Implementation of Atlantic Sea Scallop Reference Points

SSC Meeting
August 19, 2025
Boston, MA

New England
Fishery Management Council

Presentation Plan

- Dr. Dvora Hart – NEFSC Population Dynamics Branch
  - 2025 Scallop Research Track Assessment
  - Calculation of the F_{ABC}
  - Spatial explicit estimation of natural mortality in the Mid-Atlantic

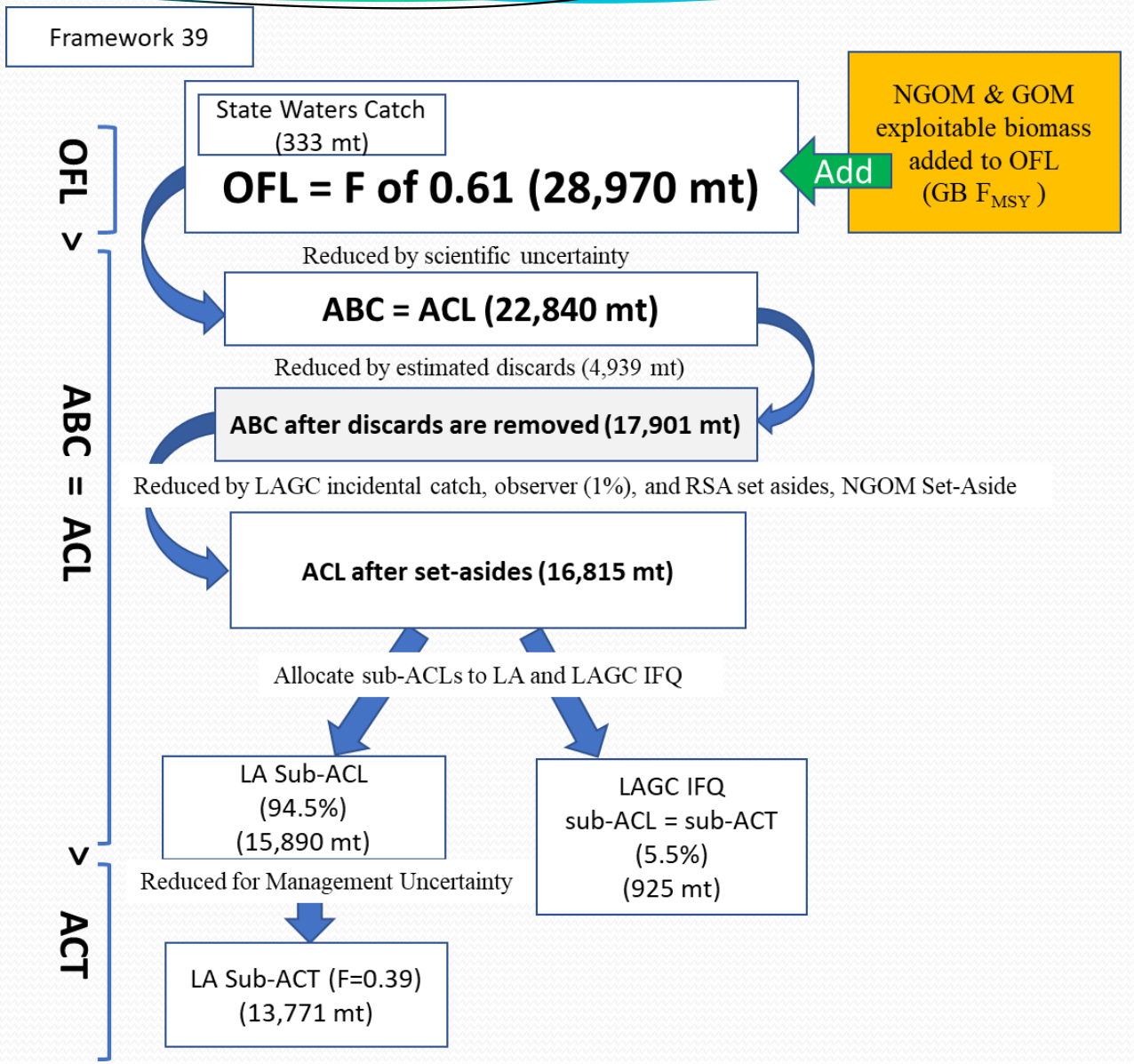
- **Connor Buckley – Scallop Plan Coordinator**
  - **Scallop PDT input on the use of Scallop biological reference points for management**

Overview

- At the Council's request, the NRCC accepted a proposed change to the Research Track assessment's Terms of Reference to provide status determination for the scallop stock to inform immediate management actions
- Research Track assessment passed peer review in April 2025, with ToR 5 (Status Determination) considered partially met
- While the Peer Review panel accepted the updated reference points as appropriate for providing management advice, they also outlined several concerns:
  1. **Mid-Atlantic F_{MSY} is not well defined**
  2. **Due to substantial regional variation in environmental conditions, natural mortality, growth, and fishing mortality, the use of a combined reference point for the stock (Georges Bank + Mid-Atlantic) risks not identifying overfishing occurring on Georges Bank.**

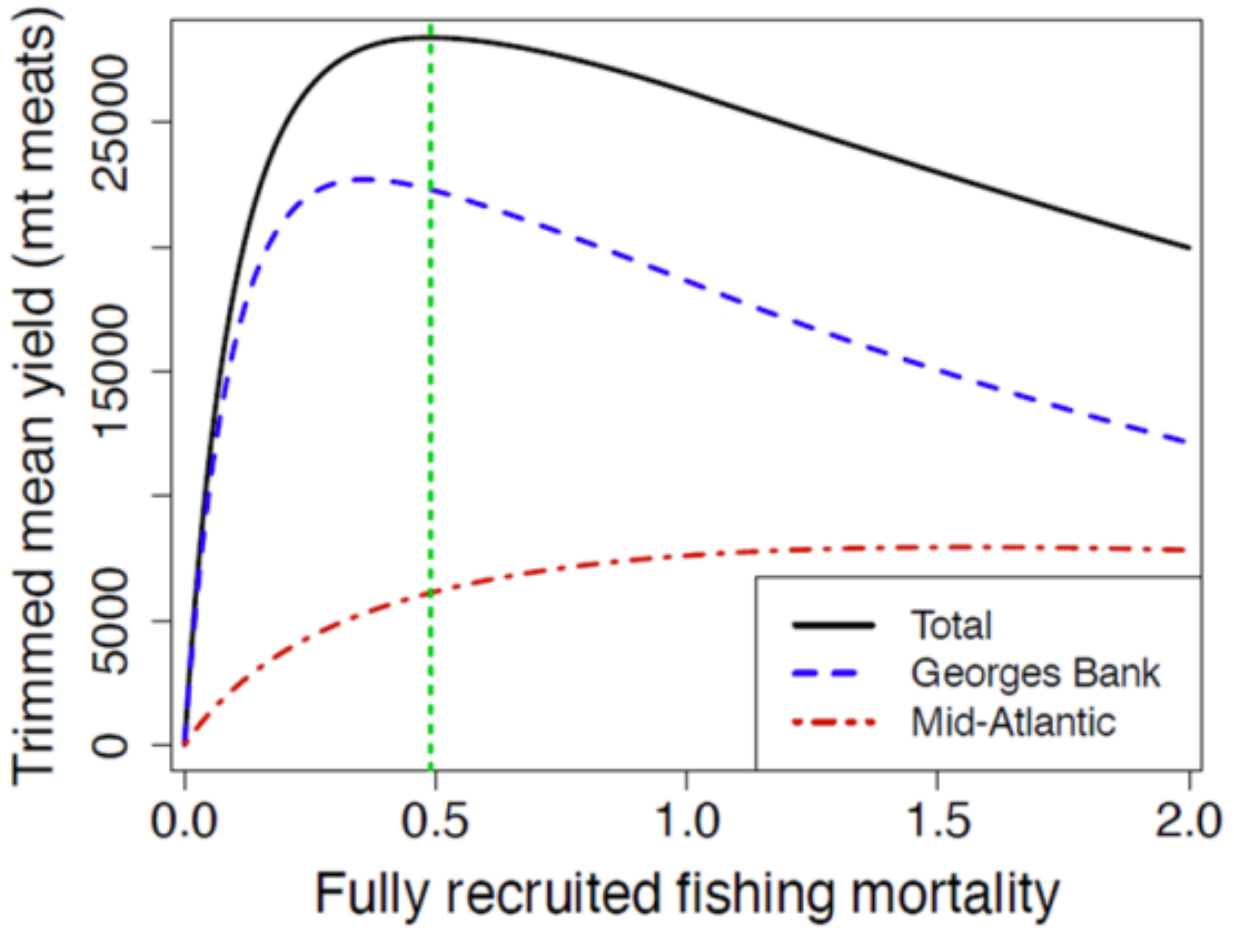
ACL Flowchart

- OFL = F_{MSY}
- ABC control rule – F_{ABC}, defined as the 75% probability of remaining below the true F_{MSY}. Risk is evaluated in terms the probability of overfishing compared to the fraction loss of yield.
- **The fishery has not exceeded ABC/ACL under A15 control rule**
- **Stock status: Not overfished and overfishing not occurring**



Mid-Atlantic yield curve

- Mid-Atlantic F_{MSY} is not well defined and presents a high level of uncertainty.
- Flat yield curve reflects the biology of Mid-Atlantic scallops, with high *k* and low L_{∞}.
- Because natural mortality is exceeding growth at sizes > 100mm, the YPR model tends to support high fishing mortality rates.
- Fishing at F=1.56 would remove ~65% of fully-recruited scallops annually.



Review Panel comments

- The Review Panel was concerned about the reliability of the combined region [Mid-Atlantic and Georges Bank] reference point.
- Catch-at-Size Analysis (CASA) model needed different spatial regions to fully represent the range of dynamics present throughout the stock range. The different modelling regions appear to be experiencing substantially different environmental conditions, different rates and temporal patterns of natural mortality, growth, and recent patterns of exploitation.
- Reference points are region-specific, and combining them, although done in a mathematically correct way, introduces additional and unquantified risk. For example, a single reference point based on the entire region risks not identifying overfishing that could be occurring in Georges Bank. The Review Panel questioned whether a single reference point for the entire region is appropriate.

Region	MSY (mt)	F_{MSY}	F_{ABC}	B_{MSY} (mt)	½ B_{MSY} (mt)	B_{2023} (mt)	F_{2023}
Mid-Atlantic	7,941	1.56	1.24	15,909		20,556	0.06
Georges Bank	22,706	0.36	0.29	83,414		49,400	0.47
Combined	28,402	0.49	0.36	93,282	46,641	69,596	0.33

Recent stock reference points

	Definition in Scallop FMP	SARC 50 (2010)	SARC 59 (2014)	SARC 65 (2018)	2020 Management Track	2024 Research Track
OFL	F_{MSY}	F=0.38	F=0.48	F=0.64	F=0.61	F=0.49
ABC=ACL	25% probability of exceeding the OFL	F=0.32	F=0.38	F=0.51	F=0.45	F=0.36
B_{MSY}	B_{TARGET}	125,358 mt	96,480 mt	116,766 mt	102,657 mt	93,282 mt
½ B_{MSY}	$B_{THRESHOLD}$	62,679 mt	48,240 mt	58,383 mt	51,329 mt	46,641 mt
MSY		24,975 mt	23,798 mt	46,531 mt	32,079 mt	28,402 mt
Overfished?	$B < B_{THRESHOLD}$	No	No	No	No	No
Overfishing?	$F < F_{THRESHOLD}=F_{MSY}$	No	No	No	No	No*

Options for setting reference points

1. Use combined F_{ABC} (F=0.36) in calculating the ABC for FY2026 and FY2027
   - Default approach of ABC control rule
   - Could recommend DAS that keep GB-Open F <= 0.36, or <= 0.29.

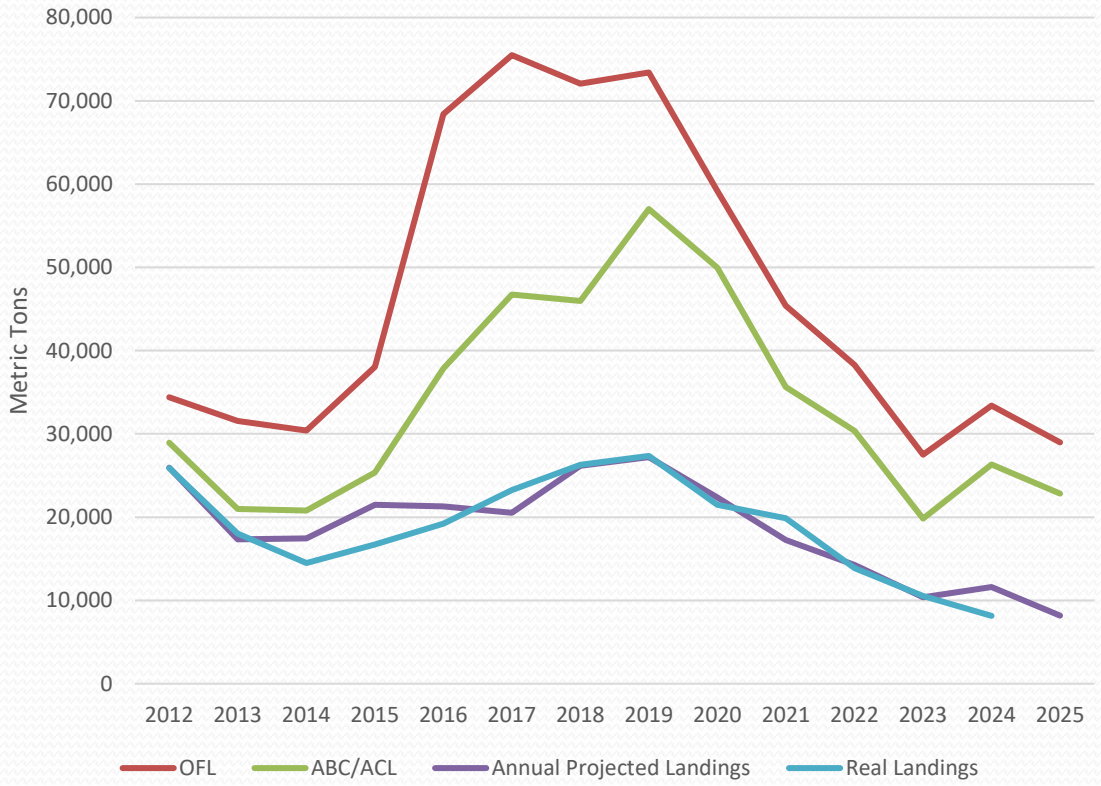
   - Keep legal limits the same and recommend reduced DAS/fishery allocations.
   - Questionable utility of legal catch limits for preventing overfishing on Georges Bank

2. Use GB F_{MSY} (F=0.36) and F_{ABC} (F=0.29) in calculating the ABC for FY2026 and FY2027
   - Ensures legal limits would cap fishing effort below GB F_{MSY}

3. Use combined F_{MSY} (F=0.49) but modify p* to calculate an F_{ABC}
   - Currently, ABC = catch associated with an F rate that has a 25% chance of exceeding the OFL.

   - Modification to the application of ABC control rule to increase the buffer between the OFL and ABC.
   - Would likely require an Amendment – not possible before FY 2026.

PDT Considerations and Questions



- The PDT felt caution was warranted given the high level of uncertainty associated with the Mid-Atlantic F_{MSY} and the consequences that could have on Georges Bank.
- The PDT also notes that scallop fishery allocations are set well below the OFL/ABC, and that the legal limits do not typically constrain fishing effort.
- Are the reference points appropriate for use in management to set scallop fishery specifications?
- How should we be considering the elevated uncertainty associated with the combined reference point when setting FY 2026 specifications?

SSC input on Stock Reference Points

TERMS OF REFERENCE

A. Consider the results of the 2025 research track assessment for Atlantic sea scallops and information provided by the Council's Scallop Plan Development Team (PDT) on developing specifications considering biological reference points.

B. Provide recommendations related to fishing mortality reference points and targets for developing specifications for fishing year (FY) 2026 and default FY 2027. The SSC will review catch specification methods when recommending overfishing limits (OFL) and acceptable biological catch (ABC) at the October 2025 SSC meeting.

- The Scallop PDT considered several approaches to address concerns regarding the implementation of the combined reference points but does not offer a recommendation today. SSC input from today will guide the Scallop PDT's development of OFL/ABC estimates for FY 2026 and FY2027 that will be presented to the SSC in October.

Extra Slides

Recent Scallop Resource Trends

- **Abundance has increased**
  - Abundance increased between 2023 and 2024, driven by large recruitment events
  - 50% of total scallop biomass is currently too small to be captured by a commercial dredge (4 inches)
- **Shifted to Georges Bank**
  - In 2024, ~80% of landings came from Georges Bank
  - Georges Bank = 7.4 million scallops
  - Mid-Atlantic = 3.7 million scallops
- **Non-fishing mortality is increasing**
  - Increase in non-fishing (natural) mortality is thought to be driven by warming ocean temperatures and expanding ranges of known scallop predators, such as Jonah crabs and sea stars