Atlantic Herring Stock Assessment SARC 65 Review Panel Report

Atlantic Herring Management Board
October 22, 2018

Overview

The 65th Northeast Regional
Stock Assessment Review Committee (SARC)
Northeast Fisheries Science Center
Woods Hole, Massachusetts
June 26-29, 2018

SARC Chairman:

Dr. Pat Sullivan, Cornell University, NEFMC Scientific and Statistical Committee

SARC Panelists:

Dr. Cathy Dichmont, Australia, Center for Independent Experts (CIE)

Dr. Coby Needle, United Kingdom, CIE

Dr. Geoff Tingley, New Zealand, CIE

Atl. Herring Assessment TORs

1. Estimate catch from all sources ✓
2. Evaluate fishery-independent and fishery dependent indices used in the assessment ✓
3. Examine stock distribution, and consumption of herring by predators ✓
4. Estimate annual fishing mortality, recruitment, and biomass for the time series ✓
5. Propose biological reference points ✓
6. Evaluate stock status. Describe condition of the stock ✓
7. Conduct stock projections ✓
8. Consider whether current stock definition is reasonable ✓
9. Review research recommendations and identify new ones ✓

SARC Panel Findings

- 2018 assessment is accepted by the review panel
  Stock status: not overfished and no overfishing occurring

- Given low recent recruitment, prognosis for future stock size is relatively poor

- New reference points: Approaches used to develop BRPs and to rescale the assessment are scientifically sound

- Biological reference points cannot be compared to past reference points because they have a different basis

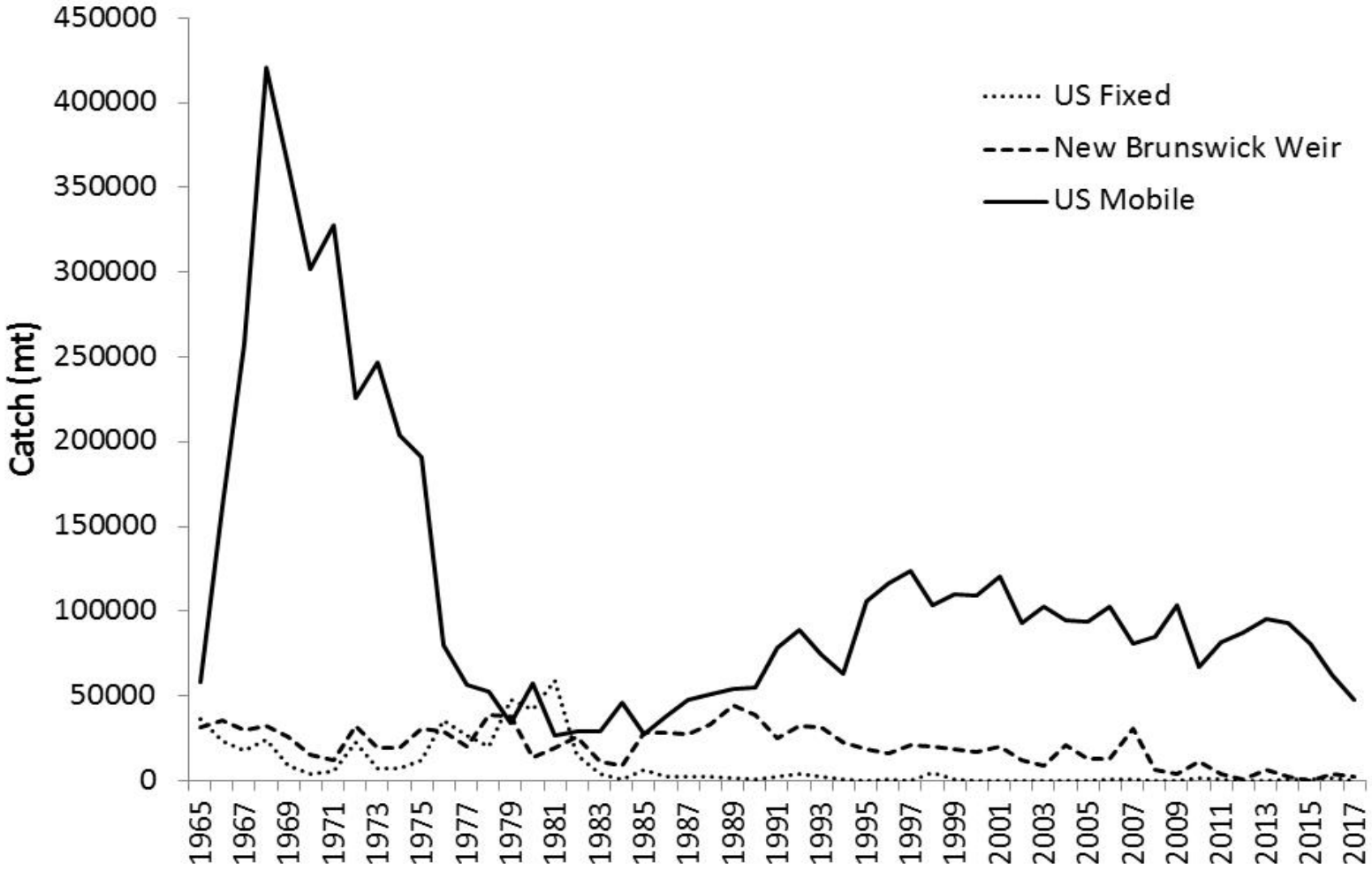
SARC Panel Findings

- Acoustic index from trawl survey was an important component of assessment
- Herring fishery was responsible for less removals than natural predators. Consumption estimates did not include marine mammals, seabirds, and some fish predators (tuna)
- Reasonable justification for natural mortality *M* values used in the assessment

SARC Panel Recommendations

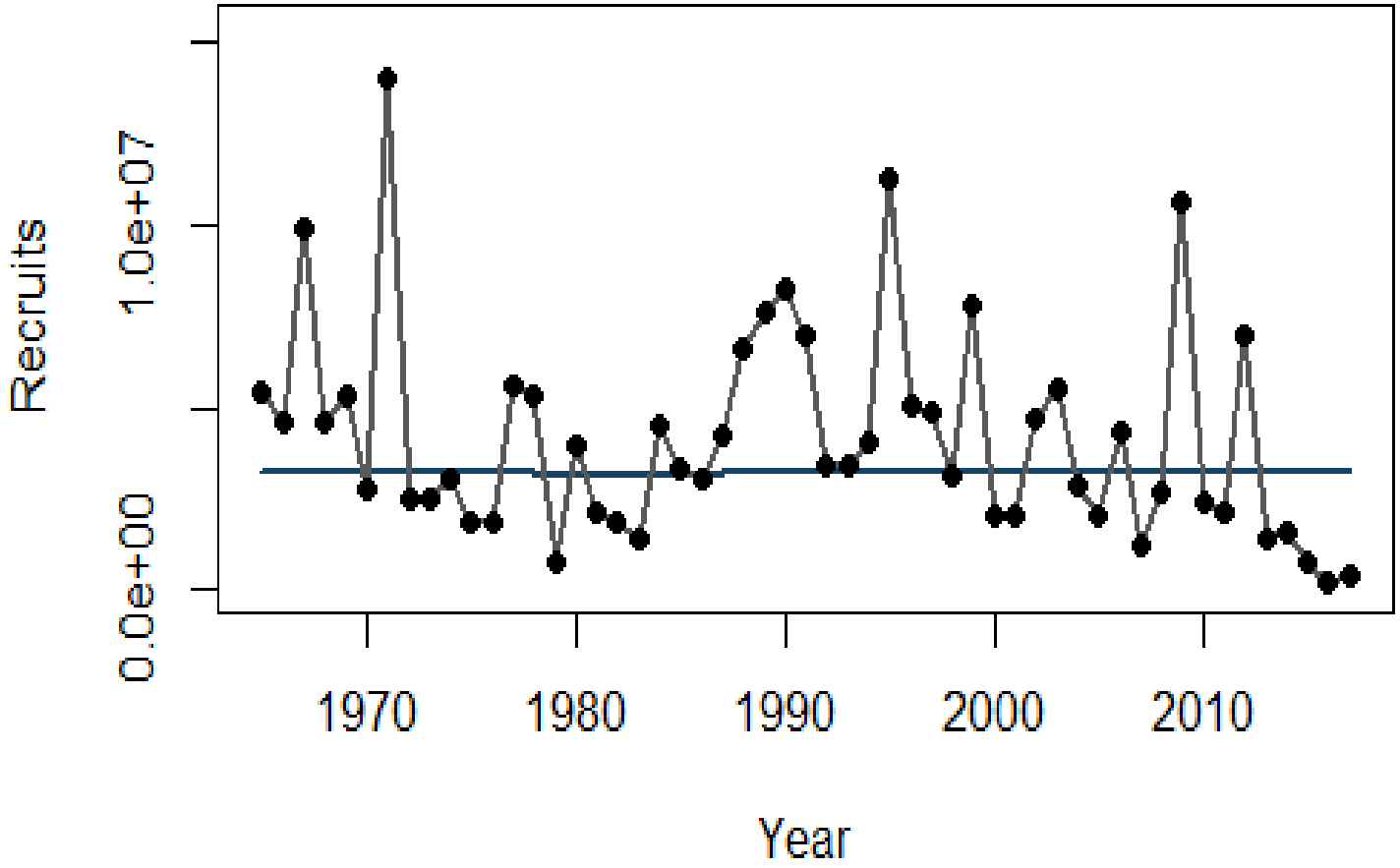
- Explore alternative management strategies to better understand implications of stock declines
- Continue to examine ecological and environmental factors influencing recruitment and mortality
- Consider a directed acoustic survey to complement and compare with acoustic data collected during trawl surveys
- Try including more predator species when estimating consumption of herring
- Consider alternative approaches to estimating reference point proxies (e.g., length-based methods)
- Further exploration of stock structure

Herring Catch by Gear Type



Mobile gear catch peaked in 60s and 70s due to foreign fleets. Stable catches in the 1990s, then declining recently with increased management measures.

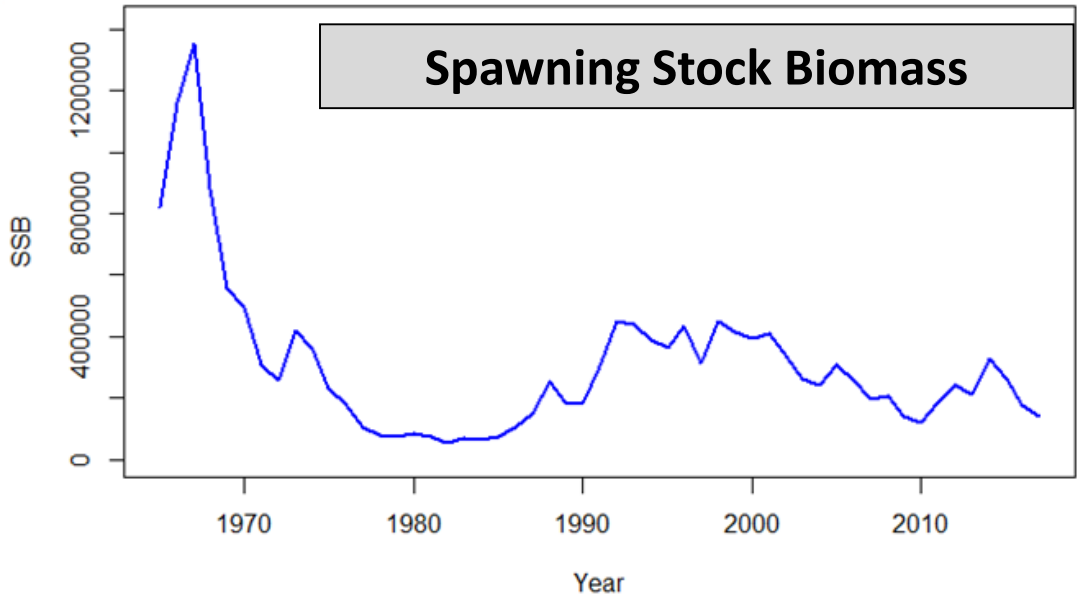
Herring Recruitment



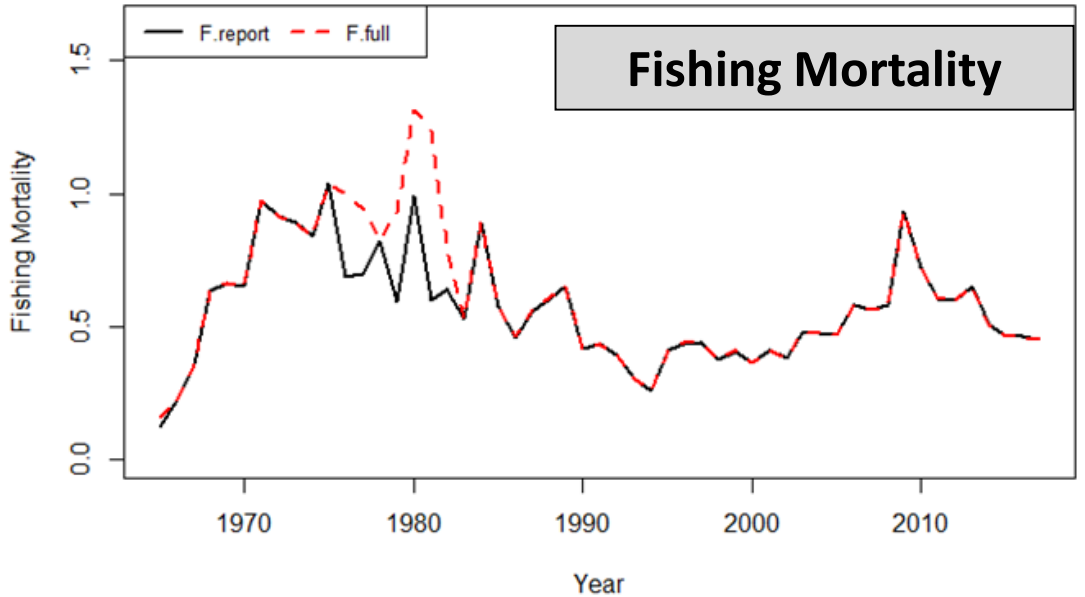
Time series high was 1971. $R_{age\ 1}$ below average since 2013. Lows occurred in 2016 and 2017. There is more uncertainty associated with recent estimates.

Herring Stock Dynamics

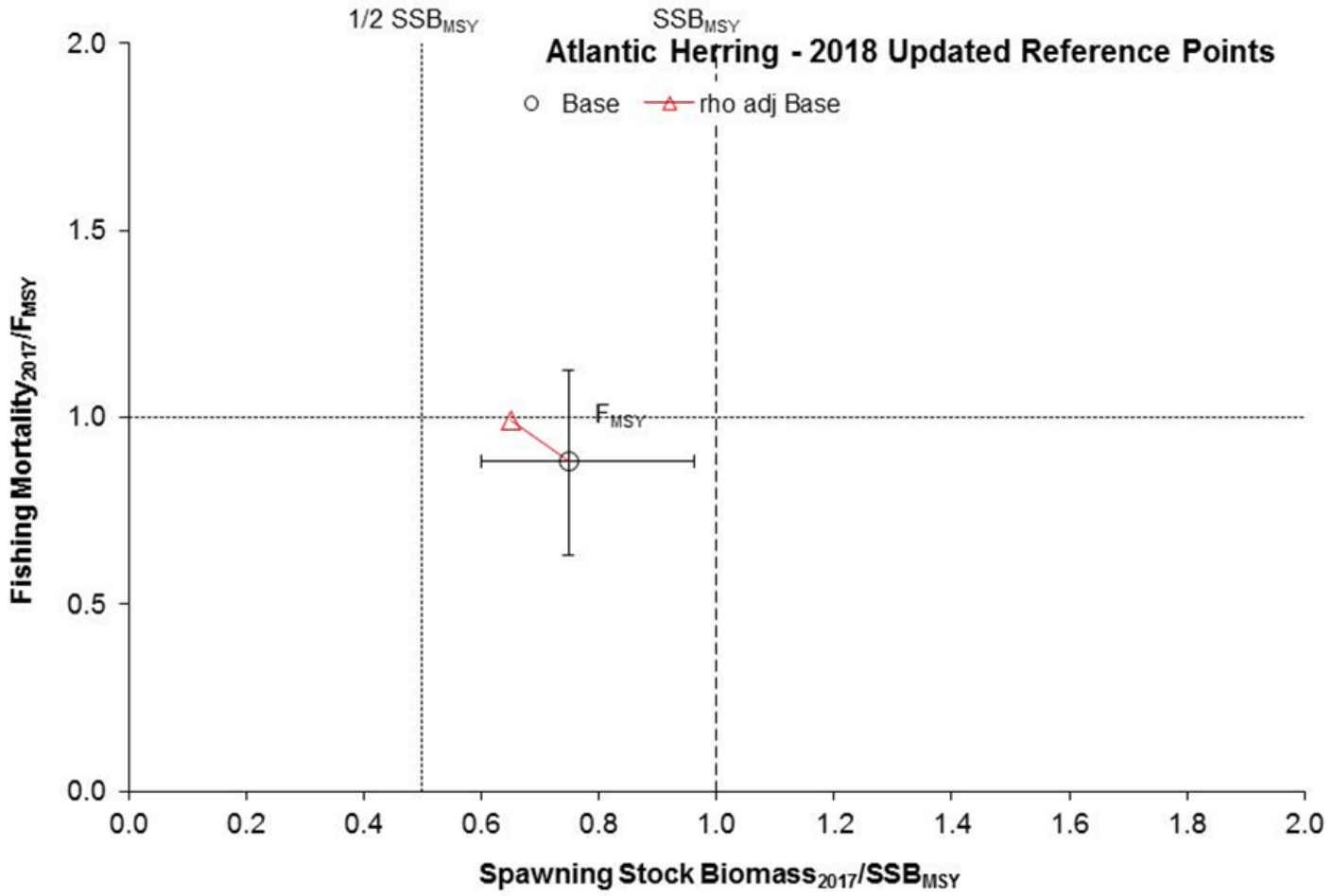
SSB high in the 60s
declined in the 80s
up slightly in the 90s
Then declined again
SSB_{2017} = 141,000 mt



F was high in 70s – 80s
declined in mid 1990s
F_{2017} = 0.45



Herring Stock Status



Proxy reference points calculated as $F_{40\%}$ = 0.51, B_{target} proxy = 189,000 mt
$B_{Threshold}$ proxy = ½ $B_{40\%}$ = 94,500 mt
In 2017, stock not overfished and overfishing not occurring

Questions?

Atlantic Herring Spawning

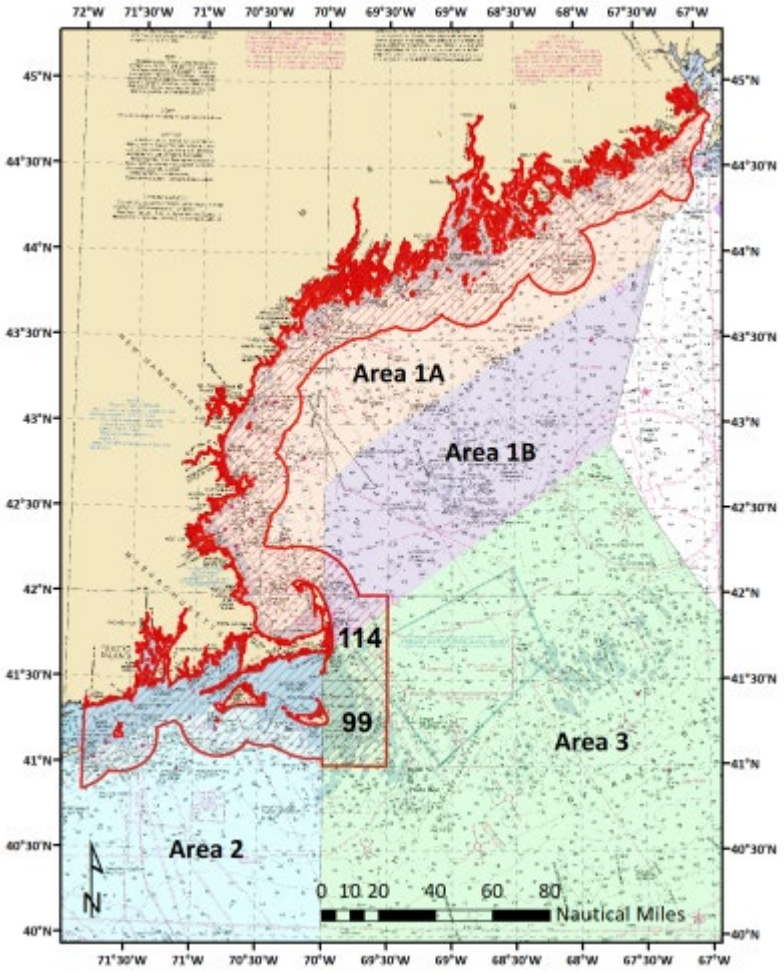
Atlantic Herring Management Board
October 22, 2018

Background

- In August, Board asked staff to review protections provided to spawning herring
  - Prompted by results of 2018 Stock Assessment
- Memo focuses on:
  - Existing GOM spawning closure protocol to assess adequacy of current protections
  - Considerations regarding spawning aggregations in Georges Banks (GBK) and Nantucket Shoals (NS); intended to inform preliminary discussions

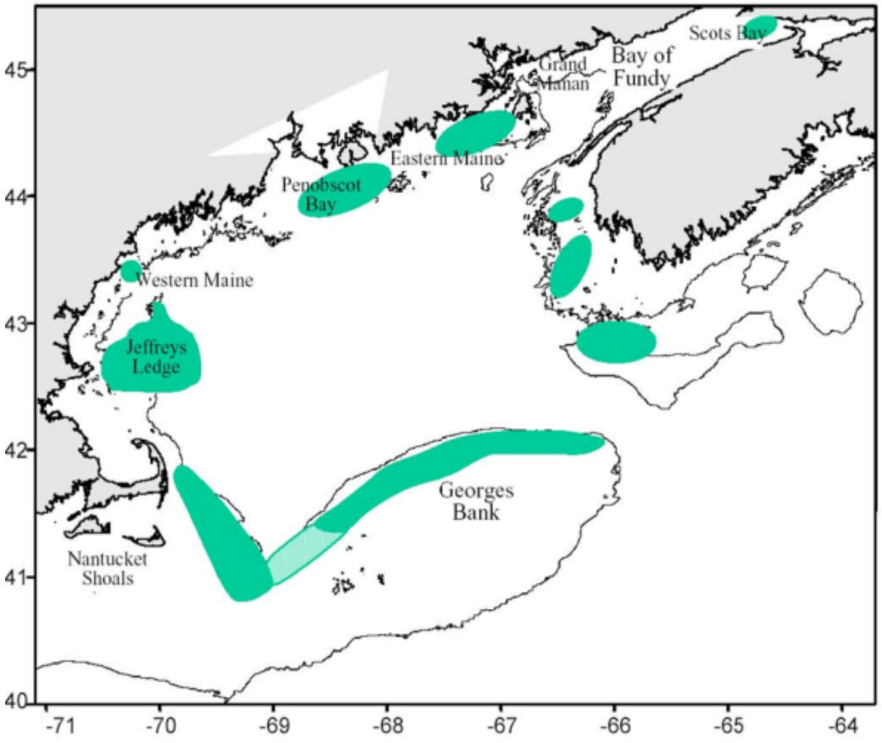
Recent NEFMC Action

- NEFMC Amendment 8
  - 12 nm buffer in management areas 1A, 1B, 2 (east of 71º, 51º W), and 3 which prohibits use of MWT year-round
  - Buffer extended by two 30 minute squares along Cape Cod



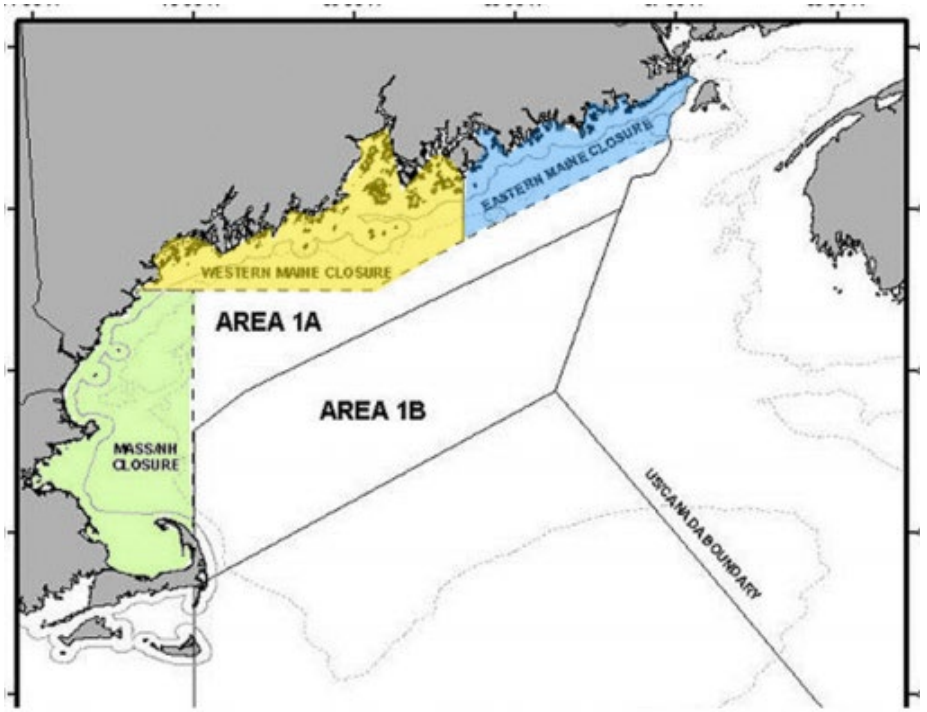
Spawning Locations & Protections

Primary spawning locations



Overholtz et al. 2004

Current GOM spawning closures



GOM Spawning Closures & Amendment 3

1. Monitoring System
2. Trigger Value
3. Closure Period
4. Closure Area Boundaries

1. Monitoring System

- Amendment 3 adopted GSI_{30} spawning protocol
- January TC memo compared performance of GSI_{30} protocol vs. length-based system
  - 2015 MA/NH spawning closure was initiated nearly 2 weeks early using length-based protocol, requiring use of 2 week re-closure
  - If GSI_{30} had been used in 2015, MA/NH spawning closure would have started 3 days after spawning likely without need for re-closure
- GSI_{30} better able to predict inter-annual changes in timing of spawning

2. Trigger Value

- Amendment 3 implemented a trigger value of 25
  - Higher trigger value closes fishery later, just before spawning
  - Lower trigger value encompasses more time before spawning
  - Values in Amendment 3 ranged from 23-28
- January TC memo evaluated effectiveness of trigger value
  - From 2015-2017, current trigger value (25) resulted in a spawning closure that started within a few days of when the population reached 25% spawning
- Question for Board to consider is whether initiating a closure when ~25% of population is spawning is appropriate
  - TC noted reducing trigger value to 23 or 24 would reduce probability of greater than 25% spawning fish in catch; however a lower trigger value will require an earlier default date and may require frequent re-closures under existing 4 week closure

3. Closure Period

- Amendment 3 established a 4 week spawning closure with ability to re-close for 2 additional weeks
  - Amendment 3 also had option for an initial 6 week closure
- January TC memo showed that between 2015-2017, spawning seasons in MA/NH were 4 weeks, 2.3 weeks, and 4.9 weeks
  - Greater confidence in longer spawning seasons due to limited sampling in 2016
  - Spawning season defined by 25% spawners in fishery; if Board wants to define start of spawning season at lower percentage, this would increase the length of spawning season
- TC concluded use of 4 week spawning closure would likely result in frequent use of re-closure
  - 6 week initial closure could increase spawning protection, simplify protocol, and provide greater predictability

4. Area Boundaries

- Amendment 3 considered combining WM and MA/NH spawning areas into a single unit given no difference in predicted spawning times
  - Board decided to maintain distinct spawning areas given concerns a wide-spread closure could impact bait availability
- Slight differences in timing of WM and MA/NH closures in 2016, 2017

	WM	MA/NH
2016	September 18th	October 2nd
2017	September 26th	October 1st

Considerations for GBK/NS

1. Availability of Samples
2. Size and Location of Closure

1. Availability of Samples

- Current GSI_{30} protocol requires samples to annually inform relationship between GSI and maturity
- While long-term use of closures has prompted sampling in GOM, significantly fewer samples have been collected in GBK/NS
  - The spatial and seasonal spawning patterns of GBK/NS are less well known
- Note: ability to collect samples from all regions may be impacted by reductions in ACL

2. Size and Location of Closure

- GBK spawning area encompasses northern edge of Bank
  - Spawning throughout the region may not occur at the same time
- Ideally, spawning closures maximize protection to herring population while minimizing economic impacts
  - Multiple, discrete closures can account for spatial/temporal differences in spawning but require more samples
  - A single, large closure requires fewer samples but likely results in a longer closure to encompass asynchronous spawning and may have greater impacts on industry

Summary

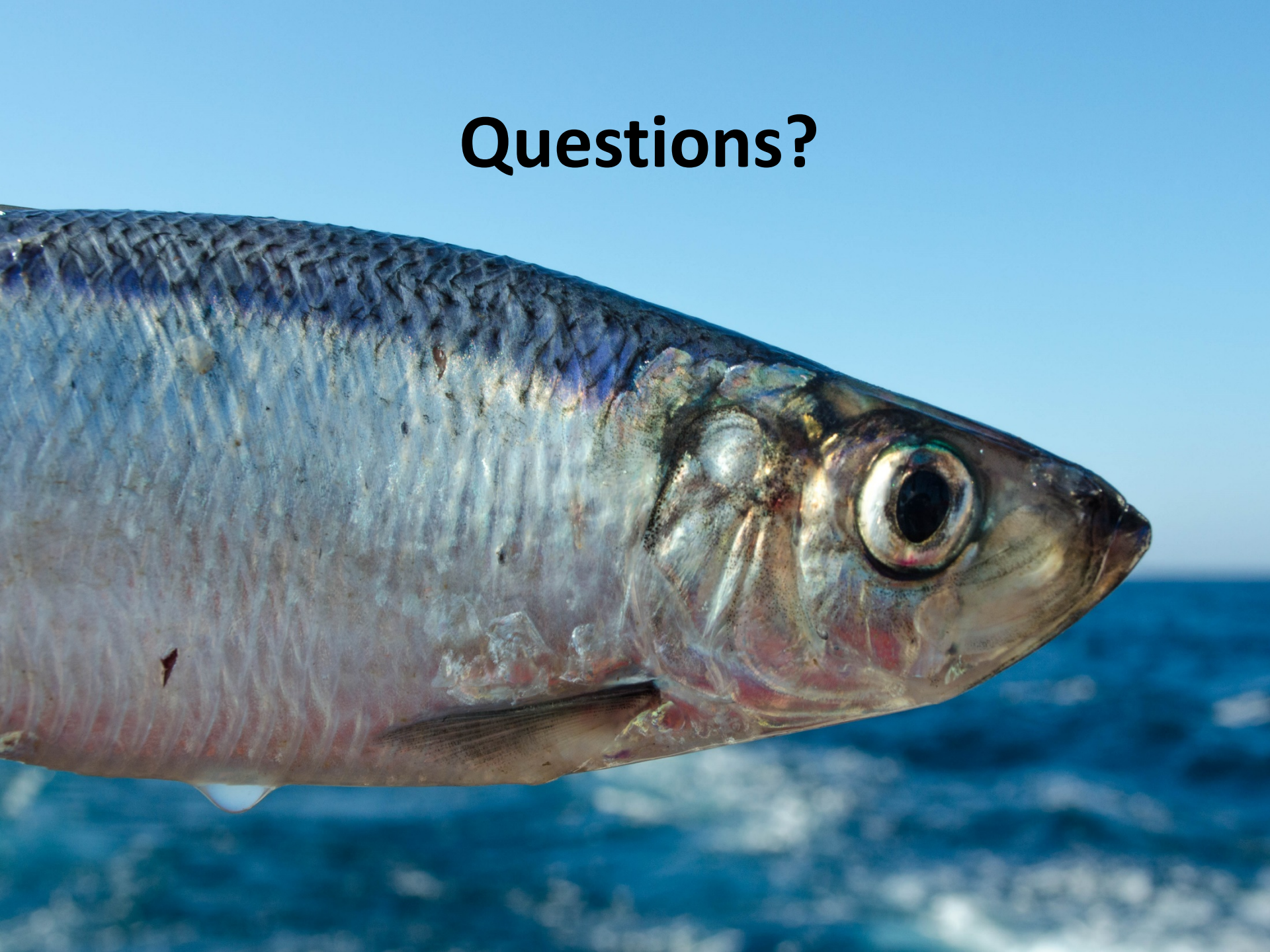
Gulf of Maine

- GSI_{30} protocol represents a significant improvement over length-based system
- May be opportunities to strengthen protections to spawning herring (trigger value, closure period)

Georges Bank/Nantucket Shoals

- Fewer samples collected to-date so uncertainty about spatial/temporal patterns in spawning
- Important to consider size of closure, sampling needs, and impacts to industry

Questions?

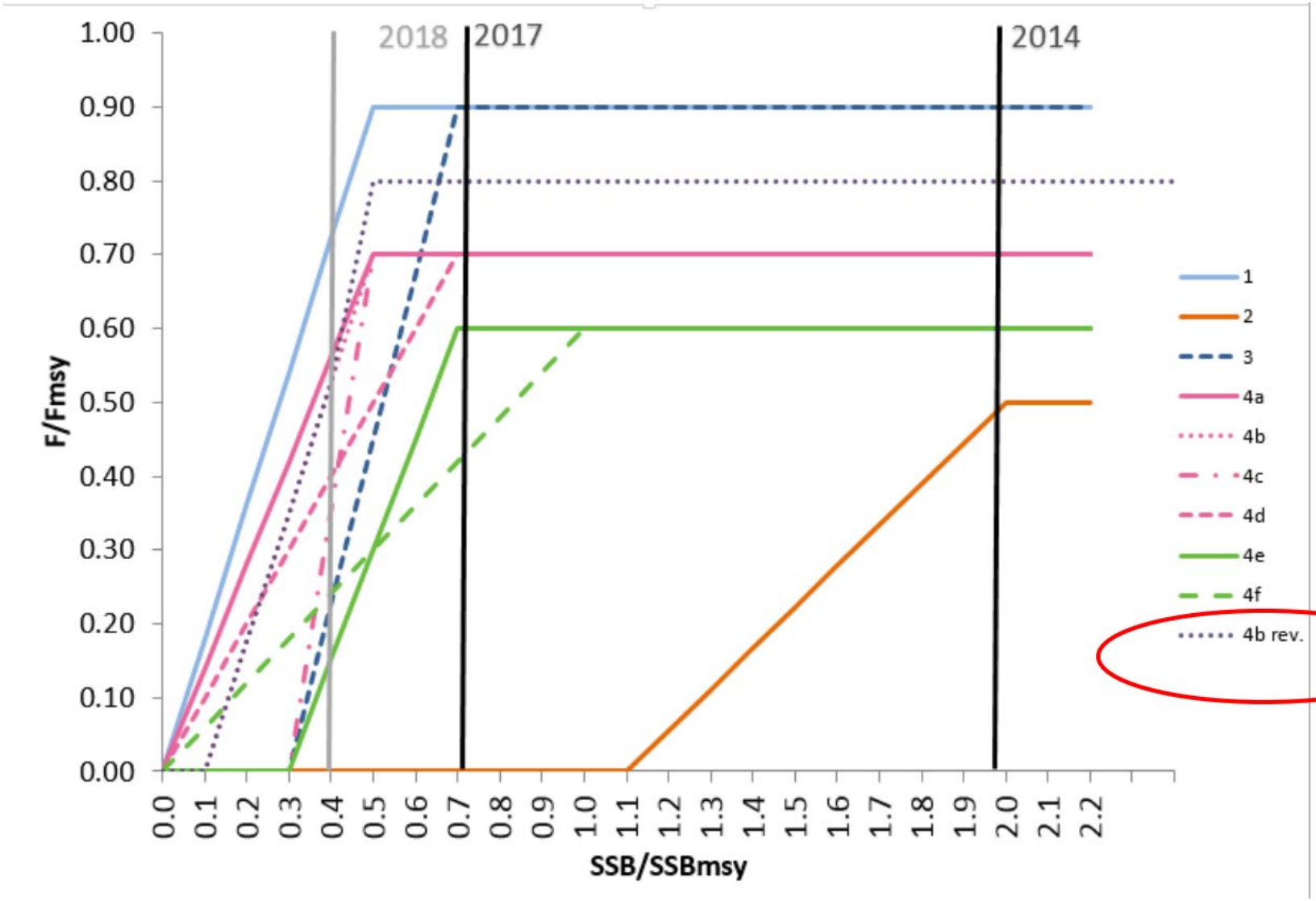


2019-2021 Atlantic Herring Specs

Atlantic Herring Management Board

October 22, 2018

NEFMC Harvest Control Rule



2019-2021 Specs

- Originally 2019 was expected to be the start of a new three-year specification package
  - NMFS review and consider implementation of Amendment 8 in spring 2019
  - NMFS implementation of spec package in summer 2019
- Original timeframe is of concern given 2019 catch limits are expected to be reduced due to stock status
  - If we roll over of 2018 catch levels into the start of 2019, probability of overfishing/overfished too high

2019 In-Season Action

- NEFMC has recommended that NOAA fisheries develop an in-season action to set 2019 catch limits
  - 2020 would be the start of the next specification package
- NEFMC provided guidance to NOAA Fisheries on 2019 in-season action
  - Use harvest control rule selected in Amendment 8
  - Proportionally reduce FGSA
  - Set Border Transfer to zero
  - Maintain sub-ACLs proportions from last specification package (Area 1A = 28.9%; Area 1B = 4.3%, Area 2 = 27.8%, Area 3 = 39%)
- NOAA Fisheries expected to publish proposed rule-making ahead of December NEFMC meeting

Oct. SSC Meeting

- SSC met on October 10th to consider Atlantic herring OFL and ABCs

	2019	2020	2021
OFL (mt)	30,668	38,878	38,878
ABC (mt)	21,266	16,131	16,131

- NEFMC will review the SSC Report and then it will be forwarded to NOAA
- SSC recommendation for NEFMC to request an operational stock assessment update in 2020

Questions?

2019 Area 1A Specifications

Atlantic Herring Management Board

October 22, 2018

What we would typically do…

- Motion to approve 2019-2021 Atlantic Herring Specifications as recommended by NEFMC
- Motion to allocate the 2019 Area 1A sub-ACL seasonally with 72.8% available June – September and 27.2% allocated from October-December. The fishery will close with 92% of the seasonal period quota has been harvested and underages from June – September may be rolled into the October – December period.

What we would typically do…

Address at future meeting when we have 2019 specs from NOAA

- Motion to approve 2019-2021 Atlantic Herring Specifications as recommended by NEFMC
- Motion to allocate the 2019 Area 1A sub-ACL seasonally with 72.8% available June – September and 27.2% allocated from October-December. The fishery will close with 92% of the seasonal period quota has been harvested and underages from June – September may be rolled into the October – December period.

Area 1A Quota Periods

- Per Amendment 3, Board can consider distributing the Area 1A sub-ACL using bi-monthly, trimester, or seasonal quota periods to meet the needs of the fishery
- The Board can also decide whether quota from January 1 – May 31 will be allocated to later in the fishing season
- Recently, Board has allocated the Area 1A sub-ACL:
  - 0% from January 1 – May 31
  - 72.8% from June 1 – September 30
  - 27.2% from October 1 – December 31

Area 1A Quota Periods

Bi-Monthly Quotas								
January – December			No Landings Prior to June 1 (with June as a one-month period)			No Landings Prior to June 1 (with December as a one-month period)		
Period	Months	%	Period	Months	%	Period	Months	%
1	Jan/Feb	1.5%	1	June	16.4%	1	June/July	36.8%
2	Mar/Apr	2.3%	2	July/Aug	40.1%	2	Aug/Sep	36.0%
3	May/June	24.0%	3	Sep/Oct	34.0%	3	Oct/Nov	27.1%
4	July/Aug	34.6%	4	Nov/Dec	9.5%	4	Dec	0.2%
5	Sep/Oct	29.4%						
6	Nov/Dec	8.2%						

Trimesters			Seasonal Quotas					
January – December			January - December			No Landings Prior to June 1		
Trimester	Months	%	Season	Months	%	Season	Season	%
1	Jan - May	13.7%	1	Jan - Sep	76.5%	1	Jun - Sep	72.8%
2	Jun - Sept	62.8%	2	Oct - Dec	23.5%	2	Oct - Dec	27.2%
3	Oct - Dec	23.5%						

*These allocation %'s are fixed and can only be changed through an addendum