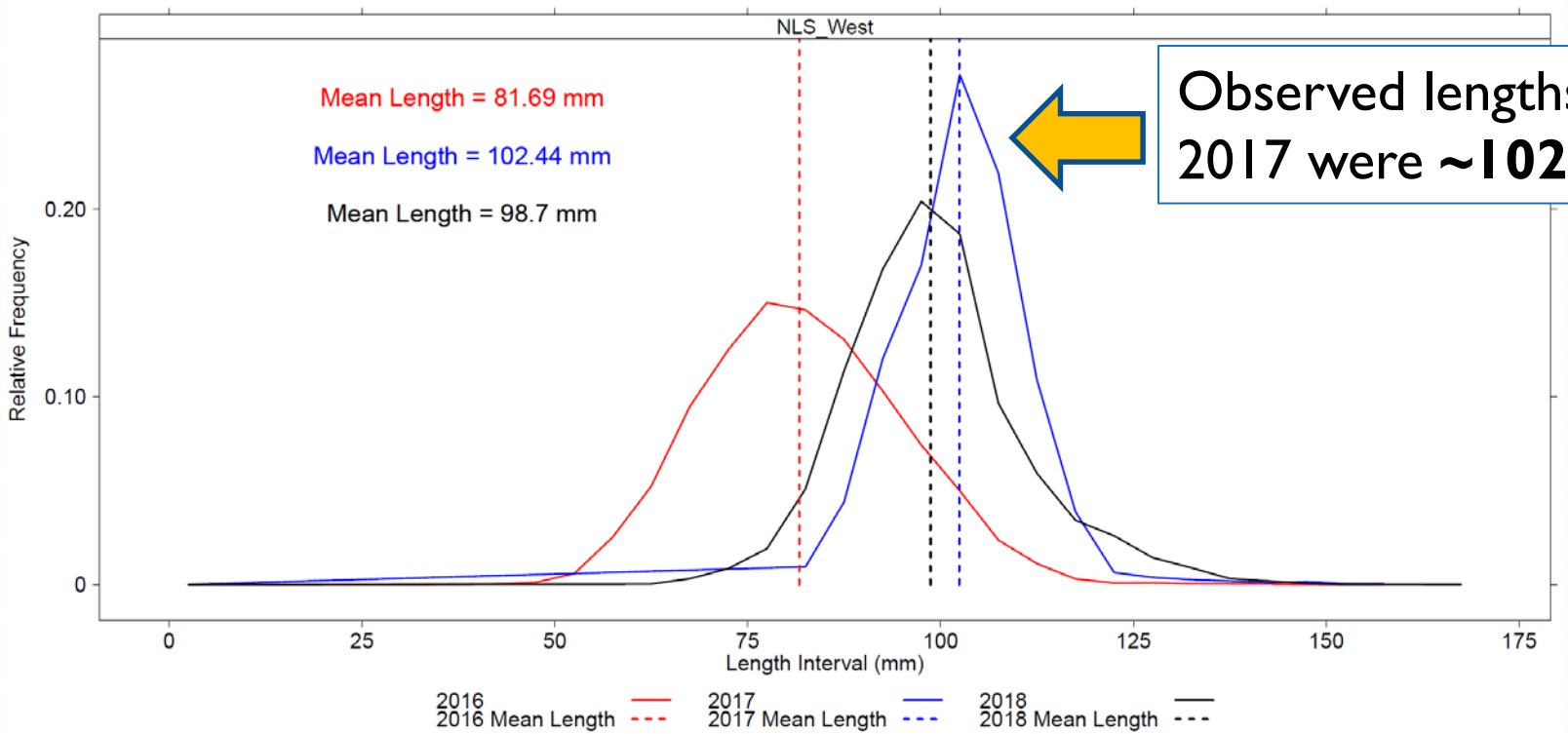


Nantucket Lightship "West" Growth Projections



~~Slow~~ No Growth – "West" Region

- Virtually no growth observed between 2017 and 2018

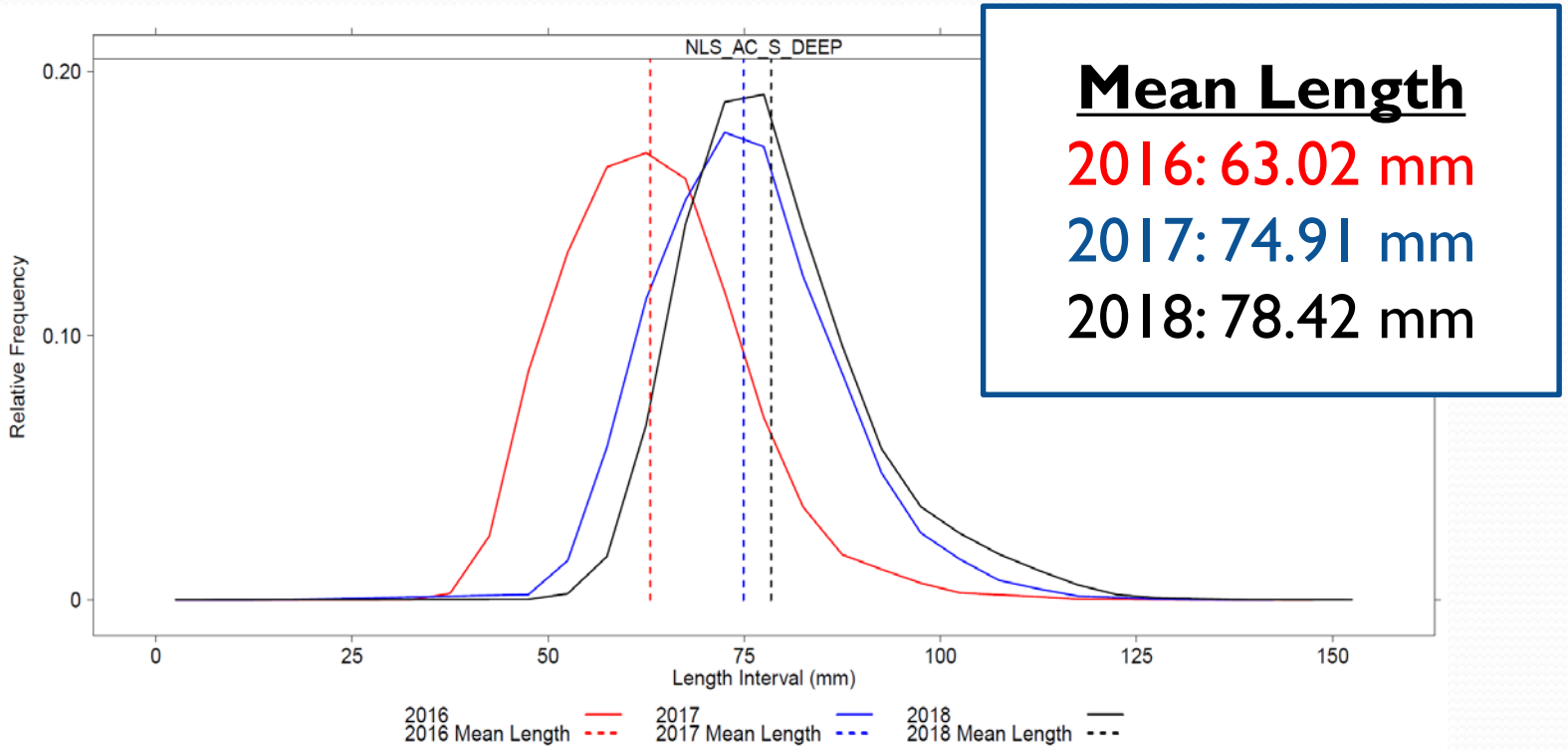


Observed lengths in 2017 were **~102 mm**

- L∞ set to119 mm, reduced from 151 mm for NLS region.

~~Slow~~ No Growth – "South - deep"

- In 2016, 4 yo animals were the size of 2 year olds.
- Virtually no growth observed between 2017 and 2018



Mean Length

2016: 63.02 mm

2017: 74.91 mm

2018: 78.42 mm

- L∞ set to 110 mm (vs. 119 mm in "West" and 151 mm in "North"

NLS "South-deep" in 2018

- 34,483 mt ≈ 76 million lbs of meats

2017 → 2018

- Almost no observed growth
- Reduction in density per m^2
- Outlook:
  - Meat quality appears good.
  - Not growing normally.
  - Questionable fecundity.
  - May be environmental or density dependent factors that are limiting their potential to grow and reproduce.

Density

2017: 9.70 m^2

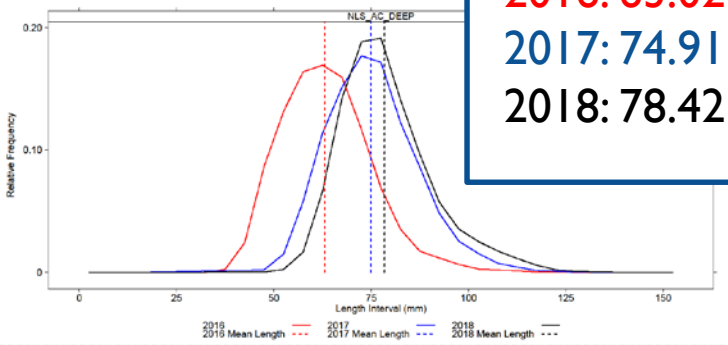
2018: 5.50 m^2

Mean Length

2016: 63.02 mm

2017: 74.91 mm

2018: 78.42 mm



Why is harvest a challenge?

Policy objectives: improve yield-per-recruit from the fishery.

- 4” Ring selects for larger animals.
- Crew limits.
- Prohibition on mechanical shucking/processing.
- Prohibition on shell stocking large amounts of scallops.

Harvest? Double Rainbow

Credit: Yosemite Bear – Double Rainbow

Photo Courtesy of Peter Hughes, Atlantic Capes Fisheries

WEST Area: Allocated ~30 million lbs (meat weight) 2yrs

- Harvest ranged from 20-30 to 10-20 counts
- ex-vessel price $7-$9 range

SOUTH Area: No directed harvest on smaller scallops. Area closed in 2019. Council action needed. M?

Developing accurate projections

Management Approach:

- Adjustments to **SH-MW parameters** using VIMS survey data from 2016 - 2018.
- Adjustments to dredge biomass estimates in high density areas to account for reduce **dredge efficiency**.
- Reducing **growth** expectations for animals that did not grow (much) between 2017 and 2018, and are not growing normally.
- Applying **fishery selectivity** that better reflects the size distribution of scallops that will be in the fishery.

RESULT: Lower catch limits for the fishery (OFL, ABC)

Lessons & Thoughts

- **Research set-aside** provided resources to effectively track (unpredictable) outcomes.
  - Value in having multiple survey methods (dredge, optical)
- **Council Process:** Challenges associated with capturing benefits from unique circumstances.
  - Adapting in near real-time not enough in all situations;
  - Managers dealing with multitude of issues;
  - Equity – Who benefits?
- Principles of Rotational Management
  - "Windows of Opportunity" (Bethoney and Stokesbury, 2019)

Thank you!

- **Acknowledgements:**
  - New England Fishery Management Council
  - Scallop Plan Development Team
  - NOAA Fisheries & Dr. Dvora Hart
  - Scallop Survey Groups: