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## New England Fishery Management Council

50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116  
Eric Reid, *Chairman* | Thomas A. Nies, *Executive Director*

**To:** Tom Nies, Executive Director

**From:** Scientific and Statistical Committee (SSC)

**Date:** November 11, 2021

**Subject:** Terms of Reference – Overfishing levels (OFLs) and acceptable biological catch (ABC) recommendations for Atlantic sea scallops for fishing year 2022 and 2023 (default)

The SSC met on October 13, 2021 via webinar to address the following terms of reference (TORs):

1. Review information provided by the Scallop PDT on changes to scallop meat weights and dredge efficiency used to develop 2021 survey estimates, and growth and selectivity parameters used in the Scallop Area Management Simulation (SAMS) model to project biomass. Provide the Council with a recommendation as to whether these changes are appropriate.
2. Consider if the biomass estimates developed by PDT for areas of the Gulf of Maine that have been surveyed but are outside of the NGOM and the current Georges Bank scallop survey strata are appropriate to include in the biomass estimates for the resource as a whole in developing 2022 and 2023 OFL and ABC estimates.
3. Using reference points updated by the 2020 management track assessment, and considering the Council's Risk Policy Statement, review the Scallop PDTs updated projections for the scallop resource, including estimates from the Gulf of Maine and Northern Gulf of Maine management unit, and provide the Council with OFL and ABC recommendations using the Council's ABC control rule for fishing years 2022 and 2023 (default).

To address these TORs, the SSC considered the following information:

- 1.0 Staff Presentation
- 1.1 Terms of Reference for Sea Scallops for October 13, 2021, SSC Meeting
- 1.2 SSC Final Report on OFL and ABC for Scallop Framework 33, December 1, 2020
- 1.3 Scallop PDT recommendations for 2022 and 2023 (default) OFL and ABC
- 1.4 Sea scallop assessment update from the Fall 2020 Management Track Assessment (September 2020)
- 1.5 Management Track Peer Review Panel Report (September 2020). *See pp.8-12.*
- 1.6 Risk Policy Matrix (2021) - Atlantic Sea Scallops
- 1.7 NEFMC Risk Policy Roadmap that includes the Risk Policy Statement and Implementation Plan, see pp. 4-5.
- 1.8 State of the Ecosystem Report for the Northeast U.S. Shelf – Available at:  
<https://www.fisheries.noaa.gov/new-england-mid-atlantic/ecosystems/state-ecosystem-reports-northeast-us-shelf>
- 1.9 Scallop PDT recommendations for 2021-2022 (default) ABC, dated November 18, 2020.
- 1.10 Yochum, N. and DuPaul, W.D. Journal of Shellfish Research, Vol. 27, No.2, 265-271, 2008.

- 1.11 Hart, D.R. Quantifying the tradeoff between precaution and yield in fishery reference points. ICES Journal of marine Science, doi.10.1093/icesjms/fss204
- 1.12 SARC 65 – Scallop Appendix A1 – Sea Scallop Growth
- 1.13 SARC 65 – Scallop Appendix A2 – Scallop Shell Height/Meat Weight Relationships
- 1.14 2020 Management Track Assessment – Appendix I, CASA Models
- 1.15 Scallop PDT Meeting Summaries a. September 1 – October 1 (five meetings)
- 1.16 SARC 65 Full Report
- 1.17 Hodgdon, C.T., Torre, M., and Chen, Y. 2020. Spatiotemporal variability in Atlantic sea scallop (*Placopecten magellanicus*) growth in the Northern Gulf of Maine. J. Northw. Atl. Fish. Sci., 51: 15–31. <https://doi.org/10.2960/J.v51.m729>
- 1.18 Chang, J.H., Shank, B.V. and Hart, D.R., 2017. A comparison of methods to estimate abundance and biomass from belt transect surveys. Limnology and Oceanography: Methods, 15(5), pp.480-494.
- 1.19 Hart, D. R., Munroe, D. M., Caracappa, J. C., Haidvogel, D., Shank, B. V., Rudders, D. B., Klinck, J. M., Hofmann, E. E., and Powell, E. N. 2020. Spillover of sea scallops from rotational closures in the Mid-Atlantic Bight (United States). – ICES Journal of Marine Science, 77: 1992–2002.
- 1.20 Rudders, D., S. Roman, A. Trembanis, and D. Ferraro. 2019. A study to assess the effect of tow duration and estimate dredge efficiency for the VIMS sea scallop dredge. survey: final report. Marine Resource Report No. 2019-04. Virginia Institute of Marine Science, William & Mary. <https://dx.doi.org/doi:10.25773/g9sh-qt28>.

### **SSC members in attendance**

Lisa Kerr, Cate O’Keefe, John Wiedenmann, Kevin St. Martin, Adrian Jordaan, Yong Chen, Fred Serchuk, Jeremy Collie, Richard Merrick, J.J. Maguire, Conor McManus, Lindsay Williams, Hiro Uchida, Mike Carroll, and Jason McNamee

### **SSC Findings**

***TOR 1:*** Review information provided by the Scallop PDT on changes to scallop meat weights and dredge efficiency used to develop 2021 survey estimates, and growth and selectivity parameters used in the Scallop Area Management Simulation (SAMS) model to project biomass. Provide the Council with a recommendation as to whether these changes are appropriate.

The SSC accepted the PDT changes to (1) the sea scallop shell height to meat weight relationships, (2) the dredge efficiency used to develop 2021 survey estimates, and (3) the growth and selectivity parameters used in the Scallop Area Management Simulation (SAMS) model to project biomass. The SSC views these changes as appropriate and representative of the best scientific information available. However, the SSC recommends that in the future a more holistic consideration of changes in the stock biological parameters and a more systematic approach to adjusting survey and model parameters be employed.

### ***Rationale***

As in previous years, the SSC agreed with the PDT’s use of area-specific shell-height to meat-weight parameter estimates derived from the dredge survey in the Nantucket Lightship region. This adjustment is aimed at accounting for the slower than expected growth of scallops in this region. The SSC also agreed with the PDT’s adjustment for decreased survey dredge efficiency in high density areas as determined by optical survey observations. The SSC further supported the PDT changes to the growth and selectivity assumptions informing the SAMS model. The

SSC agreed with the continued use of different growth assumptions in the SAMS model to match the slower growth of scallops in the Georges Bank and the Mid-Atlantic regions. The SSC further endorsed the continued application of the SARC 65 Georges Bank Open Area selectivity curve in the Nantucket South area, as the Open Area selectivity curve reflects targeting of smaller scallops compared to the Georges Bank Closed Area selectivity curve, as estimated in the CASA model.

The SSC noted the continued need to make adjustments to the assumptions of the SAMS model and expressed concern over the *ad hoc* nature of adjusting parameters to account for recent changes in stock dynamics. The SSC recommended that research be undertaken to address these changes in a more systematic and holistic manner. In 2020, the SSC recommended a review of the SAMS model in the next management track assessment and supported the NEFSC's development of a geostatistical SAMS model for the 2024 research track assessment. The PDT noted that a review of the SAMS model has been scheduled for spring 2023 and that the NEFSC has hired a contractor to develop a geostatistical projection model for the scallop fishery (i.e. GeoSAMS). Updates on this work are expected in late 2022. Despite these concerns, the SSC agreed with the use of these adjustments as the best scientific information currently available for informing catch advice.

***TOR 2:*** Consider if the biomass estimates developed by PDT for areas of the Gulf of Maine that have been surveyed but are outside of the NGOM and the current Georges Bank scallop survey strata are appropriate to include in the biomass estimates for the resource as a whole in developing 2022 and 2023 OFL and ABC estimates.

The SSC recommended the inclusion of biomass estimates for areas of the Gulf of Maine (GOM) that have been surveyed but are outside of the Northern Gulf of Maine management area (NGOM) in estimating biomass for the resource as a whole in developing 2022 and 2023 OFL and ABC estimates.

### ***Rationale***

Amendment 21 to the Scallop FMP modified how scallops from the NGOM management unit are accounted for by including them as part of the OFL and ABC for the total sea scallop fishery. This required a change in the accounting of survey biomass for the NGOM and precipitated the question of whether a similar treatment is appropriate for the GOM (i.e., Stellwagen south and the western Gulf of Maine (WGOM) closure). Although there is no precedent to include the GOM area in the calculation of the OFL and ABC, there is also no biological reason to exclude this region. Furthermore, the SSC noted that while the GOM area is not currently included in the stock assessment and OFL and ABC estimates, the landings from this region do count against the ABC. The SSC discussed whether the SSC was the appropriate group to address this question and whether a more appropriate treatment could occur through the upcoming research track assessment. However, it was noted that this change in accounting of survey biomass is happening for the NGOM area and survey data are currently available to apply the same approach for the GOM.

The SSC was concerned whether surveys of the GOM area would continue in the future so that scallop biomass in this region could continue to be included in the total sea scallop biomass calculations. The PDT noted that while continued survey coverage is not guaranteed, there is a

strong commitment to continue surveying this area in the future. The SSC recommends consideration of the future of surveys in the GOM region in the ongoing Scallop Survey Working Group and NEFSC-supported scallop survey re-stratification efforts. The SSC also discussed the implications of including the GOM biomass in developing OFL and ABC estimates. The PDT indicated that this addition would increase the 2022 and 2023 OFL and ABC values by approximately 3%. However, since Stellwagen south would be the only area fished and the majority of this additional biomass is in the WGOM closed area, the impact on allocation to the fishery would be closer to 1%. Because no reference points are available for this region, the Georges Bank  $F_{MSY}$  was used for this calculation, which is similar to the approach used for the NGOM management unit.

***TOR 3:*** *Using reference points updated by the 2020 management track assessment, and considering the Council’s Risk Policy Statement, review the Scallop PDTs updated projections for the scallop resource, including estimates from the Gulf of Maine and Northern Gulf of Maine management unit, and provide the Council with OFL and ABC recommendations using the Council’s ABC control rule for fishing years 2022 and 2023 (default).*

The SSC accepts use of the SAMS model for stock projections and developing catch advice. The SSC considered the calculations provided by the PDT and recommends the following OFLs and ABCs (metric tons):

<b>Fishing Year</b>	<b>Areas Included</b>	<b>OFL</b>	<b>ABC</b>
2022	GB, MA, NGOM+GOM	38,271	30,305
2023	GB, MA, NGOM+GOM	34,941	27,606

***Rationale***

The SSC discussed its concern about the performance of the SAMS model and its tendency to produce estimates that are overly optimistic due to issues with model assumptions (i.e., growth, recruitment, and natural mortality). As noted under TOR 1, there is a need for a more holistic evaluation of changes in stock dynamics, a synoptic evaluation of potential drivers (e.g., changing ocean conditions, including ocean acidification and warming), and revision of model assumptions to account for these changes. The SSC strongly recommends integration of the results of ongoing research examining drivers of changing stock dynamics in the upcoming review of the SAMS model and in the research track assessment for scallops. The SSC supported the inclusion of the Gulf of Maine region, in addition to the Georges Bank, Mid-Atlantic, and Northern Gulf of Maine areas, in developing overall OFLs and ABCs as detailed under TOR 2. The SSC noted that the 2022 and 2023 biomass projections indicate a continued decline from the record-high levels observed in recent years. This decline is attributed to the continued harvest of the exceptional 2012 and 2013 year classes, the absence of strong recruitment in subsequent years, and reduced sea scallop growth rates.

## SUMMARY OF RECOMMENDATIONS

The SSC believes that the recommendations provided are based on scientific information that meets the applicable National Standard guidelines for best scientific information available.

1. The SSC recommends acceptance of the Scallop PDT adjustments used to derive survey biomass estimates and to inform the Scallop Area Management Simulation (SAMS) model.
2. The SSC recommends the inclusion of Gulf of Maine (i.e., Stellwagen south and the western Gulf of Maine closure) biomass estimates in the 2022 and 2023 OFL and ABC estimates.
3. The SSC recommends the following OFL and ABC for fishing years 2022 and 2023:

<b>Fishing Year</b>	<b>Areas Included</b>	<b>OFL</b>	<b>ABC</b>
2022	GB,MA, NGOM+GOM	38,271	30,305
2023	GB,MA, NGOM+GOM	34,941	27,606

## Research Recommendations

1. The SSC recommends that in the future a more holistic consideration of stock changes and a more systematic approach to adjusting survey and model parameters be employed.
2. The SSC recommends consideration of the future of surveys in the GOM region be included in the ongoing Scallop Survey Working Group and NEFSC-supported scallop survey re-stratification efforts.
3. The SSC recommends that ongoing research on potential drivers of changes in sea scallop stock dynamics (e.g., changing ocean conditions, including ocean acidification and warming) be included in the upcoming review of the SAMS model and in the 2024 research track assessment for scallops.