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*

MEMORANDUM

DATE: October 5, 2022

TO: Scientific and Statistical Committee (SSC)

FROM: Tom Nies, Executive Director

SUBJECT: **Terms of Reference – Overfishing levels (OFLs) and acceptable biological catch (ABC) recommendations for Atlantic sea scallops for fishing year 2023 and 2024 (default)**

Terms of Reference

1. Review information provided by the Scallop PDT on changes to scallop meat weights used to develop 2022 survey estimates. Review growth and selectivity parameters and assumptions of natural mortality 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. 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 2023 and 2024 (default).

Background

2021 SSC Research Recommendations
The SSC developed three research recommendations as part of their 2021 report responding to the scallop TORs:

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.

Other Background

Framework 36 to the Scallop FMP will include fishery specifications for 2023, as well as default measures for 2024. The Council requests that the SSC provide OFL and ABC recommendations for these years to be included in Framework 36. Following the SSC's guidance from 2021, this will be the second year that biomass from the Gulf of Maine and Northern Gulf of Maine management (NGOM) area is included as part of the OFL and ABC

The SSC final report from last year has been included for reference (Doc. 1.2), as has the summary report from the 2020 scallop management track assessment which was reviewed in September of 2020 (Doc. 1.4). The Council is requesting that the SSC review adjustments to survey data and projections proposed by the Scallop PDT (TOR#1). The OFL and ABC projections were developed using survey data collected in May, June, and July of 2022. The Scallop PDT utilized data collected from the Mid-Atlantic, Georges Bank, and the Gulf of Maine to develop OFL and ABC recommendations for 2023 and 2024. As the scallop resource is managed as a single stock throughout its range, the Council requests that the SSC provide an OFL and ABC recommendation that combines all appropriate areas for 2023 and 2024.

The 2020 management track assessment updated biological reference points for the scallop resource. The current ABC control rule sets ABC at a level that has a 25-percent probability of exceeding OFL (*i.e.,* a 75-percent probability that the ABC will not exceed the OFL). The F rate associated with OFL decreased from F=0.64 to F=0.61 in the 2020 Management Track Assessment. The ABC F rate with a 25% chance of exceeding OFL is estimated at F=0.45. In 2019, the stock was not overfished, and overfishing was not occurring. The OFL and ABC estimates for 2023 and 2024 (default) are based on these updated reference points and are provided in Document 1.3.

As with previous years, the PDT memo will address data treatment issues. The Scallop PDT recommends using finer scale meat weight estimates based on data from the 2016-2022 VIMS dredge surveys in the Nantucket Lightship South area. Fishery selectivity assumptions for scallops in high density areas of the Nantucket Lightship South were adjusted to account for slow growth.

The PDT continued to compare survey results with projections from the previous year. In the four years since the 2018 benchmark assessment, projections have been overly optimistic compared to the survey results, with some exceptions. The PDT remains concerned about forecasts being higher than realized biomass, and considered changes to growth and natural mortality.

The 2018 benchmark assessment indicated that there had been substantial changes in growth over time, with growth rates tending to increase from 1994-2012. In recent years, growth appears to have slowed based on survey size-frequencies. The 2020 update assessment modified growth assumptions in the CASA model by applying slower growth rates in the Mid-Atlantic and Georges Bank in recent years to account for the perceived change in growth. Based on the reduced growth expectations in the CASA model, and what appears to be an overestimation of biomass in recent years, the PDT reduced the maximum growth potential (L∞) across most of Georges Bank and the Mid-Atlantic in the SAMS model in 2020. Comparison of 2022 survey results with last year's projections suggest that this change is appropriate to continue, and the PDT used slower growth assumptions again for the 2023 and 2024 projections. Reducing L∞ has the net effect of reducing exploitable biomass estimates for the coming fishing years.

For several years, surveys have detected recruitment in the Virginia and Delmarva areas at the southern extent of their range. Subsequent surveys have not encountered larger scallops,

suggesting high levels of natural mortality. The PDT suspects that elevated M could be due to environmental changes and warming bottom temperatures in this area. In an effort to explore ways to possibly improve the accuracy of projections, the PDT completed projections with the current assumptions of M and an elevated M for these areas. The net effect of increasing M will be lower estimates of the OFL and ABC, which could be more accurately reflect the state of the resource. Improving projections is a priority going forward, and adjustments to M could be a way to tune the SAMS model on a larger scale going forward.

The OFL and ABC estimates are based on projections of exploitable biomass from all areas that are open or closed to scallop fishing. Allocations to the fishery are based on projected landings from areas open to the fishery.

Information
    1.0   Staff Presentation *(to be provided)*

    1.1   Terms of Reference for Sea Scallops for October 12, 2022, SSC Meeting

    1.2   SSC Final Report on OFL and ABC for Scallop Framework 34, November 11, 2021

    1.3   Scallop PDT recommendations for 2023 and 2024 (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 (2022) - 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

Additional Background Documents
    1.9   Scallop PDT recommendations for 2022-2023 (default) ABC, dated October 7, 2021.

    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.   August 31 – October 3

    1.16   SARC 65 Full Report (link only)

    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.