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Sea Scallop Management Track Assessment Fall 2020

US DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Science Center
Woods Hole, Massachusetts
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This series represents a secondary level of scientific publishing. All issues employ thorough internal scientific review; some issues employ external scientific review. Reviews are transparent collegial reviews, not anonymous peer reviews. All issues may be cited in formal scientific communications.

Sea Scallop Management Track Assessment Fall 2020

by the Northeast Fisheries Science Center

NOAA Fisheries, Northeast Fisheries Science Center, 166 Water Street,
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Editorial Notes

Editorial Treatment: In the interest of expedited publication, this report has undergone a truncated version of the NEFSC Editorial Office's typical technical and copy editing procedure. Aside from the front and back matter included in this document, all writing and editing have been performed by the authors included on the title page.

Information Quality Act Compliance: In accordance with section 515 of Public Law 106-554, the Northeast Fisheries Science Center (NEFSC) completed both technical and policy reviews for this report. These pre-dissemination reviews are on file at the NEFSC Editorial Office.

Species Names: The NEFSC Editorial Office's policy on the use of species names in all technical communications is generally to follow the American Fisheries Society's lists of scientific and common names for fishes, mollusks, and decapod crustaceans and to follow the Society for Marine Mammalogy's guidance on scientific and common names for marine mammals. Exceptions to this policy occur when there are subsequent compelling revisions in the classifications of species, resulting in changes in the names of species.

Statistical Terms: The NEFSC Editorial Office's policy on the use of statistical terms in all technical communications is generally to follow the International Standards Organization's handbook of statistical methods.

2020 Management Track Peer Review Panel Report

Jean-Jacques Maguire[1] (chair), Richard Merrick[2], Patrick Sullivan[3] and Cate O'Keefe[4]

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Executive Summary:

Thirteen groundfish and one scallop stock assessments were scheduled to be reviewed in the Autumn 2020 Management Track process. The Assessment Oversight Panel (AOP) reviewed the assessment plans and recommended that three assessments be direct delivery (Level 1): Ocean pout, Atlantic halibut and Northern silver hake. Of the remaining eleven, six were expedited reviews (Level 2) and five were enhanced reviews (Level 3). The eleven assessments with expedited or enhanced peer review included in this report are: 1) Atlantic wolffish, 2) Acadian redfish, 3) Atlantic sea scallops, 4) Northern window pane flounder, 5) Southern window pane flounder, 6) Georges Bank winter flounder, 7) Gulf of Maine winter flounder, 8) Southern New England Mid-Atlantic winter flounder, 9) Northern red hake, 10) Southern red hake, 11) Southern silver hake / Offshore hake.

Peer Review Panel Report:

The Peer Review Panel (PRP) for the September 2020 Management Track Assessments met via webinar on September 14 - 18, 2020. Attendance at the meeting is provided in Appendix 2. The assessments were prepared under guidelines provided by the 2020 Assessment Oversight Panel (AOP). These guidelines provide a pathway for continuing development of previously accepted assessments for each species including incorporation of the most recent data and understanding of biology of the species being assessed.

We thank Russ Brown (Population Dynamics Branch Chief) and Michele Traver (Assessment Process Lead) for their support during the meeting. We thank the staff of the Population Dynamics Branch at NEFSC for the open and collaborative spirit with which they engaged the PRP. Our thanks extend not only to the analysts for each assessment, but also to the rapporteurs for taking extensive notes during the meeting and to staff of the New England Fishery Management Council, Atlantic States Marine Fisheries Commission, and NOAA Fisheries/Greater Atlantic Regional Fisheries Office who provide context and additional background. We also thank the other participants for helping make the meeting productive and collegial. Finally, the PRP thanks the staff at NEFSC for supporting the logistics during the meeting.

The PRP has suggestions for improvements that could be made for the next Management Track Assessments. With respect to information needs:

1. It is very helpful to have all background documents, information, and presentations available prior to the beginning of a stock's review. This should include the full AOP report and summary, documentation of the current assessment, documentation of the preceding assessment (including peer review reports and relevant SSC reports), the most recent benchmark research track assessment (if different from the preceding), a table of the stock's status and reference points, and at least a draft version of the Powerpoint presentations.
2. It would be useful if changes between the previous method(s) and the currently proposed method were documented in assessment summary reports. For example, the northern windowpane report did not document updated AIM model output, and the red hake reports did not document the results of the Red Hake Stock Structure Workshop (a "Research Track" exercise).

3. Assessment update reports should match the requirements laid out in the Management Track Assessment Terms of Reference. For example, the analyst should list and respond to any review panel or SSC concerns relevant to the most recent prior assessments.

With respect to process:

1. The Panel should be provided with a clear summary of what each Management Track review level allows.
2. The implications of going to a plan B should also be explained. To that end, the Panel is concerned that rejection of a Plan A assessment, and acceptance of the Plan B approach, obligates the analyst to continue to use the Plan B approach until a research track assessment can be completed. It may be more expedient to allow the analyst to retable an improved Plan A assessment for a Level 3 review at the next assessment cycle.
3. It should also be made clear that the Panel is not expected to provide ad hoc management advice, but is to focus on reviewing the assessment and its results.
4. The NEFSC should consider allowing analysts to be cited as authors of their assessments.
5. An appendix should be added to the Management Track Assessment Peer Review Panel Report that compiles all relevant AOP background information, specifically the summaries of each stock's management track assessment proposal to the AOP and the Summary of the AOP Meeting.

Finally, the missing 2020 spring and fall surveys will create problems in the next set of assessments. As such, the next PRP should be made aware that these missing data will need to be handled in appropriate ways. A table or table(s) documenting survey completeness for the previous ten years should be provided in the background documents.

Atlantic Sea Scallop

The 2020 assessment for Atlantic sea scallops is an enhanced review (Level 3) update of the 2018 benchmark assessment, as recommended by the Assessment Oversight Panel (AOP), because of a new approach to modeling selectivity in reference points. The 2020 assessment focused on the two models used to determine stock status: CASA and SYM. The forward projection model, SAMS, was not reviewed as part of this assessment The Peer Review Panel was asked to review the mechanics and assumptions behind the Atlantic sea scallop assessment procedure, which employs the CASA model, in preparation for conducting 1) the stock assessment, 2) providing reference point estimates and 3) evaluating stock status. The responses to the Terms of Reference given below focusses on this element of the review. The last Benchmark review occurred in 2018 (SARC 65) at which time the stock was considered not overfished and overfishing was not occurring.

The Peer Review Panel concludes that the 2020 assessment update for Atlantic sea scallop is technically sufficient to evaluate stock status and provide scientific advice. The assessment represents Best Scientific Information Available for this stock for management purposes. The Peer Review Panel concludes that Atlantic sea scallops are not overfished and overfishing is not occurring.

Sea Scallop Terms of Reference (TOR)

1. *Estimate catch from all sources including landings and discards.*

   This TOR was satisfactorily addressed. Catch landings and discard data were provided by region. Landings are near record high levels.

2. *Evaluate indices used in the assessment (e.g., indices of relative or absolute abundance, recruitment, state surveys, age-length data, etc.).*

   This TOR was satisfactorily addressed. Sea scallop surveys included the dredge survey, the drop camera survey, which uses both video and digital still cameras, and the Habcam still camera survey. Neither the Habcam nor the drop camera surveys were fully completed on Georges Bank in 2019. Information from the two camera surveys was combined to cover all management areas. Indices from the three survey approaches track each other well although the Habcam survey was more sensitive to tracking the strong recruitment pulses representing the 2012 year class in Georges Bank and the 2013 year class in the Mid-Atlantic. The high recruitments were followed by high natural mortality in the recruiting year class that may be density dependent.

3. *Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) as possible (depending on the assessment method) for the time series using the approved assessment method and estimate their uncertainty. Include retrospective analyses if possible (both historical and*

within-model) to allow a comparison with previous assessment results and projections, and to examine model fit.

   a. *Include bridge runs to sequentially document each change from the previously accepted model to the updated model proposed for this peer review.*
   b. *Prepare a "Plan B" assessment that would serve as an alternate approach to providing scientific advice to management if the analytical assessment were to not pass review*

This TOR was satisfactorily addressed. The CASA model, a size-based forward projection model, has been used since 2007. Growth was adjusted for observed slower growth in recent years and fishery selectivity periods for 2018 and 2019 were added to the Georges Bank Closed area model but no major structural changes were made to the CASA model. Current model output was compared to that from the 2018 benchmark assessment and the two assessments track each other well until the most recent years when the strong recruitment pulses followed by a period of high natural mortality on those recruits leads to an apparent and reasonably explainable retrospective pattern. Time varying natural mortality rates are estimated by the model using information from closed areas and sublegal elements of the population that provide information on natural mortality through observed declines in population density when no fishing mortality is present.

A Plan B assessment was not considered necessary as the assessment procedure was approved.

4. *Re-estimate or update the BRP's as defined by the management track level and recommend stock status. Also, provide qualitative descriptions of stock status based on simple indicators/metrics (e.g., age- and size-structure, temporal trends in population size or recruitment indices, etc.).*

   The Stochastic Yield Model (SYM) was used for estimating the Biological Reference Points for Georges Bank and the Mid-Atlantic and combined whole stock. SYM combines per-recruit calculations with stock-recruit relationships to obtain probabilistic MSY-based reference point estimates. The assumed standard deviation of natural mortality in the SYM model was reduced for model runs this cycle. This had very little effect on the reference points but helped to stabilize the model. The revised Biological Reference Point estimates are: F_{MSY} = 0.61 and B_{MSY} = 102,657 mt meats. This compares to F_{MSY} = 0.64 and B_{MSY} = 116,766 mt meats from the 2018 assessment. The stock is not overfished and overfishing is not occurring.

5. *Conduct short-term stock projections when appropriate.*

   No short-term projections were provided. Projections are prepared through a separate process by the scallop PDT as a direct delivery to the SSC using the current year's survey data. The 2020 survey data updates are not yet available.

6. *Respond to any review panel comments or SSC concerns from the most recent prior research or management track assessment.*

   Research Recommendations from 2018 Benchmark

1. Further investigate methods for better survey coordination between the various survey programs, including survey design, timing, and standardized data formatting for easier sharing

The NEFMC is organizing a committee to facilitate coordination.

2. Investigate changes in dredge efficiency and saturation due to high scallop densities or high bycatch rates

No substantial progress has been made beyond that presented in the 2018 assessment. However, the issue has become less acute as densities have declined.

3. Analyze past juvenile scallop mortality events and develop better methods to model time-varying mortality in the assessment models

Some progress has been made – see the CASA models from this assessment.

4. Collect information needed for the management of the GOM fishery and development of appropriate reference points including biological parameters, fishery-independent surveys, and fishery-dependent data.

Survey and growth data are being collected from the GOM. However, it is difficult to estimate reference points due to the lack of a time series in the area.

5. Continue development of scallop ageing methods and examination of scallop growth processes including density dependent effects.

An RSA funded project is underway towards these goals.

6. Improve training of annotators used in optical surveys and develop standardized QA/QC procedures for data collected from imagery.

New QA/QC procedures are being developed for the NEFSC Habcam survey, and should be ready for implementation in 2021.

7. Investigate use of software for automated annotation of imagery from optical surveys.

Work towards this goal is underway; see https://www.fisheries.noaa.gov/feature-story/computers-now-see-animals-ocean-bottom

8. Investigate methods to better estimating biomass and abundance variances from Habcam optical surveys including development of Bayesian geostatistical methods.

A Bayesian geostatistical model is being developed.

9. Investigate and estimate current and historical unreported landings and effects of spatially heterogeneous fishing mortality on mortality estimates.

No progress has been made.

10. Develop a spatially-explicit methodology for forecasting the abundance and distribution of sea scallops by incorporating spatial data from surveys, landings, and fleet effort (aka GEOSAMS).

No progress has been made, although there are plans to develop a GEOSAMS model in the coming year.

11. Investigate and parameterize sub-lethal effects of disease, parasites, or discarding on mortality, growth, and landings.

There are ongoing projects investigating gray meats and nematode infections.

12. Revive and streamline previously-developed methods for interpreting VMS data.

No progress

13. Further refine and test methods for forecasting LPUE.

Some progress has been made developing spatial choice models for scallop fishermen, which would affect LPUE forecasts.

14. Continued investigation of discard mortality, particularly during warm water periods, by incorporating environmental data.

No progress.

15. Continue improvements of observer recordings for vessel fishing behavior including deck loading and shucking dynamics in responses to disease or poor scallop health.

Observer protocols were modified a few years ago to better track scallop health and meat condition.

16. Continue investigating the extent of incidental fishing mortality, particularly on hard bottom habitats.

No progress.

Research Recommendations from the SSC

1. Different growth rates found in different scallop harvesting areas, particularly the Nantucket Lightship region.

Shells have been collected from this area and aged. Analysis is in progress.

2. Further work to develop gonad-based estimates of SSB and reference points

No progress.

3. Runs of previous assessment model configurations to compare to new version of assessment.

No progress, although we routinely present an historical retrospective, which compares current and previous assessment models.

Assessment update for Atlantic sea scallops for 2020

This assessment of the Atlantic sea scallop (Placopecten magellanicus) stock is a management track assessment updating the existing 2018 benchmark assessment (NEFSC 2018). Based on the previous assessment, the stock was not overfished and overfishing was not occurring. This assessment updates commercial fishery catch data, research survey indices of abundance, survey and commercial length compositions, and CASA and SYM model estimates through 2019. In addition reference points using the SYM model were updated using the SARC-65 approach as well as a new method that couples selectivity to fishing mortality. No projections were made; these will be developed in the fall after the 2020 surveys have been completed.

State of Stock: Based on this updated assessment, the Atlantic sea scallop (*Placopecten magellanicus*) stock is not overfished and overfishing is not occurring (Figures 1-2). Retrospective adjustments were not made to the model results. Spawning stock biomass (SSB) in 2019 was estimated to be 147,073 t meats, which is 143% of the biomass target (B_{MSY} =102,657 t meats; Figure 2). The 2019 fully selected fishing mortality was estimated to be 0.34, which is 56% of the overfishing threshold ($F_{\mathrm{MSY}} = 0.61$; Figure 1).

Table 1. Catch and status table for Atlantic sea scallops by region: Mid-Atlantic (MA), Georges Bank (GB) and Gulf of Maine (GOM). Southern New England was included as part of Georges Bank. Nantucket Lightship deep water scallops (NLSDS) were not included in the models or in the totals. All weights are in units of (metric) tons meats.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Data										
Land MA	19532	17741	11583	6221	9442	10501	13470	15324	9857	10315
Land GB	6169	8644	13875	11935	5513	5315	4329	7158	15905	16681
Land GOM	185	256	428	502	388	391	640	976	681	651
Disc MA	730	536	278	157	70	562	2074	931	366	369
Disc GB	717	555	890	362	240	202	116	482	1102	835
Disc GOM	3	2	0	6	9	2	6	34	1	1
Model										
SSB Tot	131781	122560	113215	108533	132925	175263	188878	193441	173494	147073
SSB NLSDS						54898	65305	76967	39940	65561
SSB/B_{MSY}	1.28	1.19	1.10	1.06	1.29	1.71	1.84	1.88	1.69	1.43
F Overall	0.34	0.34	0.40	0.35	0.25	0.26	0.23	0.23	0.23	0.34
F/F_{MSY}	0.56	0.56	0.65	0.57	0.41	0.42	0.38	0.37	0.37	0.56

Table 2. Comparison of reference points estimated from the 2018 benchmark, from the current assessment update using the same methods, and using the variable selectivity SYM model.

	2018	2020	Variable selectivity
F_{MSY}	0.64	0.61	0.55
F_{ACL}	0.51	0.45	0.45
B_{MSY}	116,766	102,657	101,227
Overfishing	No	No	No
Overfished	No	No	No

Special Comments:

- What are the most important sources of uncertainty in this stock assessment? Explain, and describe qualitatively how they affect the assessment results such as estimates of biomass, F, and recruitment?

  Natural mortality and growth, and their spatio-temporal variability. For reference points, recruitment, and in particular the weight put on large recruitment events by the SYM model, as well as the selectivity assumptions. In particular, portions of the very large 2012 year class in Georges Bank (mainly in Nantucket Lightship Closed Area) has been growing relatively slowly. The reference point calculations are based on growth in the most recent period. It is not clear whether the slower growth is only a particularity of this year class, or will persist. Previously, there had been a trend towards faster growth. Although not as striking, there are similar issues in the Mid-Atlantic with respect to its very strong 2013 year class.

- Does this assessment model have a retrospective pattern? If so, is the pattern minor, or major? A major retrospective pattern occurs when the adjusted SSB or F_{Full} lies outside of the approximate joint confidence region for SSB and F_{Full}.

  Minor to moderate retrospective. In the three regional models, Mohn's ρ ranged from 0.23 to 0.33 for SSB and from -0.03 to 0.41 for F_{Full}. The largest ρ occurred for the Georges Bank open region. Part of the retrospective on Georges Bank is related to the elevated natural mortality rates for juveniles in the open area and adults in the closed area in certain years. No retrospective adjustments were made.

- Describe any changes that were made to the current stock assessment, beyond incorporating additional years of data and the effect these changes had on the assessment and stock status.

  Changes were made in growth for the most recent years, adjusting to the observed slower growth, which is at least in part due to the large year classes. Fishery selectivity periods for 2018 and 2019 for Georges Bank Closed were added to account for the large landings of intermediate-sized scallops in the Nantucket Lightship West area. The assumed standard deviation of natural mortality in the SYM reference point model was reduced, which had very little effect on the reference points but helps stabilize the model.

- Provide qualitative statements describing the condition of the stock that relate to stock status.

  Stock biomass has been declining since its time series peak in 2017 as the dominant 2012 and 2013 year classes are reduced due to both fishing and natural mortality. Poor recent recruitment and anomalously high mortality in the Nantucket Lightship West area are contributing to the decline. Nonetheless, the stock remains above B_{MSY} and fishing mortality is well below F_{MSY}.

- Indicate what data or studies are currently lacking and which would be needed most to improve this stock assessment in the future.

  Better quantification of growth, especially in recent years. Work in this regard is underway, including an inter-reader comparison that will evaluate the precision of ageing among readers.

- Are there other important issues?

  A novel approach to calculating reference points was explored. Standard methods assume that fishing mortality F and fishery selectivity are separable, that is, changes in fishing mortality do not affect selectivity. Evidence, however, indicates that in the sea scallop fishery (and likely many others), selectivity is shifted towards smaller scallops when F increases. Varying selectivity by F in the SYM reference point model resulted in lower predicted yields at very low and high Fs, and hence a more distinct peak, but only affected the reference point estimates slightly.

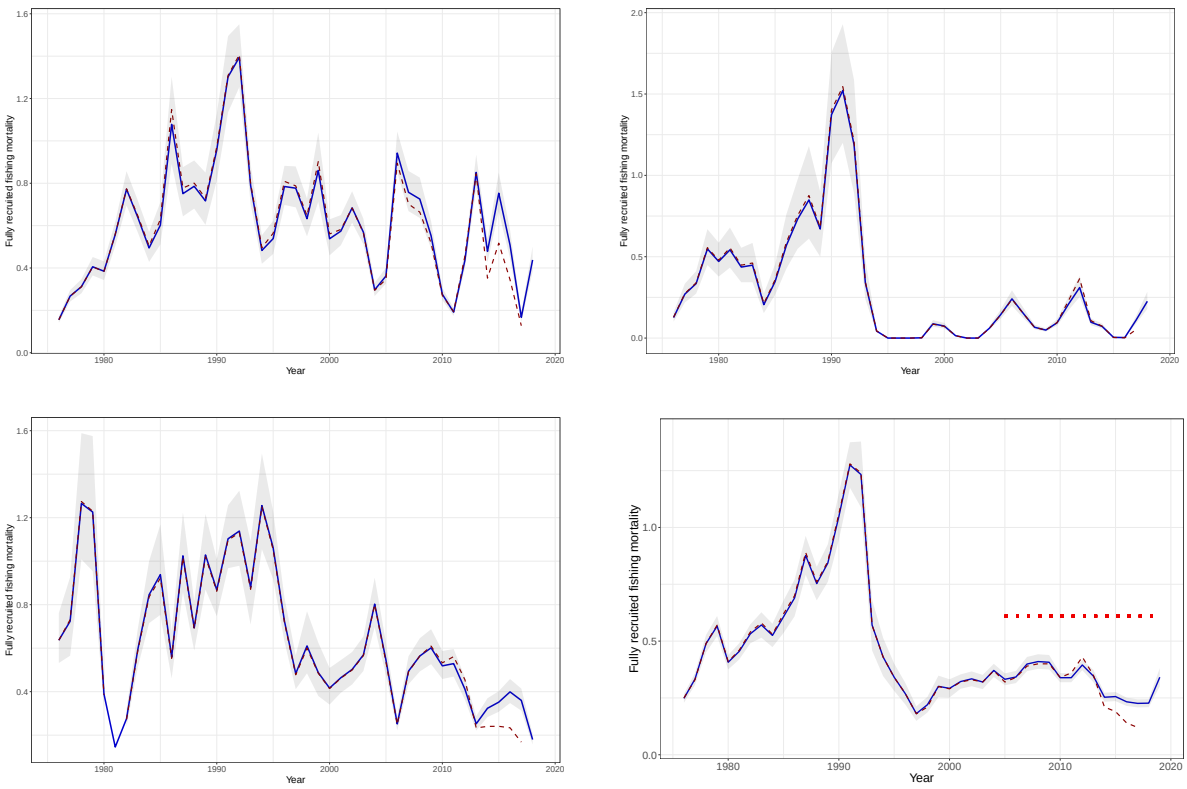

Figure 1. Estimates of fully recruited fishing mortality from CASA for Georges Bank open (top left), Georges Bank closed (top right), Mid-Atlantic (bottom left), and combined (bottom right). The blue solid lines are the point estimates for the current update, the shading is their 95% confidence interval, and the dark red dashed lines are the estimates from the 2018 benchmark assessment. The F_{MSY} reference point is shown on the combined plot (red dotted line); it is shown only from 2005 to 2019 since the fishery was less selective prior to this time, which implies that F_{MSY} during that period was less than that from the current period.

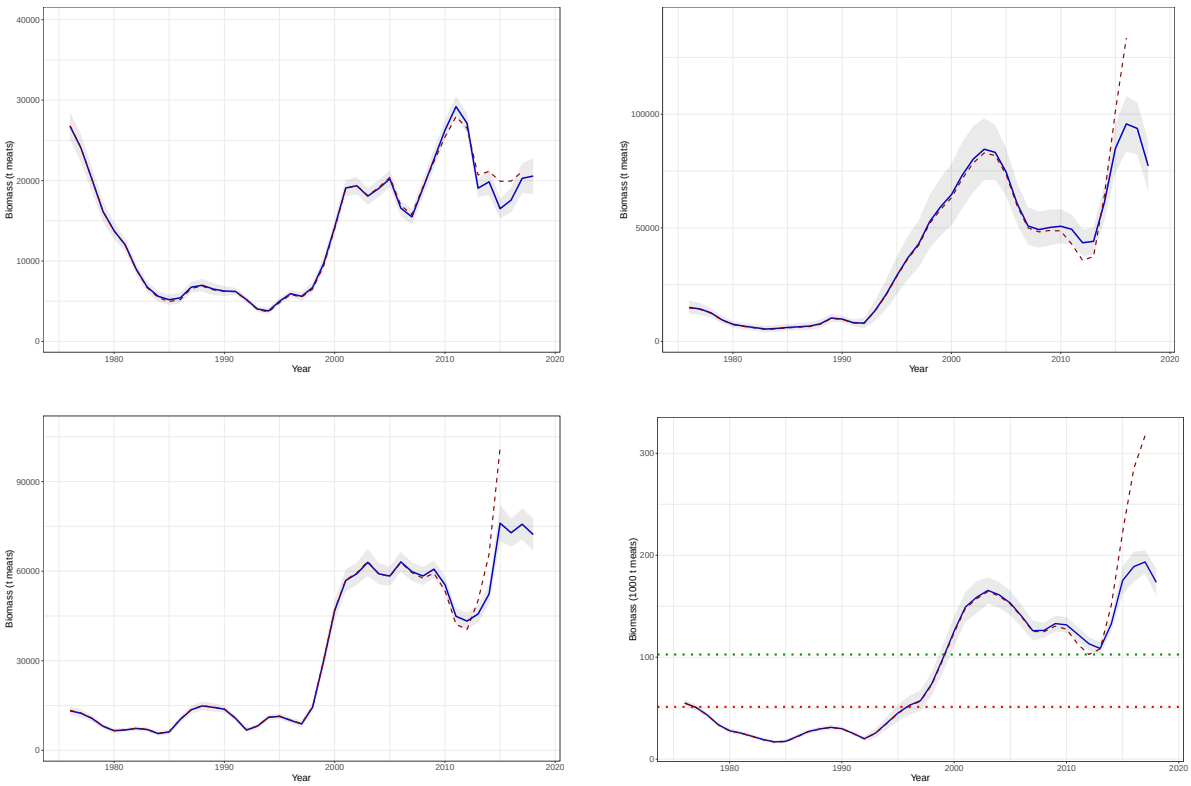

Figure 2. Estimates of biomass (t meats) from CASA for Georges Bank open (top left), Georges Bank closed (top right), Mid-Atlantic (bottom left), and combined (bottom right). The blue solid lines are the point estimates for the current update, the shading is their 95% confidence interval, and the dark red dashed lines are the estimates from the 2018 benchmark assessment. The biomass target (B_{MSY}, green dotted line), and biomass threshold ($B_{\mathrm{MSY}}/2$, red dotted line) are also shown in the combined plot.

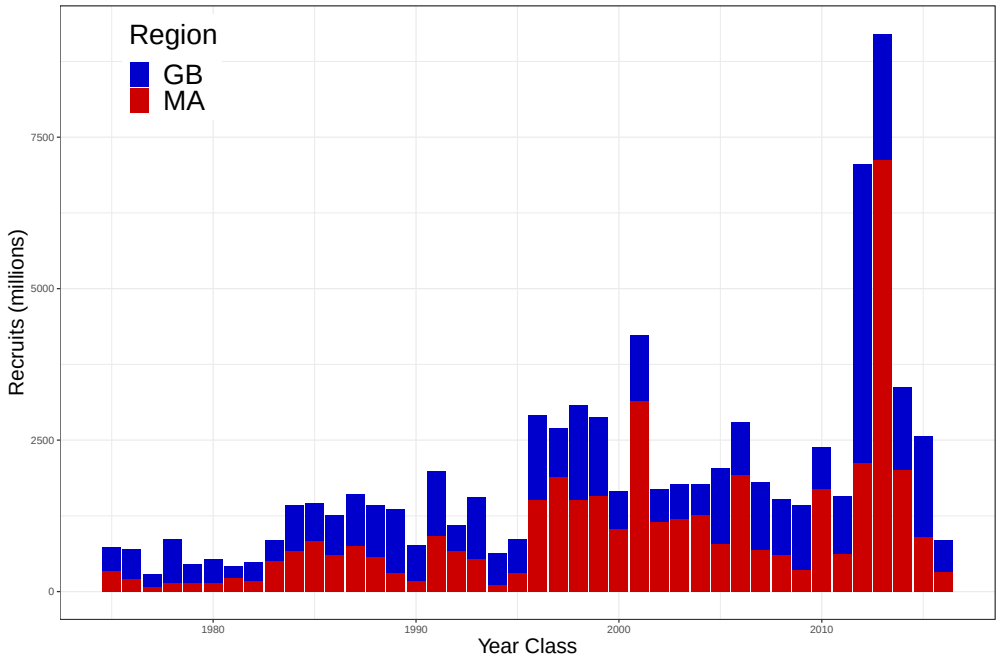

Figure 3. Recruitment (as three year olds) in Georges Bank (blue) and the Mid-Atlantic (red).

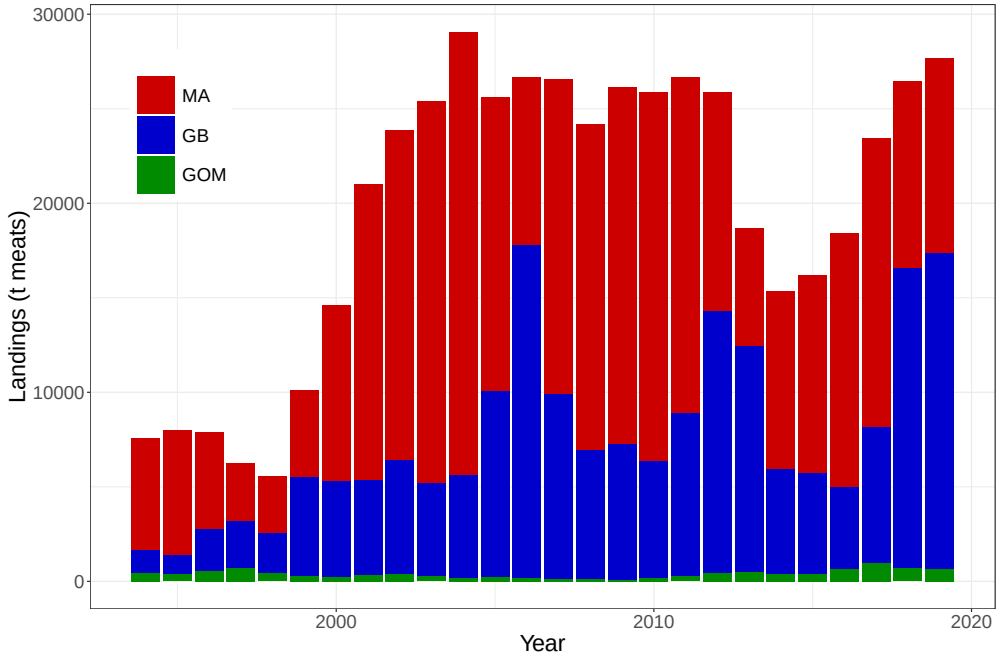

Figure 4. Landings from Mid-Atlantic, Georges Bank, and the Gulf of Maine 1994-2019.

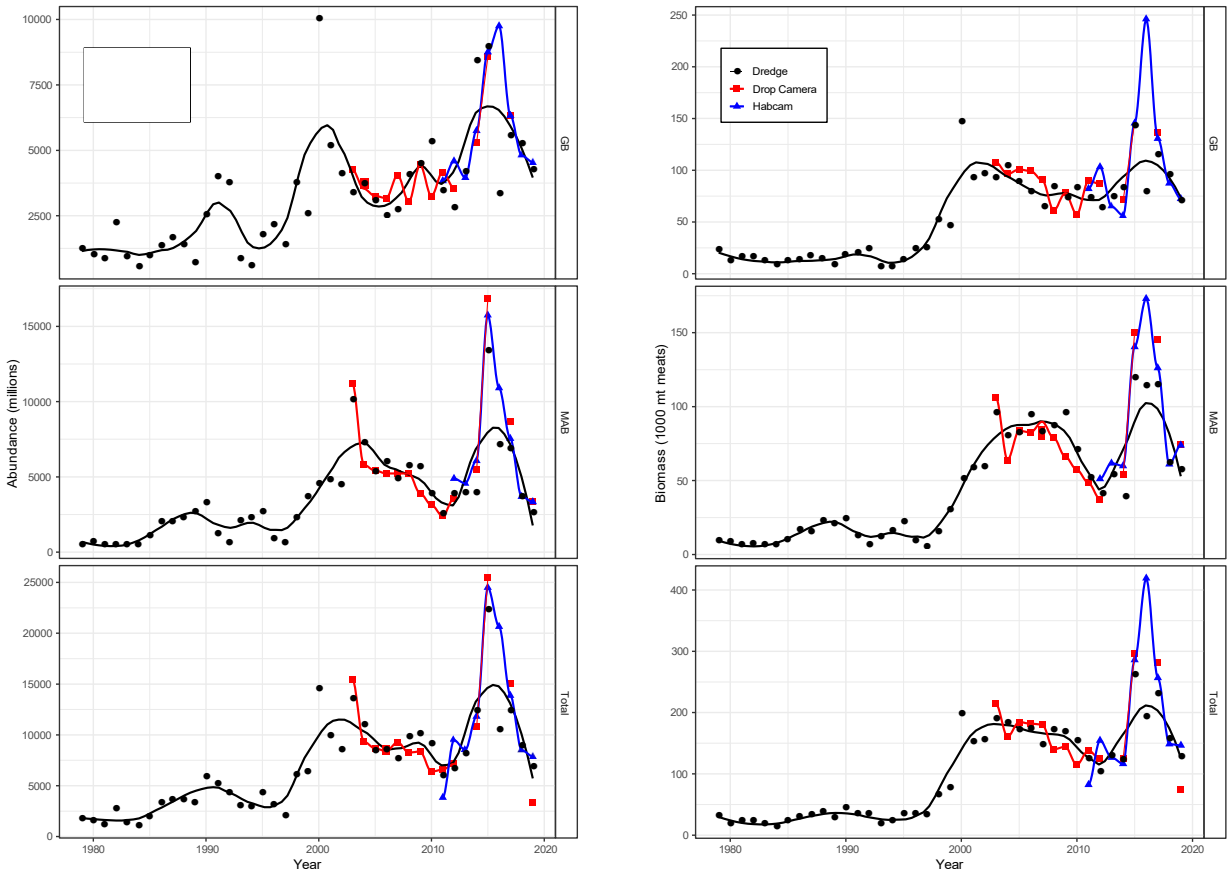

Figure 5. Indices of sea scallop abundance (left) and biomass (right) for the lined dredge, drop camera, and Habcam surveys on Georges Bank (top row),the Mid-Atlantic (middle row) and combined (bottom row). The lines represent lowess smoothers.

Appendix 1. Abbreviations and Acronyms

AOP Assessment Oversight Panel
ASAP Age- Structured Assessment Program
ASMFC Atlantic States Marine Fisheries Commission
CRD Center Research Document
CSE Council of Science Editors
GARFO Greater Atlantic Regional Fisheries Office
ISO International Standardization Organization
MA DMF Massachusetts Division of Marine Fisheries
MAFMC Mid-Atlantic Fisheries Management Council
ME DMR Maine Department of Marine Resources
MRIP Marine Recreational Information Program
NEFMC New England Fisheries Management Council
NEFSC Northeast Fisheries Science Centre
NMFS National Marine Fisheries Service
NOAA National Oceanographic and Atmospheric Administration
NRCC Northeast Regional Coordinating Council
NYDENCew York Department of Environmental Conservation
PDF Portable Document Format
PDT Plan Development Team
RI DEM Rhode Island Department of Environmental Management
SARC 55 55th Stock Assessment Review Committee meeting
SAW Stock Assessment Workshop
SAW 55 55th Stock Assessment Workshop
SMAST School for Marine Science and Technology (New Bedford, Maine)

Statistical/review concepts, parameters, etc.

ABC acceptable biological catch
BRP biological reference point
BSB black sea bass
BSIA Best Scientific Information Available ,
CDF cumulative distribution function
Covid refers to coronavirus pandemic years –
CPUE catch per unit effort
F (instantaneous) fishing mortality rate
FFull fishing mortality on fully selected ages
FMSY fishing mortality for maximum sustainable yield
FMSY proxy proxy estimate of fishing rate for maximum sustainable yield
FThreshold threshold fishing mortality level that indicates overfishing status
F% fishing rate at % of the total catch
kg/tow kilograms per tow

kt kiloton = thousand metric tons
Loess LOESS curve fitting (local polynomial regression)
log-normal probability distribution whose logarithm is normally distributed
M (instantaneous) natural mortality rate
M -ramp model: natural mortality has ramped increase with time
ρ Mohn's rho parameter: the average relative bias of retrospective estimates
MSY maximum sustainable yield
mt metric ton
NA not applicable
OFL overfishing limit ,
QA/QC quality assurance and quality control
SSB spawning stock biomass
SSBMSY spawning stock biomass consistent with maximum sustainable yield
SSBMSY proxy proxy value for spawning stock biomass estimation for maximum sustainable yield
SSBTarget theoretically ideal spawning stock biomass level
SSBThreshold threshold for spawning stock biomass that indicates overfished status
TOR Term of Reference

Locations/regions: state, country, etc.
CA Canada
GB Georges Bank
GOM Gulf of Maine
MA Massachusetts
ME Maine
NE Northeast
NY New York
RI Rhode Island
US United States
WHOI Woods Hole Oceanographic Institute

Appendix 2. September 2020 management track peer review meeting attendees.

Key:
ASMFC - Atlantic States Marine Fisheries Commission
NEFSC - Northeast Fisheries Science Center
NEFMC - New England Fisheries Management Council
MADMF - Massachusetts Division of Marine Fisheries
MEDMR - Maine Department of Marine Resources
SMAST - School of Marine Science and Technology, Univ. of Massachusetts, Dartmouth GARFO - Greater Atlantic Regional Fisheries Office
NOAA - National Oceanic and Atmospheric Administration

Panel
J-J Maguire - Chair
Catherine O'Keefe - Reviewer
Richard Merrick - Reviewer
Pat Sullivan - Reviewer

Attendees and Presenters
Russ Brown - NEFSC
Michele Traver - NEFSC
Alex Hansell - MADMF
Alejandro Gonzalez
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Andy Applegate - NEFMC Staff
Brian Linton - NEFSC
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Chris Legault - NEFSC
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Dan Hennen - NEFSC
Dave McElroy - NEFSC
Dave Rudders - VIMS
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Halle Berger - University of Connecticut
Jamie Cournane - NEFMC
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Jeff Kaelin - Lund's Fisheries
Jennie Rheuban - Woods Hole Sea Grant
Jennifer Couture - NEFMC
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Kaitlyn Clark - VIMS
Katherine Sosebee - NEFSC
Kelly Whitmore - MADMF
Kyle Molton - GARFO
Larry Alade - NEFSC
Libby Etrie - NEFMC Member
Lisa Hendrickson - NEFSC
Liz Sullivan - GARFO
Louise Cameron - Northeastern University
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Maggie Raymond - Associated Fisheries of Maine
Mark Terceiro - NEFSC
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Megan Ware - MEDMR
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Nicole Charriere - NEFSC
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Spencer Talmage - GARFO
Steve Cadrin - SMAST
Susan Wigley - NEFSC
Tara Trinko Lake - NEFSC
Tom Nies - NEFMC Executive Director
Toni Chute - NEFSC
Toni Kerns - ASMFC
Tony Wood - NEFSC
Travis Ford - GARFO
Z. Aleck Wang - Woods Hole Oceanographic Institute

Procedures for Issuing Manuscripts in Northeast Fisheries Science Center In-house Publication Series

NOAA's National Marine Fisheries Service (NOAA Fisheries) is responsible for the stewardship of the nation's ocean resources and their habitat. We provide vital services for the nation, all backed by sound science and an ecosystem-based approach to management. As the research arm of NOAA Fisheries Greater Atlantic Region, the Northeast Fisheries Science Center (NEFSC) supports the agency's mission by providing the scientific information needed to ensure productive, sustainable, and healthy marine ecosystems and coastal communities in our region. Results of NEFSC research are largely reported in anonymously peer-reviewed scientific journals. However, to assist itself in providing data, information, and advice to its constituents, the NEFSC occasionally releases results in one of two in-house publication series.

NOAA Technical Memorandum NMFS-NE –The series typically includes: data reports of long-term field or lab studies of important species or habitats; synthesis reports for important species or habitats; annual reports of overall assessment or monitoring programs; manuals describing program-wide surveying or experimental techniques; literature surveys of important species or habitat topics; proceedings and collected papers of scientific meetings; and indexed and/or annotated bibliographies. All issues receive internal scientific review, and most issues receive technical and copy editing. Technical memoranda are citable.

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