



Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901
Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org
Michael P. Luisi, Chairman | P. Weston Townsend, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: August 3, 2023
To: Michael P. Luisi, Chairman, MAFMC
From: Paul J. Rago, Ph.D., Chair, MAFMC Scientific and Statistical Committee (SSC)
Subject: Report of the July 2023 SSC Meeting

Executive Summary

Background

The SSC met in person in Philadelphia, PA and via webinar from 24th - 26th of July 2023, to develop ABC recommendations for Bluefish, Black Sea Bass, Scup, Summer Flounder, Longfin Squid, and Atlantic Mackerel. In addition, we provided comments on the National Standard 1 (NS1) Technical Guidance Memo, and the draft NMFS Climate Governance Policy. Our review of the Governance Policy was developed at a webinar meeting on July 12, 2023, and will be provided separately. A summary of the ABC recommendations by the SSC is provided below (Table 1).

Bluefish

Results of a Level 2 Management Track Assessment were presented by Anthony Wood, NEFSC; a summary of recent management activities, feedback from the Advisory Panel, and a staff recommendation for an ABC were presented by Karson Cisneros, MAFMC. Cynthia Jones, SSC, led the review of the OFL CV determination and response to the Terms of Reference.

The SSC acknowledged the significant improvements in the assessment following the Research Track Assessment. Significant advances included changes to natural mortality rates, more sophisticated methods for deriving CPUE from MRIP data, and reductions in retrospective patterns. The current spawning stock biomass estimate of 52,747 mt is 60% of the B_{msy} proxy value of 88,131 mt; the current fishing mortality rate estimate of $F=0.152$ is 64% of the F_{msy} proxy of 0.239. Following review and discussion, the SSC set most appropriate estimate of the

OFL CV = 100%. Applying the Council's risk policy, **the SSC recommended ABCs of 7,929 mt in 2024 and 9,903 mt in 2025.**

Black Sea Bass

The SSC reviewed previous catch recommendations specified in 2022 for 2023. Updated data and fishery information, feedback from the Advisory Panel, and a staff recommendation for a 2024 ABC were presented by Julia Beaty, MAFMC. Olaf Jensen, SSC, led the SSC responses to the Terms of Reference. Based on the 2021 MTA, the spawning stock biomass estimate was 29,769 mt, which was 210% of the B_{msy} proxy value of 14,441 mt; the current fishing mortality rate estimate of $F=0.39$ is 85% of the F_{msy} proxy of 0.46. The exceptional 2011 and very strong 2015 year classes are no longer dominating fishery removals as they approach the maximum age for this species. Stock biomass is expected to decline as the population becomes more reliant on recent average recruitments.

The SSC noted the difficulties of forecasting harvests and discards in the recreational fishery. Subsequent discussions related to retrospective adjustments and the current downward trajectory of the stock revealed a need for criteria for interim measures that could be applied to all stocks during interim reviews of ABCs. In this regard, greater specificity is needed on relevant statistical methods and decision criteria to be applied, and the potential magnitude of admissible ABC adjustments. **Despite the concern over the expected decline in SSB and taking into account that current SSB is twice the size of SSB_{msy} and F is below F_{msy} , the SSC recommended setting the 2024 ABC equal to the 2023 ABC of 7,557 mt.**

Scup

Results of a Level 2 Management Track Assessment were presented by Mark Terceiro, NEFSC; a summary of recent management activities, feedback from the Advisory Panel, and a staff recommendation for an ABC were presented by Hannah Hart, MAFMC. John Boreman, SSC, led the review of the OFL CV determination and responses to the Terms of Reference. The current spawning stock biomass estimate of 193,087 mt is 246% of the B_{msy} proxy value of 78,593 mt; the current fishing mortality rate estimate of $F=0.098$ is 52% of the F_{msy} proxy of 0.19.

The SSC noted the dome-shaped pattern of fishery selectivity and increases in retrospective patterns that are causes of concern. Following extensive discussion, the SSC increased the OFL CV estimate from the previous value of 60% to 100% for the 2024-2025 specifications to reflect these concerns. **The SSC recommended ABCs of 19,876 mt in 2024 and 18,028 mt in 2025.**

Summer Flounder

Results of a Level 2 Management Track Assessment were presented by Mark Terceiro, NEFSC; a summary of recent management activities, feedback from the Advisory Panel, and a staff recommendation for an ABC were presented by Kiley Dancy, MAFMC. Michael Wilberg, SSC, led the review of the OFL CV determination and response to the Terms of Reference.

The spawning stock biomass estimate in 2022 of 40,994 mt is 83% of the B_{msy} proxy value of 49,561 mt; the fishing mortality rate estimate in 2022 of $F=0.464$ is 103% of the F_{msy} proxy of 0.451. Overfishing is occurring but its magnitude is small. Summer Flounder is one of the most exhaustively reviewed stocks in the Northeast and assessment models with substantially different structures and assumptions have been applied. The current model performs extraordinarily well and has a nominal retrospective pattern. Following this discussion, the most appropriate estimate of the OFL CV was set to 60%.

Recent recruitment has been below average and projections were based on recruit estimates in the last 12 years. **The SSC recommended ABCs of 8,111 mt in 2024 and 9,411 mt in 2025, respectively. If the Council should prefer to adopt a constant average ABC policy, an ABC of 8,761 mt for 2024 and 2025 would satisfy the Council's risk policy.**

Longfin Squid

Results of a Level 2 Management Track Assessment were presented by Lisa Hendrickson, NEFSC; a summary of recent management activities, feedback from the Advisory Panel, and a staff recommendation for an ABC were presented by Jason Didden, MAFMC. Michael Frisk, SSC, led the review of the OFL CV determination and responses to the Terms of Reference. The SSC noted the differences in relative abundance estimates between the spring and fall NEFSC bottom trawl surveys. Coupled with known differences in seasonal growth rates, scale differences between surveys may be indicative of productivity differences between seasons.

Efforts to develop an analytical stock assessment model have not been successful; hence it is not possible to specify stock status or derive an OFL. Given the lack of trend in swept area biomass estimates and stability in catches over recent decades, and the efficacy of management measures to distribute fishing effort seasonally and spatially, SSC recommended continuation of recent ABCs for another three years. **The SSC recommended ABCs of 23,400 mt each year for 2024, 2025 and 2026.** The SSC looks forward to the results of the Research Track Assessment in 2026 and its application for determination of future ABCs.

Atlantic Mackerel

Results of a Level 1 Management Track Assessment were presented by Kiersten Curti NEFSC; a summary of recent management activities, feedback from the Advisory Panel, and staff recommendation for an ABC were presented by Jason Didden, MAFMC. David Secor, SSC, led the responses to the Terms of Reference.

SSC deliberations focused on the limited recovery of stock biomass since the inception of the rebuilding program. The SSC noted that elimination of overfishing in the Management Track Assessment was expected given low catches, but the lack of rebuilding in stock size was unexpected. Moreover, apparent overestimation of recent incoming year classes suggests stock biomass will decline further. Information from the February 2023 Fisheries and Oceans Canada (DFO) assessment of the northern contingent of Atlantic Mackerel has led to a closure of Canadian commercial fisheries. **In view of these considerations, the SSC recommended ABCs of 2,726 mt and 3,900 mt in 2024 and 2025, respectively.** These recommendations are

based on the results of a sensitivity analysis provided by the NEFSC that included a downward adjustment of estimated recruitment in 2022 to the time series median. This change, along with the updated estimates of stock size in 2022, results in a reduction of F_{rebuild} from $F=0.11$ to $F=0.07$. Given our current understanding of stock condition, this level of F_{rebuild} is expected to have a 61% chance of rebuilding by 2032. The SSC expressed low confidence in this forecast. It also noted that clarification of NMFS policy on the definition of overfishing during rebuilding is necessary.

Comments on NS1 Guidance on Reference Points and Status Determination

Richard Methot, NMFS, Headquarters, presented a comprehensive overview of newly revised NS1 guidance on methods for estimating reference points and defining status determination. Considerable progress has been made since this guidance document was originally developed in 1998. Improvements in methods for Data Limited Stocks have been substantial. The report also highlighted the need for dynamic reference points that are responsive to changing environmental conditions. Such approaches must distinguish effects due to low stock size from longer-term changes in productivity. This report and results of ongoing national and international research will be valuable to the SSC as it develops future ABC recommendations.

Comments on NMFS Draft Climate Governance Policy

The SSC acknowledged the importance of addressing the consequences of changes in spatial distribution of species in response to climate change and applauded the NMFS efforts to address these changes comprehensively. However, the current document and recommendations (stated to be non-binding) are insufficient to support the proposed changes to management jurisdictions. General patterns of species movements are well described, but quantification of the fraction of stocks in subareas is not yet adequate for management. A similar concern was expressed about the need to distinguish short-term from long-term changes in distributions. Economic criteria for shifting patterns of landings are similarly difficult to distinguish responses to distributional shifts from other economic and management factors. Finally, the SSC expressed concerns about increased workloads that would be required to support implementation of this policy. Such increases would be borne by the Councils, State partners, Science Centers, and Regional Offices.

Table 1. Summary of the catch limit recommendations, in metric tons, made by the Mid-Atlantic SSC during their July 24-26, 2023 meeting. For summer flounder, the first set of recommendations are associated with an annual/varying ABC approach, and the second set of recommendations are associated with a constant/average ABC approach. OFL – Overfishing Limit; ABC – Acceptable Biological Catch; OFL CV – Overfishing Limit Coefficient of Variation.

Species	Year	OFL	ABC	OFL CV
Bluefish	2024	11,734	7,929	100%
	2025	12,467	9,903	
Black Sea Bass	2024	NA	7,557	NA
Scup	2024	20,295	19,876	100%
	2025	18,408	18,028	
Summer Flounder (annual ABC)	2024	10,422	8,111	60%
	2025	11,515	9,411	
Summer Flounder (constant ABC)	2024	10,422	8,761	60%
	2025	11,325	8,761	
Longfin Squid	2024	NA	23,400	NA
	2025	NA	23,400	NA
	2026	NA	23,400	NA
Atlantic Mackerel	2024	NA	2,726	NA
	2025	NA	3,900	NA

Summary Report

Background

The SSC met in person in Philadelphia, PA and via webinar from 24th - 26th of July 2023, to develop ABC recommendations for Bluefish, Black Sea Bass, Scup, Summer Flounder, Longfin Squid, and Atlantic Mackerel. The agenda for the meeting and the participants are provided in Attachments 1 and 2, respectively. In addition, we provided comments on the National Standard 1 (NS1) Technical Guidance Memo, and the draft NMFS Climate Governance Policy. Our review of the Governance Policy was developed at a webinar meeting on July 12, 2023, and has been provided separately. A summary of the ABC recommendations by the SSC is provided in the Executive Summary (Table 1).

I wish to express my appreciation to Brandon Muffley for his leadership in organizing the meeting and to all Council staff named in the individual species sections below. Scientists from NEFSC also deserve special mention for their detailed and lucid presentations. Each is named in the species sections. Of special note, the SSC recognized the long-term contributions of Mark Terceiro on both Summer Flounder and Scup. For both species, Mark has supported the work of the SSC and Council with thorough and consistently excellent stock assessments for over two decades. His wise counsel and exemplary scientific expertise will be missed as he moves into retirement in the coming year.

Members of the public also contributed to the meeting. By statutory design the meeting must focus on the basis for the assessments rather than the implications of the catch recommendations. However, many public contributions provided valuable context for the scientific discussions and stimulated debate within the SSC.

Finally, I thank all the members of the SSC for the lively and engaged discussions of ideas. Many members served as leads for discussions of the Terms of Reference and the OFL CV matrices. Others served as rapporteurs for the committee's summaries. Sarah Gaichas somehow managed to simultaneously record responses to TORs and take encyclopedic notes which were used to prepare this report.

All documents referenced in this report can be accessed via the SSC's meeting website <https://www.mafmc.org/ssc-meetings/2023/july-24-26>. The OFL CV framework table that provides the general evaluation metrics associated with the nine decision criteria for each OFL CV bin can be found in Attachment 3. Applications of the OFL CV framework to Bluefish, Scup, and Summer Flounder may be found in Attachments 4, 5, and 6, respectively. A comprehensive guide to the acronyms in this and earlier reports may be found in Attachment 7.

Bluefish

Results of a Level 2 Management Track Assessment (MTA) were presented by Anthony Wood, NEFSC. A summary of recent management activities, feedback from the Advisory Panel, and a

staff recommendation for an ABC were presented by Karson Cisneros, MAFMC. Cynthia Jones, SSC, led the review of the OFL CV determination and response to the Terms of Reference.

The SSC acknowledged the significant improvements in the assessment following the Research Track Assessment (RTA). Significant advances included incorporation of age-specific natural mortality rates, more sophisticated methods for deriving CPUE from MRIP data, and reductions in retrospective patterns. Advances made in the data and modeling were summarized in the SSC's May 2023 report to Council.

Changing the natural mortality rate to be age specific rather than constant produced more realistic estimates of SSB/R and YPR. Estimated recruitment in 2022 was above average and exploratory projections were suggested to understand its potential influence on catch projections. The retrospective statistic (Mohn's Rho) was near zero for recruitment, suggesting relatively little potential for bias from poorly estimated recruitment. Recruitment is modeled with an autoregressive model with a correlation coefficient of 0.767. In a two-year projection their contribution to total catch weight is expected to be minor.

Additional discussions focused on the basis for the projections, which include use of a previously specified seven-year rebuilding plan by 2028 that has a 50% probability of achieving the B_{msy} proxy. It was not possible at the meeting to determine the relative importance of the 2022 year-class to the rebuilding trajectory. Given the large changes in M , particularly in younger ages, and the dome shaped selectivity for older fish, the relative contribution of fishing mortality to total mortality has decreased.

Members suggested more formal communication of data quality statistics be reported particularly with respect to diagnostics such as sample sizes by wave and mode and proportional standard errors in the recreational fishery, port sampling summaries for commercial fisheries, measurement or indices of compliance for fishermen subject to mandatory reporting, and active/inactive permit status by permit category. In addition, comparison of estimates from MRIP on for-hire vessels with those required via Vessel Trip Reports was also suggested. All these factors impact or help validate the scientific quality of the data that go into the stock assessments reviewed by the SSC, and not just for Bluefish.

Following these presentations and general discussion, the SSC addressed the Terms of Reference (*italics*) for the Bluefish. Responses by the SSC (standard font) to the Terms of Reference provided by the MAFMC are as follows:

Terms of Reference

For Bluefish, the SSC will provide a written report that identifies the following for the 2024-2025 fishing years:

- 1) Based on the criteria identified in the acceptable biological catch (ABC) control rule, assign the stock to one of four types of control rules (analytically derived, modified by the assessment team, modified by the SSC, or OFL cannot be specified) the SSC deems most appropriate for the information content of the most recent stock assessment;*

The SSC deems the assessment uncertainty level that requires an SSC-derived coefficient of variation (CV) for the OFL as the most appropriate for the new management track assessment.

- 2) *If possible, determine the level of total catch (in weight) for each requested fishing year that is consistent with the constant 7-year rebuilding fishing mortality rate ($F_{rebuild}$) selected by the Council and, if appropriate, the associated coefficient of variation recommended by the SSC and its basis;*

Based on projection estimates provided in the 2023 MTA for Bluefish, the level of catch associated with the OFL 2024-2025 assuming ABC in 2023 is caught are:

<u>Year</u>	<u>OFL (mt)</u>
2024	11,734
2025	12,467

Note that the OFL is calculated on a constant $F_{rebuild}$ (0.183)

- 3) *The level of catch (in weight) associated with the ABC for each requested fishing year consistent with the 7-year rebuilding fishing mortality rate ($F_{rebuild}$) selected by the Council. If appropriate, specify interim metrics that can be examined to determine if multi-year specifications need reconsideration prior to their expiration;*

<u>Year</u>	<u>ABC (mt)</u>
2024	7,929
2025	9,903

The SSC recommends an OFL CV of 100% based on the following considerations (see Attachment 4 for the additional information and basis of this recommendation). Bluefish is predominantly a recreational fishery (86% of total catch) and MRIP catch estimates remain a key uncertainty with substantial changes over time. Self-reported recreational discards have been increasing over time. The new recreational discard mortality is lower than that used previously and lowers the estimate of dead discards. Improvements to ALK and age-based M are new in the modeling framework. Data is now modeled at the region and season level and there is a new WAA calculation. Conversion to WHAM from ASAP included multiple sensitivity analyses and bridge runs and alternate Plan B models were WHAM to be rejected. However, no independent survey estimate of biomass was available.

Interim metrics for Bluefish (*Pomatomus saltatrix*) include: updates on guild estimation of MRIP CPUE, MRIP and commercial estimates of landings and discards.

- 4) *The most significant sources of scientific uncertainty associated with determination of total catch and the ABC;*
 - The trend in recreational catch estimates has an important influence on recent estimates of biomass and on recreational catch estimates of biomass and on stock status estimates. The pattern in the revised MRIP data is an important source of uncertainty.

- There is uncertainty in F_{rebuild} as used to define the OFL.
- A key source of uncertainty will be whether the ABC is caught.
- A significant proportion of the population is in the aggregated 6+ age groups for which there is relatively little information.
- Uncertainty associated with commercial landings that are assumed to be a complete census but have no estimates of compliance monitoring.
- The recruitment estimate from the 2023 MTA is noticeably higher than seen in recent years.

5) *Ecosystem considerations accounted for in the stock assessment, as appropriate, and any additional ecosystem considerations that the SSC considered in selecting the ABC, including the basis for those additional considerations;*

An extensive Ecosystem and Socioeconomic Profile (ESP) was completed for the Bluefish RTA. This ESP evaluated ecosystem factors that could affect the stock throughout its life history, and developed ecosystem and socioeconomic indicators specific to Bluefish. A forage index was developed and used as a catchability covariate in a companion model within the RTA.

The climate vulnerability assessment (Hare et al. 2016) indicates Bluefish has low overall vulnerability to climate effects.

6) *Research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation and/or improve the assessment level;*

- Where mandatory bluefish reporting measures have been implemented, recommend cost-effective compliance monitoring investigations be implemented to ensure measures of data uncertainty are computed for use in assessments and management.
- We endorse the recommendations from the 2022 RTA and 2023 MTA.
- The estimate of recreational release mortality changed based on a meta-analysis of the literature. We recommend further field-based studies to confirm the new estimate.

7) *The materials considered by the SSC in reaching its recommendations;*

[SSC Terms of Reference for Bluefish](#)

[Staff Memo: 2024-2025 Bluefish ABC Recommendations](#)

[2024-2025 Bluefish OFL/ABC Stock Projections](#)

[Draft Bluefish OFL CV Decision Criteria Summary](#)

[Draft 2023 Bluefish Management Track Assessment Report](#)

(See the [Stock Assessment Support Information \(SASINF\) Search Tool](#) for additional information including tables and figures)

[Draft 2023 Management Track Peer Review Panel Summary Report](#)

[February 23, 2023 Assessment Oversight Panel \(AOP\) Report](#)

[Summary Report of the 2022 Bluefish Research Track Stock Assessment Peer Review](#)

Center for Independent Experts (CIE) Report for the 2023 Bluefish Research Track Stock Assessment Peer Review: [Cook](#), [Powers](#), [Medley](#)

[2022 Bluefish Research Track Assessment Working Group Report](#)

[2023 Bluefish Advisory Panel Fishery Performance Report](#)
[Bluefish 2023 Fishery Information Document](#)

- 8) *A conclusion that the recommendations provided by the SSC are based on scientific information the SSC believes meets the applicable National Standard guidelines for best scientific information available.*

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

Black Sea Bass

The SSC reviewed previous catch recommendations specified in 2022 for 2023. Updated data and fishery information, feedback from the Advisory Panel, and a staff recommendation for a 2024 ABC were presented by Julia Beaty, MAFMC. Olaf Jensen, SSC, led the SSC responses to the Terms of Reference. Based on the 2021 MTA, the spawning stock biomass estimate was 29,769 mt, which was 210% of the B_{msy} proxy value of 14,441 mt; the current fishing mortality rate estimate of $F=0.39$ is 85% of the F_{msy} proxy of 0.46. The exceptional 2011 and very strong 2015 year classes are no longer dominating fishery removals as they approach the maximum age for this species. Stock biomass is expected to decline as the population becomes more reliant on recent average recruitments.

The timeline for the Research Track Assessment (RTA) has been extended. As a result, the SSC had no new model results to guide its ABC specification. The SSC noted the difficulties of forecasting harvests and discards in the recreational fishery. Subsequent discussions related to retrospective adjustments and the current downward trajectory of the stock revealed a need for criteria for interim measures that could be applied to all stocks during interim reviews of ABCs. In this regard, greater specificity is needed on relevant statistical methods and decision criteria to be applied, and the potential magnitude of admissible ABC adjustments.

The SSC acknowledged the difficulties of forecasting recreational discards and cautioned against multiyear averages that ignore important behavioral responses of anglers to regulatory changes. Ongoing work by the FMAT should be useful.

Public comments questioned how the SSC was defining overfishing for stocks well above their B_{msy} proxy values. The SSC relies on standard definitions to define overfishing ($F_t > F_{msy}$ proxy). Another member of the public asked about the role of the SSC in specifying management uncertainty. The SSC noted that it does not specify management uncertainty. However, the SSC noted the potential degradation of data quality that can occur when management uncertainty is high is considered when specifying the OFL CV. Similarly, noncompliance with regulations is not within the purview of the SSC, but it could affect the quality of data used in assessment models.

Following the presentation and general discussion, the SSC addressed the Terms of Reference (italics) for the Black Sea Bass. Responses by the SSC (standard font) to the Terms of Reference provided by the MAFMC are as follows:

Terms of Reference

For Black Sea Bass, the SSC will provide a written report that identifies the following for the 2024 fishing year:

1) The appropriateness of retaining status quo (i.e., 2023 fishing year) ABC specifications for the 2024 fishing season. If status quo is inappropriate, specify an alternative ABC for 2024 and provide any supporting information used to make this determination;

Despite some warning signs in stock trends, the SSC concluded that the magnitude of reductions needed to avoid overfishing could not be estimated given the lack of new information and the $p^* = 0.49$. Therefore, it recommended continuation of the previously approved ABC of 7,557 mt for Black Sea Bass.

2) The most significant sources of scientific uncertainty associated with the ABC determination;

- The greatest source of uncertainty is the lack of updated assessment information since the 2021 MTA..
- Management uncertainty continues to be large and generally in the direction of overages. This results in substantial uncertainty in the actual harvest and discards in 2023.
- Recent SSB shows a declining trend as recent increases in harvest and the decline of some of the largest year classes show their impacts on SSB.
- The retrospective pattern in SSB and F was large enough to need the corrections (outside the 90% confidence intervals), and the additional uncertainty caused by applying the correction is unclear. The model for the northern sub-area has a larger retrospective pattern than the model for the southern sub-area. This is particularly relevant to the 2024 ABC decision as the terminal year retrospective adjustment in SSB moves it from near the SSB target to above it.

In addition, many of the sources of scientific uncertainty associated with the previous assessment remain relevant to uncertainty in the 2024 ABC determination:

- The natural mortality rate (M) used in the assessment — because of the unusual life history strategy, the current assumption of an equal M in the assessment model for both sexes — may not adequately capture potential sex-based differences in M.
- The spatial distribution of productivity within the stock range.
- The level, temporal pattern, and spatial distribution of recreational catches.

- The nature of exchanges between the spatial regions defined in the assessment model.
- The extent to which the spatial structure imposed reflects the dynamics within the stock. The combination of the values from the northern and southern sub-areas is conducted without weighting based on landings or biomass. It is unclear whether or how the uncertainty should be treated when the biological reference points are combined using simple addition.
- Future effects of temperature on stock productivity and range are highly uncertain.
- Estimates of 2020 harvest and dead discards in both the recreational and commercial sectors are highly uncertain because of COVID-related pauses in observer coverage and MRIP intercept surveys.

3) *The materials considered by the SSC in reaching its recommendations;*

- [SSC Terms of Reference for Black Sea Bass](#)
- [Staff Memo: 2024 Black Sea Bass ABC Recommendation](#)
- [2023 NEFSC Black Sea Bass Data Update](#)
- [2023 Summer Flounder, Scup, and Black Sea Bass Advisory Panel Fishery Performance Report](#)
- [Black Sea Bass 2023 Fishery Information Document](#)

4) *A conclusion that the recommendations provided by the SSC are based on scientific information the SSC believes meets the applicable National Standard guidelines for best scientific information available.*

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

Scup

Results of a Level 2 Management Track Assessment (MTA) were presented by Mark Terceiro, NEFSC. A summary of recent management activities, feedback from the Advisory Panel, and a staff recommendation for an ABC were presented by Hannah Hart, MAFMC. John Boreman, SSC, led the review of the OFL CV determination and responses to the Terms of Reference. The current spawning stock biomass estimate of 193,087 mt is 246% of the B_{msy} proxy value of 78,593 mt; the current fishing mortality rate estimate of $F=0.098$ is 52% of the F_{msy} proxy of 0.19.

The SSC applauded efforts to evaluate the utility of the Gear Restricted Areas (GRA) as a determinant of rebuilding success. The currently high biomass of the stock is a function of exceptional recruitment and low fishing mortality since 2010. A strong 2011 year class and the extraordinary 2015 year, the maximum estimated over the assessment period (1984-2022) have dominated the stock and landings in recent years. Since 2015 recruitments have been about average, the SSC noted that a transition to lower biomass is expected. There is some evidence of

density dependent responses in growth rates. Given the current stock biomass well above B_{msy} and historic underestimation of F , the SSC discussed potential application of risk concepts, in addition to uncertainty, when deriving catch recommendations. The SSC noted that both the dome-shaped pattern of fishery selectivity and increases in retrospective patterns are causes of concern.

Public comments came from both commercial and recreational fishermen. Commercial harvesters noted the overages in the recreational sectors and its ancillary effects on future commercial allocations and MSC certification. The SSC acknowledged the problem but cautioned not to conflate management uncertainty with scientific uncertainty. Recreational representatives noted that even though overfishing has occurred the stock has continued to increase and a need to explicitly define the underlying science for this apparent contradiction. It was noted that stock sizes can continue to increase if there is a strong upward trend in recruitment.

Following these presentations and general discussion, the SSC addressed the Terms of Reference (*italics*) for Scup. Responses by the SSC (standard font) to the Terms of Reference provided by the MAFMC are as follows:

Terms of Reference

For Scup, the SSC will provide a written report that identifies the following for the 2024-2025 fishing years:

- 1) Based on the criteria identified in the acceptable biological catch (ABC) control rule, assign the stock to one of four types of control rules (analytically derived, modified by the assessment team, modified by the SSC, or OFL cannot be specified) the SSC deems most appropriate for the information content of the most recent stock assessment;*

The SSC determined that the level of uncertainty of OFL in the assessment requires an SSC-specified CV.

- 2) If possible, determine the level of catch (in weight) associated with the overfishing limit (OFL) for each requested fishing year based on the maximum fishing mortality rate threshold or, if appropriate, an OFL proxy, and the associated coefficient of variation recommended by the SSC and its basis;*

Based on projection estimates provided in the 2023 MTA for Scup, the level of catch associated with the OFL for 2024-2025, based on an OFL proxy of $F_{40\%}$ and assuming that ABCs in 2023 and 2024 are caught, are:

<u>Year</u>	<u>OFL (mt)</u>
2024	20,295
2025	18,408

The SSC expressed concern about the uncertainty in the assumption of the 2023 ABC being fully caught as the basis for projections. The 2021 and 2022 ABC were exceeded and the OFL was also exceeded in 2022. If the 2023 catch is greater than the 2023 ABC, the subsequent OFLs and ABCs would be different from those provided here.

- 3) *The level of catch (in weight) and the probability of overfishing (P^*) associated with the ABC for each requested fishing year, based on: 1) the traditional approach of varying ABCs in each year, and 2) a constant ABC approach derived from the projected ABCs. If appropriate, specify interim metrics that can be examined to determine if multi-year specifications need reconsideration prior to their expiration;*

The SSC recommends using an OFL coefficient of variation (CV) level of 100% for the following reasons (see Attachment 5 for the additional information and basis of this recommendation): There is high data quality; there are consistent signals, from surveys, catch-at-age, and model results, and the data agree with theory throughout. There is also a relatively low effect of revised MRIP estimates. Several surveys show declines or low abundance in early years to record lows in the mid-1990s and increases in abundance thereafter. Age structure in surveys shows a decline or low abundance of older ages in survey catches in early years and increases in abundance of older ages in recent years. Age structure in commercial landings-at-age and recreational landings-at-age show similar trends of increasing abundance of older ages in the stock. Several large recruitment events have been indicated by survey indices. In combination, these trends are consistent with lower fishing mortality rates in recent years, and increasing stock abundance as indicated by model results. Although 53% of the catch weight in 2022 is attributable to the recreational fishery, the increase in recreational catch related to the new MRIP estimation methodology is relatively low in comparison to other stocks. There has been no obvious or clear trend in recent recruitment over the past decade, although a declining trend in recruitment may be emerging. Adjustment of projected recruitment currently appears unwarranted. There is no discernable impact of thermal habitat on interannual variation in availability, so adjustment of survey indices to account for thermal habitat effects also appears unwarranted.

In 2021, the SSC recommended an OFL CV of 60% for Scup. Although many aspects of the stock assessment have not changed from the previous MTA, the principal reason for raising the CV to 100% in 2023 is because the rating for retrospective pattern has changed from 60% to 100%. In the 2021 assessment, the Mohn's Rho was approaching, but not over, the 90% CI threshold; the value for SSB in the 2021 assessment was -14% and is now -21%, and the value for F in 2021 was +20% and has now increased to +42%. Since the adjusted 2022 SSB estimates based on the retrospective patterns were outside the model-estimated 90% confidence intervals, a retrospective adjustment (correction) was made for both the determination of stock status and for projections of catch and biomass in 2024 and 2025. The addition of the retrospective correction is a new discontinuity factor affecting overall uncertainty in the OFL. The need for correction is

indicative of lack of model fit and/or inconsistent data, and should be monitored in future assessments.

The Council's request for ABCs that are constant for 2024 and 2025 leads to an ABC recommendation for 2025 that is associated with a P^* value = 0.511. The SSC is precluded from setting an ABC that results in overfishing in any one year; therefore, only ABCs associated with the traditional (variable) approach are offered.

The recommended ABCs are as follows:

<u>Year</u>	<u>Traditional (mt)</u>	<u>Pstar</u>
2024	19,876	0.49
2025	18,028	0.49

Interim metrics:

- (1) The SSC will examine as many surveys as are available for the next SSC meeting, with a focus on the NEFSC surveys.
- (2) Catch and landings information, as available.
- 4) *The most significant sources of scientific uncertainty associated with determination of OFL and ABC;*
 - Retrospective patterns have increased in the MTA relative to the previous assessment. The retrospective pattern underestimates SSB and overestimates F; an adjustment was applied. The adjustment itself represents increased uncertainty relative to previous assessments and impacts the probability of overfishing in an unknown manner. The source of the retrospective pattern is unknown.
 - While older age Scup (age 3+) are represented in the catch used in the assessment model, most indices used in the model do not include ages 3+. As a result, the dynamics of the older ages of Scup are driven principally by catches and inferences regarding year class strength.
 - A sizable portion of the stock biomass is in older age classes, which are estimated to have low Fs as a result of the selectivity pattern estimated in the model.
 - Uncertainty exists with respect to the estimate of natural mortality (M) used in the assessment.
 - Uncertainty exists as to whether the MSY proxies (SSB_{40%}, F_{40%}) selected and their calculated precisions are appropriate for this stock.
 - The SSC assumed that OFL has a lognormal distribution with a CV = 100%, based on a meta-analysis of survey and statistical catch at age (SCAA) model accuracies.

- Survey indices are particularly sensitive to Scup availability, which result in high inter-annual and regional variability – efforts were made to address this question by weighting surveys in the SAW/SARC that should be continued.
- The projection on which the ABC was determined is based on an assumption that the 2023 ABC will be caught and not exceeded.

5) *Ecosystem considerations accounted for in the stock assessment, as appropriate, and any additional ecosystem considerations that the SSC considered in selecting the ABC, including the basis for those additional considerations;*

The ABCs were not modified based on ecosystem considerations. The most recent benchmark assessment included ecosystem considerations, specifically efforts to estimate habitat suitability based on a thermal niche model that was fit to survey catchability, but this did not improve model fits.

The climate vulnerability assessment (Hare et al. 2016) indicates Scup is moderately vulnerable to climate effects.

6) *Research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation and/or improve the assessment level;*

- Evaluate fleet selectivity patterns.
- Investigate mechanisms for declines in weights at age.
- Investigate drivers of retrospective patterns.
- Characterize the pattern of selectivity for older ages of Scup in both surveys and fisheries.
- Mean weights-at-age have declined and age-at-maturity has increased slightly (the proportion mature at age 2 has decreased) in recent years. Continued monitoring of both is warranted.
- It was conjectured that the increase in stock biomass since 2000 resulted from increased recruitments due to the imposition of gear restriction areas (GRAs), to minimize interactions between Scup and squid fisheries, and from increases in commercial mesh sizes. Long-term climate variation is a potential alternative explanation for increased recruitments from 2000 to 2015. Research to explore the validity of both hypotheses is warranted.
- Improve estimates of discards and discard mortality for commercial and recreational fisheries.
- Evaluate the degree of bias in the catch, particularly the commercial catch.
- Conduct experiments to estimate catchability of Scup in NEFSC surveys.
- Explore the utility of incorporating ecological relationships, predation, and oceanic events that influence Scup population size and productivity on the continental shelf.
- Explore additional sources of age-length data from historical surveys to inform the early part of the time series, providing additional context for model results.
- An MSE could evaluate the effectiveness of Scup management procedures.

- Most of the fishery-independent indices used in the model provide estimates of the abundance of Scup < age 3. One consequence is that much of the information on the dynamics of Scup of older ages arises largely from the fishery catch-at-age and from assumptions of the model and are not conditioned on fishery-independent observations. As a result, the dynamics of these older fish remain uncertain. Knowledge of the dynamics of these older age classes will become more important as the age structure continues to expand in the fishery.
- Evaluate the impacts of the reduction in port sampling, which has the potential to exacerbate concerns about the dynamics of older fish.
- The pattern of natural mortality rates at age used in the assessment should be re-evaluated.
- Uncertainty exists as to whether the MSY proxies (SSB_{40%}, F_{40%}) selected and their precisions are appropriate for this stock.
- Survey indices are particularly sensitive to Scup availability, which results in high inter-annual variability. Further consideration of ecosystem factors controlling, and potentially forecasting availability of Scup is warranted.

7) *The materials considered by the SSC in reaching its recommendations;*

- [SSC Terms of Reference for Scup](#)
- [Staff Memo: 2024-2025 Scup ABC Recommendations](#)
- [OFL/ABC Scup Stock Projections](#)
- [Draft Scup OFL CV Decision Criteria Summary](#)
- [Draft 2023 Scup Management Track Stock Assessment Report](#)
- [Draft 2023 Management Track Peer Review Panel Summary Report](#) (same report as found under Bluefish above)
- [February 23, 2023 Assessment Oversight Panel \(AOP\) Report](#) (same report as found under Bluefish above)
- [60th SAW/SARC Stock Assessment Report \(2015\)](#)
- [2023 Summer Flounder, Scup, and Black Sea Bass Advisory Panel Fishery Performance Report](#) (same report as found under Black Sea Bass above)
- [Scup 2023 Fishery Information Document](#)

All documents without citation can be accessed via the SSC meeting website:

<https://www.mafmc.org/council-events/2023/july-2023-ssc-meeting>

8) *A conclusion that the recommendations provided by the SSC are based on scientific information the SSC believes meets the applicable National Standard guidelines for best scientific information available.*

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

Summer Flounder

Results of a Level 2 Management Track Assessment (MTA) were presented by Mark Terceiro, NEFSC; a summary of recent management activities, feedback from the Advisory Panel, and a staff recommendation for an ABC were presented by Kiley Dancy, MAFMC. Michael Wilberg, SSC, led the review of the OFL CV determination and response to the Terms of Reference.

The spawning stock biomass estimate in 2022 of 40,994 mt is 83% of the B_{msy} proxy value of 49,561 mt; the fishing mortality rate estimate in 2022 of $F=0.464$ is 103% of the F_{msy} proxy of 0.451. Overfishing is occurring but its magnitude is small. Summer Flounder is one of the most exhaustively reviewed stocks in the Northeast and assessment models with substantially different structures and assumptions have been applied. The current model performs extraordinarily well and has a nominal retrospective pattern. Recent recruitment has been below average and projections were based on recruitment estimates in the last 12 years. There were no major questions from the SSC or members of the public. Discussions related to the specification of the OFL CV and the Terms of Reference were extensive and are captured below.

Following these presentations, the SSC addressed the Terms of Reference (*italics*) for Summer Flounder. Responses by the SSC (standard font) to the Terms of Reference provided by the MAFMC are as follows:

Terms of Reference

For Summer Flounder, the SSC will provide a written report that identifies the following for the 2024-2025 fishing years:

- 1) *Based on the criteria identified in the acceptable biological catch (ABC) control rule, assign the stock to one of four types of control rules (analytically derived, modified by the assessment team, modified by the SSC, or OFL cannot be specified) the SSC deems most appropriate for the information content of the most recent stock assessment;*

The approach to estimating uncertainty in the OFL has not changed since the previous benchmark (SAW/SARC 66). Accordingly, the SSC maintains its determination that the assessment should be considered an “SSC-modified OFL” status.

- 2) *If possible, determine the level of catch (in weight) associated with the overfishing limit (OFL) for each requested fishing year based on the maximum fishing mortality rate threshold or, if appropriate, an OFL proxy, and the associated coefficient of variation recommended by the SSC and its basis;*

The SSC accepts the Maximum Fishing Mortality Threshold ($F_{35\%} = 0.4512$) used in the assessment. The SSC recommends the use of the most recent 12-year recruitment series for OFL projections, because near-term future conditions are more likely to reflect recent recruitment patterns than those in the entire 38-year time series.

The SSC recommends using 2023 catch based on 100% of 2023 ABC in OFL projections.

The rationale for using 100% of 2023 ABC to predict catch is that this is the method applied in the past.

The SSC reports OFLs based on both variable and average ABCs in 2024 and 2025

Variable

<u>Year</u>	<u>OFL</u>
2024	10,422
2025	11,515

Average/Constant

<u>Year</u>	<u>OFL</u>
2024	10,422
2025	11,325

- 3) *The level of catch (in weight) and the probability of overfishing (P^*) associated with the ABC for each requested fishing year, based on: 1) the traditional approach of varying ABCs in each year, and 2) a constant ABC approach derived from the projected ABCs. If appropriate, specify interim metrics that can be examined to determine if multi-year specifications need reconsideration prior to their expiration;*

The SSC determined that the weight of evidence for the OFL CV for Summer Flounder continues to support a value of 60% (see Attachment 6 for the additional information and basis of this recommendation). The fishery-dependent data for Summer Flounder are thought to be of relatively high quality. Summer Flounder has a large number of survey indices that have a large amount of agreement. Summer Flounder has had multiple assessment models with different structures that gave consistent results. The present assessment compares well with empirical measures such as swept area biomass and swept area abundance estimates from the NEFSC spring and fall surveys. Retrospective bias is low overall, and no retrospective pattern adjustment was applied to the results. The projections use recruitment estimates for the most recent 12 years to estimate the OFLs, which appears to be appropriate given low but relatively stable recruitment during that period. Prediction error has been quantified by comparing earlier and later assessments. Some questions were brought up about whether the data quality is really as good as in the last assessment given the new CAMS system, missed surveys, and lower sampling in 2020. The NEFSC trawl survey is perhaps most consistent for Summer Flounder among all species in the Mid-Atlantic. Based on this rationale, the SSC categorized the Summer Flounder stock assessment as demonstrably better than the “default” level of assessment uncertainty.

<i>Variable ABC</i>			
<i>Year</i>	<i>OFL</i>	<i>ABC</i>	<i>P*</i>
2024	10,422	8,111	0.326
2025	11,515	9,411	0.358
<i>Constant ABC</i>			
<i>Year</i>	<i>OFL</i>	<i>ABC</i>	<i>P*</i>
2024	10,422	8,761	0.377
2025	11,325	8,761	0.322

Interim metrics the SSC will look at:

- (1) The SSC will examine as many surveys as are available for the next SSC meeting, with a focus on the NEFSC surveys.
 - (2) Catch and landings information, as available.
- 4) *The most significant sources of scientific uncertainty associated with determination of OFL and ABC;*
- Changes in life history are apparent in the population; for example, declining growth rates and changing maturity of age.
 - Uncertainty regarding recreational catch and discard estimates from MRIP, especially for 2020 when some data were imputed.
 - Potential changes in productivity of the stock, which may affect estimates of biological reference points. Changes in size-at-age, growth, and recruitment may be environmentally mediated, but mechanisms are unknown.
 - Potential changes in availability of fish to some surveys and to the fishery as a result of changes in the distribution of the population.
- 5) *Ecosystem considerations accounted for in the stock assessment, as appropriate, and any additional ecosystem considerations that the SSC considered in selecting the ABC, including the basis for those additional considerations;*

The SSC considered that Summer Flounder had “moderate” vulnerability in the Climate Vulnerability Assessment results (https://www.st.nmfs.noaa.gov/data-and-tools/NE-CVA/pdf/Summer_Flounder.pdf) as part of the OFL CV process. The 2018 benchmark assessment reviewed potential causal factors for changes in recruitment, SSB, and distribution or growth rates, but none were identified as significant.

- 6) *Research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation and/or improve the assessment level;*

The SSC endorses the research recommendations provided in the SAW-66 assessment report and the 2023 management track review.

The SSC also recommends that research should be conducted to:

- Understand the objectives and performance measures for the fishery from a socioeconomic perspective, to evaluate the balance of costs and benefits of ABC specifications;
- Reconsider stock structure based on modern approaches (see Hoey et al. 2020)
- Evaluate the causes of decreased recruitment and changes in the recruit-per-spawner relationship in recent years;
- Evaluate uncertainties in biomass to determine potential modifications to the OFL CV employed;
- Evaluate causes and consequences of Summer Flounder declines in Chesapeake Bay
- Sample for sex and size distributions of landed and discarded fish in the Summer Flounder fisheries;
- Incorporate sex-specific differences in size-at-age into the stock assessment through model structures as well as data streams;
- Evaluate the effects of past and possible future changes to size regulations on retention and selectivity in stock assessments and projections;
- Validate the otolith-based age determination;
- Further develop understanding of effects of ecosystem changes (e.g., temperature, trophic structure changes) on population dynamics;
- Concerns about potential effects of reduced sampling of the commercial fishery.

7) *The materials considered by the SSC in reaching its recommendations*

- [SSC Terms of Reference for Summer Flounder](#)
- [Staff Memo: 2024-2025 Summer Flounder ABC Recommendations](#)
- [OFL/ABC Summer Flounder Stock Projections](#)
- [Draft Summer Flounder OFL CV Decision Criteria Summary](#)
- [Draft 2023 Summer Flounder Management Track Stock Assessment Report](#)
- [Draft 2023 Management Track Peer Review Panel Summary Report](#) (same report as found under Bluefish above)
- [February 23, 2023 Assessment Oversight Panel \(AOP\) Report](#) (same report as found under Bluefish above)
- [66th SAW/SARC Stock Assessment Report \(2018\)](#)
- [2023 Summer Flounder, Scup, and Black Sea Bass Advisory Panel Fishery Performance Report](#) (same report as found under Black Sea Bass above)
- [Summer Flounder 2023 Fishery Information Document](#)
- Hare, J. A., Morrison, W. E., Nelson, M. W., Stachura, M. M., Teeters, E. J., Griffis, R. B., Alexander, M. A., *et al.* 2016. A Vulnerability Assessment of Fish and Invertebrates to Climate Change on the Northeast U.S. Continental Shelf. PLOS ONE, 11: e0146756
- Hoey, J. A., Fodrie, F. J., Walker, Q. A., Hilton, E. J., Kellison, G. T., Targett, T. E., Taylor, J. C., Able, K. W., & Pinsky, M. L. (2020). Using multiple natural tags provides evidence for extensive larval dispersal across space and through time in summer flounder. *Molecular Ecology*, 29, 1421– 1435. <https://doi.org/10.1111/mec.15414>

- 8) *A conclusion that the recommendations provided by the SSC are based on scientific information the SSC believes meets the applicable National Standard guidelines for best scientific information available.*

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

Longfin Squid

Results of a Level 2 Management Track Assessment (MTA) were presented by Lisa Hendrickson, NEFSC. A summary of recent management activities, feedback from the Advisory Panel, and a staff recommendation for an ABC were presented by Jason Didden, MAFMC. Michael Frisk, SSC, led the review of the OFL CV determination and responses to the Terms of Reference. The SSC noted the differences in relative abundance estimates between the spring and fall NEFSC bottom trawl surveys. Coupled with known differences in seasonal growth rates, scale differences between surveys may be indicative of productivity differences between seasons.

Efforts to develop an analytical stock assessment model have not been successful; hence it is not possible to specify stock status or derive an OFL. The SSC noted the lack of trend in swept area biomass estimates and stability in catches over recent decades, and the apparent efficacy of management measures to distribute fishing effort seasonally and spatially. The SSC welcomed the plans for a Research Track Assessment (RTA), which will begin later this year and continue until 2026.

SSC sought clarification of the survey biomass values used for derivation of approximate B_{msy} levels and information on genetic studies for stock identification. Studies suggest a single stock, but some papers have reported finer scale differences in habitat utilization.

There were no comments from the public, but industry advisers did express some wariness of in-season management because of difficulties of defining within-year status.

Following these presentations, the SSC addressed the Terms of Reference (*italics*) for Longfin Squid. Responses by the SSC (standard font) to the Terms of Reference provided by the MAFMC are as follows:

Terms of Reference

For Longfin Squid, the SSC will provide a written report that identifies the following for the 2024-2026 fishing years:

- 1) *Based on the criteria identified in the Acceptable Biological Catch (ABC) control rule, assign the stock to one of four types of control rules (analytically derived, modified by the assessment team, modified by the SSC, or OFL cannot be specified) the SSC deems most appropriate for the information content of the most recent stock assessment;*

The SSC determines that the OFL cannot be specified given the available information.

Assessment of this stock is based on a catch over biomass index. This does not allow estimation of a maximum fishing mortality rate threshold. This is unchanged from previous SSC determinations.

- 2) *If possible to determine, the level of catch (in weight) associated with the overfishing limit (OFL) for each requested fishing year based on the maximum fishing mortality rate threshold or, if appropriate, an OFL proxy, and the associated coefficient of variation recommended by the SSC and its basis;*

Because an OFL cannot be specified given the current state of knowledge, it is not possible to specify the level of catch associated with the OFL, nor to define a coefficient of variability associated with OFL on which an ABC could be defined.

- 3) *The level of catch (in weight) and the probability of overfishing (P^*) associated with the ABC for each requested fishing year, based on: 1) the traditional approach of varying ABCs in each year, and 2) a constant ABC approach derived from the projected ABCs. If possible, specify interim metrics that can be examined to determine if multi-year specifications need reconsideration prior to their expiration;*

Since an OFL is not specified, its uncertainty and therefore P^* cannot be defined; thus, the SSC cannot address the individual elements of this Term of Reference.

Following precedence, the SSC recommends an ABC for a three-year period (2024-2026) of 23,400 mt, the same as has been set since 2012 by the SSC. This estimate is based on catch levels that occurred during a period of apparent relatively light exploitation (1976-2009) according to the 2010 Longfin Squid assessment, and based on empirical evidence appears to be sustainable.

The SSC will consider the following data sources to evaluate whether to reconsider the three-year ABC specification:

1. Total landings –in particular deviation from average;
 2. Substantial changes in the relative abundances of the two intra-annual cohorts.
 3. Substantial changes in the exploitation indices of intra-annual cohorts, providing that catch data are available.
- 4) *The most significant sources of scientific uncertainty associated with determination of OFL and ABC;*

The SSC notes the following sources of uncertainty in ABC

- Apparent differences in growth, sizes at maturity and productivity of the two intra-annual cohorts is not accounted for in the ABC, which is derived from the average biomass in surveys of the two cohorts. However, the trimester system likely buffers some of the uncertainty inherent in the intra-annual cohorts;

- Annual catch advice for intra-annual cohorts likely smooths biotic and abiotic influences on the relative abundance, productivity, and catchability of each cohort;
- Because of its short life span (6-8 months), the high and variable rate of natural mortality, and the delay in collating survey and catch information, there is an inherent lag in information pertaining to the current state of the stock and the ability to estimate reference points;
- Surveys cover unknown portion of entire range (variable availability) – the range may extend beyond survey coverage;
- The timing of surveys is variable which can complicate interpretation of abundance in a migratory species;
- Using a bottom trawl survey gear for a semi-pelagic species may induce variation in the indices of abundance and obscure the true signal, and;
- Ageing remains a challenge for this species.

5) *Ecosystem considerations accounted for in the stock assessment, as appropriate, and any additional ecosystem considerations that the SSC considered in selecting the ABC, including the basis for those additional considerations;*

No specific ecosystem considerations were used in the 2023 assessment update, nor taken into account in the SSC's ABC determination.

6) *Research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation and/or could be considered for the 2026 research track assessment;*

Recommendations from the Research Track Assessment

- Continue development of a stock assessment approach that is specifically tailored to the squid life cycle and data availability. One avenue is to consider if assessment or management approaches for other semelparous species might be useful because they offer different approaches to modeling and reference point determination. Given the empirical evidence for differences in productivity between the cohort, the current annual average approach likely overestimates biological reference points for one cohort and underestimates it for the other.
- Develop an operating model with intra-cohort dynamics to support simulation experiments to evaluate key stock assessment assumptions pertaining to separating versus combining intra-annual cohorts.
- Explore impacts of system productivity and oceanographic correlates with trends in Longfin Squid availability, recruitment, growth, and abundance. This could include:
 - Development of approaches to standardize surveys relative to changes in environmental conditions and survey timing to improve understanding of availability and catchability to the surveys.
 - Evaluation of methods of incorporating ecological relationships, predation, and oceanic events that influence abundance and availability.
 - Continue to monitor the performance of the squid fisheries and related fisheries in relation to the full breadth of regulatory measures with a view towards improving the economics of the fisheries.

- Evaluate approaches to real time management including expanding age and growth studies to better estimate average growth patterns and to discern seasonal productivity/catchability patterns.

General Research Recommendations

- Until real-time assessment is feasible, expand cohort analysis to understand dynamics of Longfin Squid to support stock assessments and the incorporation of seasonal indices.
- Refine understanding of stock range and structure. In particular, determination of the extent of population closure would be of utility.
- Research addressing seasonal trends in egg production and maturation.
- Aging of squid within intra-annual cohorts to determine vital rates in support of assessment modeling.
- Deployment of sonar camera on headrope of survey gear to estimate gear avoidance.

7) *The materials considered by the SSC in reaching its recommendations;*

- [SSC Terms of Reference for Longfin Squid](#)
- [Staff Memo: 2024-2026 Longfin Squid ABC Recommendations](#)
- [Final 2023 Longfin Squid Management Track Assessment Report](#)
 - [Figures](#)
 - [Tables](#)
- [Draft 2023 Management Track Peer Review Panel Summary Report](#) (same report as found under Bluefish above)
- [February 23, 2023 Assessment Oversight Panel \(AOP\) Report](#) (same report as found under Bluefish above)
- [2023 Longfin Squid Advisory Panel Fishery Performance Report](#)
- [2023 Longfin Fishery Information Document](#)
- [51st SAW/SARC Assessment Summary Report \(2010\)](#)
- [51st SAW/SARC Assessment Report \(2010\)](#)

8) *A conclusion that the recommendations provided by the SSC are based on scientific information the SSC believes meets the applicable National Standard guidelines for best scientific information available.*

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

Atlantic Mackerel

Results of a Level 1 Management Track Assessment (MTA) were presented by Kiersten Curti NEFSC; a summary of recent management activities, feedback from the Advisory Panel, and staff recommendation for an ABC were presented by Jason Didden, MAFMC. David Secor, SSC, led the responses to the Terms of Reference.

SSC deliberations focused on the limited recovery of stock biomass since the inception of the rebuilding program. The SSC noted that elimination of overfishing in the MTA was expected given low catches, but the lack of rebuilding in stock size was unexpected. Moreover, apparent overestimation of recent incoming year classes suggests stock biomass will decline further. Information from the February 2023 Fisheries and Oceans Canada (DFO) assessment of the northern contingent of Atlantic Mackerel has led to a closure of Canadian commercial fisheries. The SSC noted that previous projections for rebuilding have been overly optimistic and have not occurred. Current data provide no indication that this situation will change. It was hypothesized that the stock has been subjected to overfishing for over 30 years, such that rebuilding may be impeded. However, the vagaries of rebuilding, as evinced by the surprisingly quick recovery of striped bass in the 1980s, are impossible to predict.

The SSC highlighted the MTA model's indication that recent recruitment has been overestimated. While no retrospective adjustment was appropriate, the modest corrections in cohort abundance had major implications for rebuilding and status. Interestingly, Atlantic Mackerel shows no evidence of decline in condition factor and the R/SSB ratio has been increasing as the stock has declined. The disparity in relative size of the 2022 year class between the US and DFO assessment models was identified as a concern. The SSC expressed low confidence in the terminal year recruitment estimate. Continuing truncation of age structure led to a recommendation to consider alternative patterns of natural mortality, potentially by applying the age-specific Lorenzen model, as used for Bluefish.

Several SSC members noted the difficulties of estimating reproduction for a migrating species with short egg and larval stage durations. Potential changes in timing of surveys over time can further complicate the interpretation of such surveys.

The Level 1 (direct delivery) MTA was predicated on not expecting a change in status for this resource. Under current NRCC guidelines, the change in status requires a Level 2 or 3 review. Thus, the results of the current assessment and implications for management are considered provisional until the assessment results are confirmed in a subsequent MTA review to be conducted in September 2023. The SSC suggested that that review focus on residual patterns from the model. It also noted that clarification of NMFS policy on the definition of overfishing during rebuilding is necessary. The SSC further recommended development of standard practices that would help improve utilization of self-reported data in the recreational and commercial fisheries.

Public commenters expressed frustration with the lack of emphasis on mandatory reporting by recreational harvesters and that this lack of accountability undermines restoration efforts. A representative of the commercial industry noted that policy recommendations in the 1990s led to overinvestment in fleet capacity.

Following the presentations and discussions, the SSC addressed the Terms of Reference (*italics*) for Longfin Squid. Responses by the SSC (standard font) to the Terms of Reference provided by the MAFMC are as follows:

Terms of Reference

For Atlantic Mackerel, the SSC will provide a written report that identifies the following for the 2024-2025 fishing years:

- 1) *The level of total catch (in weight) for each requested fishing year that is consistent with the updated $F_{rebuild}$ mortality rate associated with achieving a 61% rebuilding probability for Atlantic Mackerel by 2032 (note: given the Council’s Atlantic Mackerel rebuilding plan and risk policy this constitutes the ABC for Atlantic Mackerel);*

The most recent management track assessment indicates an $F_{rebuild} = 0.11$ would be consistent with a 61% probability of achieving rebuilding by 2032. Sensitivity analysis presented to the SSC related to uncertainty over the level of the 2022 US recruitment. The sensitivity analyses were conducted in response to four observations: (1) the 2022 Canadian recruitment was close to a time series low, (2) the uncertainty in the 2022 US recruitment is wide, (3) there is a retrospective bias in the assessment model results that suggest recruitment is likely over-estimated, and (4) the most recent management track assessment estimates of biomass are below the level of biomass estimated in projections from earlier assessment projections, despite the lack of structural changes to the assessment. Taken together, these observations suggest substantial concerns over the reliability of assessment predictions: they have been shown repeatedly to be overly optimistic. The past performance of the assessment suggests that application of the base projections from the assessment will likely yield an ABC that exceeds the “true” $F_{rebuild}$.

Accordingly, the SSC determined that, to meet its mandate to provide advice that allows for scientific uncertainty, an ABC based on the sensitivity run would be in line with the SSC’s obligation under MSA. The sensitivity run assumes the 2022 recruitment will be at the median level for recent recruitments. The sensitivity analysis indicates an $F_{rebuild} = 0.07$.

The resulting calculations from the sensitivity analyses are:

<u>Year</u>	<u>$F_{rebuild}$</u>	<u>ABC</u>
2024	0.07	2,726
2025	0.07	3,900

- 2) *Interim metrics that can be examined to determine if multi-year specifications need reconsideration prior to their expiration;*
 - SSB estimates from US and Canadian egg surveys, as available
 - Survey indices, as available
 - Age structure in surveys, as available
 - Removal estimates, as available
- 3) *The most significant sources of scientific uncertainty associated with determination of the ABC recommendation;*
 - Projections have not been reliable in the recent recovery period.

- Retrospective bias (overestimation) of SSB
 - Above-average recruitments have not materialized into older age classes.
 - Recovery of SSB projected in previous assessments has not materialized.
 - Uncertainty in this year's catch leads to uncertainty in whether F_{rebuild} will be achieved
 - Potential unaccounted mortality, including predation mortality. Literature (Smith et al. 2015; Guillemette et al. 2018) and ongoing modeling work by DFO and ICES WGNAM indicate substantial predation mortality on adult Atlantic mackerel.
 - Diverging expectations for stock productivity in projections. Choice of which recruitment stanza from which to draw projections.
 - Effects of updates in Canadian catch estimates.
 - Bait fishery in Canada was not historically monitored.
 - The time series of Canadian landings has been revised.
 - SSB derivation includes US ecosystem (egg) surveys. Do not have US-specific fecundity or phenology estimates.
 - Trawl survey representation of abundance and age structure.
- 4) *Ecosystem considerations accounted for in the stock assessment, as appropriate, and any additional ecosystem considerations that the SSC considered in selecting the ABC, including the basis for those additional considerations;*
- None explicitly included although SAW 64 examined predation by fishes in the NEFSC bottom trawl survey (low diet incidence).
 - The SSC gave emphasis on ecosystem considerations (M uncertainty) in the previous specification of OFL CV.
- 5) *Research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation and/or improve the assessment level in future years;*

As listed in the 2023 MTA:

- Investigate and understand the sources of retrospective pattern in model performance
- Fecundity and spawning phenology estimates for the southern contingent
- Temporal and age-specific patterns in natural mortality including predation
- Continued work on contingent mixing – degree of northern contingent subsidy to US fisheries and vice versa

As listed by SSC (Sept 2021 Report)

- The SSC supports all of the recommendations from SAW/SARC 64. In particular, the SSC recommends continuing the U.S. component of the Atlantic Mackerel egg survey so that the range-wide egg index can be updated and used in future assessments.
- An investigation of stock - environment – recruitment interactions that may provide insight into the likely distribution of future recruitments, and possibly biological reference points.
- Evaluation of time and age-variant M and M2 (predation mortality) for this stock
- Further evaluate how error in the egg survey propagates to error in the spawning stock biomass index

- Evaluating US recreational fishery data quality and assessment sensitivity

6) *The materials considered by the SSC in reaching its recommendations;*

- [Staff Memo: 2024-2025 Atlantic Mackerel ABC Recommendations](#)
- [Recruitment Survival Sensitivity Rebuilding/ABC Stock Projection](#)
- [Draft 2023 Atlantic Mackerel Management Track Assessment Report](#)
- [2023 Atlantic Mackerel Canadian Stock Assessment Report](#)
- [2023 Atlantic Mackerel Advisory Panel Fishery Performance Report](#)
- [2023 Atlantic Mackerel Fishery Information Document](#)

Supplemental:

- [July 19, 2023 letter to Mid-Atlantic Council from Fisheries and Oceans Canada: Atlantic Mackerel assessment and rebuilding](#)
- [Wasp-waist populations and marine ecosystem dynamics: Navigating the “predator pit” topographies](#) (Bakun 2006)
- [Breeding failure of seabirds in relation to fish depletion: Is there one universal threshold of food abundance?](#) (Guillemette et. al. 2018)
- [Consumption by marine mammals on the Northeast U.S. continental shelf](#) (Smith et. al. 2015)
- [2021 OFL CV Table for Atlantic Mackerel](#)

7) *A conclusion that the recommendations provided by the SSC are based on scientific information the SSC believes meets the applicable National Standard guidelines for best scientific information available.*

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

Comments on NS1 Guidance on Reference Points and Status Determination

Richard Methot, NMFS, Headquarters, presented a comprehensive overview of newly revised NS1 guidance on methods for estimating reference points and defining status determination. Considerable progress has been made since this guidance document was originally developed in 1998. Improvements in methods for Data Limited Stocks have been substantial. The report also highlighted the need for dynamic reference points that are responsive to changing environmental conditions. Such approaches must distinguish effects due to low stock size from longer-term changes in productivity. Moving average methods may be helpful in defining appropriate stanzas of productivity. Another major recommendation was the need for more spatial analyses of fish populations and their fisheries.

The SSC commented on the importance of forecasting future conditions relevant to ABC specifications. Trailing moving averages will better define the starting point, but will be inadequate if conditions continue to change in the future. An overarching concern is the

identification of mechanisms underlying such changes. Presently, a “weight of evidence” approach, involving comparisons of multiple single species assessments, is a practical solution.

The Guidance document acknowledges the importance of multispecies models, but does not have specific recommendations to guide application. The SSC noted that MSEs might be useful for interpreting trade-offs in analyses of multispecies approaches.

The SSC noted that observations of life history attributes (e.g., maximum age, or age at maturity) can be biased by the intensity of fishing mortality and density dependent processes. Such considerations highlight the utility of long time series of data, comparative analyses with other stocks, sufficiently complex models, and process-oriented field studies. These same approaches are relevant to the assessment of closed areas and potentially areas excluded by offshore energy development.

This report and results of ongoing national and international research will be valuable to the SSC as it develops future ABC recommendations.

Comments on NMFS Draft Climate Governance Policy

The SSC reported extensive comments from its July 12th special meeting on the Draft Climate Governance Policy to the Council on July 28th. Time restrictions during the July 24-26 meeting did not allow for further elaboration by the SSC. The SSC acknowledged the importance of addressing the consequences of changes in spatial distribution of species in response to climate change and applauded the NMFS efforts to address these changes comprehensively. However, the current document and recommendations (stated to be non-binding) are insufficient to support the proposed changes to management jurisdictions. General patterns of species movements are well described, but quantification of the fraction of stocks in subareas is not yet adequate for management. A similar concern was expressed about the need to distinguish short-term from long-term changes in distributions. Economic criteria for shifting patterns of landings are similarly difficult to distinguish responses to distributional shifts from other economic and management factors. Finally, the SSC expressed concerns about increased workloads that would be required to support implementation of this policy. Such increases would be borne by the Councils, State partners, Science Centers, and Regional Offices.

Other Business

A separate Webinar meeting of the SSC will be required in the fall of 2023 to address the results of the MTA for Spiny Dogfish and Atlantic Mackerel. The need for an Atlantic Mackerel review will depend on Council actions in August and future decisions by the NRCC.

An overarching theme that emerged during the SSC discussions was a need for more formal analyses of how to respond to “interim measures.” Each TOR typically requests recommendations for information to be provided during the period in which previously specified ABC recommendations are reviewed. The basic question of what constitutes sufficient change in an underlying condition (e.g., trend in surveys, increase in catch, etc.) to alter a previously

specified ABC has not been quantified. The SSC also recognizes that this is not a simple task. Methods such as “rumble strips” and “stop light” approaches have been proposed but not adequately tested in a decision theoretic context. To avoid overfishing the primary concerns are to specify appropriate triggers for decisions, the magnitude of the catch adjustment, and the risks of overfishing vs. premature closure of a fishery. To address these concerns the SSC proposes development of a separate work group in the coming year.

Attachment 1



Mid-Atlantic Fishery Management Council Scientific and Statistical Committee Meeting

July 24 – 26, 2023

Philadelphia Marriott Old City (1 Dock Street, Philadelphia, PA 19106)
or via Webex webinar

This will be an in-person meeting with a virtual option. SSC members, other invited meeting participants, and members of the public will have the option to participate in person at the Philadelphia Marriott Old City or virtually via Webex webinar. Webinar connection instructions and briefing materials will be available at Council's website: <https://www.mafmc.org/council-events/2023/july-2023-ssc-meeting>.

AGENDA

Monday, July 24, 2023

10:00 Welcome/Overview of meeting agenda (P. Rago)

10:05 Bluefish ABC specifications for 2024-2025 fishing years

- Overview of 2023 management track assessment results (T. Wood, NEFSC)
- Review staff memo and 2024-2025 ABC recommendations (K. Cisneros)
- 2024-2025 SSC ABC recommendations (C. Jones)

12:00 Lunch

1:00 Continue Bluefish ABC recommendations

2:00 Black Sea Bass ABC specifications for 2024 fishing year

- Review of data and fishery update, staff memo, and 2024 ABC recommendation (J. Beaty)
- 2024 SSC ABC recommendation (O. Jensen)

3:15 Break

3:30 Scup ABC specifications for 2024-2025 fishing years

- Overview of 2023 management track assessment results (M. Terceiro, NEFSC)
- Review staff memo and 2024-2025 ABC recommendations (H. Hart)

- 2024-2025 SSC ABC recommendations (J. Boreman)

5:45 Adjourn

Tuesday, July 25, 2023

9:00 Address any remaining ABC Terms of Reference from previous day (if needed)

9:30 Summer Flounder ABC specifications for 2024-2025 fishing years

- Overview of 2023 management track assessment results (M. Terceiro, NEFSC)
- Review staff memo and 2024-2025 ABC recommendations (K. Dancy)
- 2024-2025 SSC ABC recommendations (M. Wilberg)

12:00 Lunch

1:00 National Standard 1 Technical Guidance Memo – Reference Points and Status Determination (R. Methot, NMFS)

- Provide feedback and develop comments for NMFS consideration

2:30 Break

2:45 Longfin squid ABC specifications for 2024-2026 fishing years

- Overview of 2023 management track assessment results (L. Hendrickson, NEFSC)
- Review staff memo and 2024-2026 ABC recommendations (J. Didden)
- 2024-2025 SSC ABC recommendations (M. Frisk)

5:15 Adjourn

Wednesday, July 26, 2023

8:30 Address any remaining ABC Terms of Reference from previous day (if needed)

9:00 Atlantic Mackerel ABC specifications for 2024-2025 fishing years

- Overview of 2023 management track assessment results (K. Curti, NEFSC)
- Review staff memo and 2024-2025 ABC recommendations (J. Didden)
- 2024-2025 SSC ABC recommendations (D. Secor)

10:30 Break

10:45 Continue Atlantic Mackerel ABC recommendations

12:00 Other Business

- NMFS draft Climate Governance Policy

1:00 Adjourn

Note: agenda topic times are approximate and subject to change

Attachment 2

MAFMC Scientific and Statistical Committee

July 24-26, 2023

Meeting Attendance in Person and via Webinar

<u>Name</u>	<u>Affiliation</u>
Paul Rago (SSC Chairman)	NOAA Fisheries (retired)
Tom Miller	University of Maryland – CBL
Ed Houde	University of Maryland – CBL (emeritus)
Dave Secor	University of Maryland – CBL
John Boreman	NOAA Fisheries (retired)
Jorge Holzer	University of Maryland
Yan Jiao	Virginia Tech University
Sarah Gaichas	NOAA Fisheries NEFSC
Wendy Gabriel	NOAA Fisheries (retired)
Mike Wilberg (Vice-Chairman)	University of Maryland – CBL
Cynthia Jones	Old Dominion University
Gavin Fay	U. Massachusetts-Dartmouth
Brian Rothschild	U. Massachusetts-Dartmouth
Alexei Sharov	Maryland Dept. of Natural Resources
Geret DePiper	NOAA Fisheries NEFSC
Andrew Scheld	Virginia Institute of Marine Sciences
Mark Holliday	NOAA Fisheries (retired)
Mike Frisk	Stony Brook University
Olaf Jensen	U. of Wisconsin-Madison

Others in attendance (only includes presenters and members of public who spoke):

Jason Didden	MAFMC staff
Brandon Muffley	MAFMC staff
Tony Wood	NEFSC
Mark Terceiro	NEFSC
Lisa Hendrickson	NEFSC
Chelsea Tuohy	ASMFC
Kiersten Curti	NEFSC
Karson Cisneros	MAFMC staff
Julia Beaty	MAFMC staff
Richard Methot	NOAA Fisheries
James Fletcher	United National Fisherman's Assoc.
Hannah Hart	MAFMC staff
Kiley Dancy	MAFMC staff
Jason Didden	MAFMC staff
Greg DiDomenico	Lund's Fisheries
Jeff Kaelin	Lund's Fisheries
Mike Waine	American Sportfishing Assoc.
Meghan Lapp	Seafreeze Ltd.
Elisabeth Van Beveren	Fisheries and Ocean Canada

Attachment 3

OFL CV Decision Table Criteria (updated June 2020)

Decision Criteria	Default OFL CV=60%	Default OFL CV=100%	Default OFL CV=150%
Data quality	One or more synoptic surveys over stock area for multiple years. High quality monitoring of landings size and age composition. Long term, precise monitoring of discards. Landings estimates highly accurate.	Low precision synoptic surveys or one or more regional surveys which lack coherency in trend. Age and/or length data available with uncertain quality. Lacking or imprecise discard estimates. Moderate accuracy of landings estimates.	No reliable abundance indices. Catch estimates are unreliable. No age and/or length data available or highly uncertain. Natural mortality rates are unknown or suspected to be highly variable. Incomplete or highly uncertain landings estimates.
Model appropriateness and identification process	Multiple differently structured models agree on outputs; many sensitivities explored. Model appropriately captures/considers species life history and spatial/stock structure.	Single model structure with many parameter sensitivities explored. Moderate agreement among different model runs indicating low sensitivities of model results to specific parameterization.	Highly divergent outputs from multiple models or no exploration of alternative model structures or sensitivities.
Retrospective analysis	Minor retrospective patterns.	Moderate retrospective patterns.	No retrospective analysis or severe retrospective patterns.
Comparison with empirical measures or simpler analyses	Assessment biomass and/or fishing mortality estimates compare favorably with empirical estimates.	Moderate agreement between assessment estimates and empirical estimates or simpler analyses.	Estimates of scale are difficult to reconcile and/or no empirical estimates.
Ecosystem factors accounted	Assessment considered habitat and ecosystem effects on stock productivity, distribution, mortality and quantitatively included appropriate factors reducing uncertainty in short term predictions. Evidence outside the assessment suggests that ecosystem productivity and habitat quality are stable. Comparable species in the region have synchronous production characteristics and stable short-term predictions. Climate vulnerability analysis suggests low risk of change in productivity due to changing climate.	Assessment considered habitat/ecosystem factors but did not demonstrate either reduced or inflated short-term prediction uncertainty based on these factors. Evidence outside the assessment suggests that ecosystem productivity and habitat quality are variable, with mixed productivity and uncertainty signals among comparable species in the region. Climate vulnerability analysis suggests moderate risk of change in productivity from changing climate.	Assessment either demonstrated that including appropriate ecosystem/habitat factors increases short-term prediction uncertainty, or did not consider habitat and ecosystem factors. Evidence outside the assessment suggests that ecosystem productivity and habitat quality are variable and degrading. Comparable species in the region have high uncertainty in short term predictions. Climate vulnerability analysis suggests high risk of changing productivity from changing climate.
Trend in recruitment	Consistent recruitment pattern with no trend.	Moderate levels of recruitment variability or modest consistency in pattern or trends. OFL estimates adjusted for recent trends in recruitment. OFL estimate appropriately accounted for recent trends in recruitment.	Recruitment pattern highly inconsistent and variable. Recruitment trend not considered or no recruitment estimate.
Prediction error	Low estimate of recent prediction error.	Moderate estimate of recent prediction error.	High or no estimate of recent prediction error.

Assessment accuracy under different fishing pressures	High degree of contrast in landings and surveys with apparent response in indices to changes in removals. Fishing mortality at levels expected to influence population dynamics in recent years.	Moderate agreement in the surveys to changes in catches. Observed moderate fishing mortality in fishery (i.e., lack of high fishing mortality in recent years).	Relatively little change in surveys or catches over time. Low precision of estimates. Low fishing mortality in recent years. “One-way” trips for production models.
Simulation analysis/MSE	Can be used to evaluate different combinations of uncertainties and indicate the most appropriate OFL CV for a particular stock assessment.		

Attachment 4: OFL CV matrix for Bluefish

Final OFL CV Decision Criteria Table for Bluefish – July 2023

Decision Criteria	Summary of Decision Criteria Considerations	Assigned OFL CV Bin (60/100/150)
Data quality	<p>Surveys</p> <ul style="list-style-type: none"> ● A fishery-dependent measure of abundance is obtained as catch-per-unit effort from the MRIP intercept survey (1985-2022), now based on a Guild approach, which constitutes a large component of data (recreational catch [landings+discards] = 86% of total on average). ● Revised historical MRIP catch estimates were used in assessment. The new estimates scale up the entire MRIP catch series. ● NEFSC fall survey data are available for all years (except fall 2017 Bigelow) in the assessment. This survey does not cover the southern portion of the species range. Bigelow estimates adjusted for results of cooperative research studies on gear efficiency. ● Additionally, seven regional surveys are used in model tuning including the NC PNGSIN 2002-2022. <p>Landings and discards</p> <ul style="list-style-type: none"> ● Age data available for all years in surveys (1982-2022), and multinomial age-length keys from surveys were applied to commercial and recreational landings. ● Lengths of recreational discards were obtained through angler self-reporting from the Volunteer Angler Survey and minimal information from MRIP. They are now stratified by region and season. ● Commercial discards are now included even though ~0.2% ● The MRIP discards were below the long-term average. ● Live discards are assumed to have a 9.5% discard mortality rate. ● Total landings in 2022 were a time-series low. ● Uncertainty with recreational catch weight estimates. 	100%
Model appropriateness and identification process	<ul style="list-style-type: none"> ● A WHAM state-space model was used with M now age-specific. ● An extensive set of bridge runs and sensitivities were run to validate the change of model from ASAP to WHAM. ● The fishery is modeled with two fleets: commercial and recreational with an added selectivity block. ● WHAM allows random effects on recruitment and numbers at age. ● SSB declined to series low 35,152 MT in 2018 and increased to 52,747 MT in 2022. ● Reference pts $F_{35\%} = 0.239$, $SSB_{35\%} = 88,132$ MT, $SSB_{threshold} = 44,066$ MT ● Not overfished, overfishing not occurring ● Bluefish are under a rebuilding plan, $Frebuild_7$ recalculated as 0.183 ● Short-term projections used WHAM, model uncertainty, autoregressive processes and uncertainty in recruitment and numbers-at-age, full time series of recruitment (1985-2022) 	100%
Retrospective analysis	<ul style="list-style-type: none"> ● Retrospective patterns in the Management track assessment are considered minor, with retrospective errors over the last 7 terminal years averaging -0.14 for F and $\rho = 0.22$ for SSB. 	60%

	<ul style="list-style-type: none"> ● New calibrated MRIP data resulted in a rescaling of SSB, F, and R to higher estimates compared with old data. ● Retrospective patterns were minor and within 90% CI. 	
Comparison with empirical measures or simpler analyses	<ul style="list-style-type: none"> ● Comparisons with simpler estimates of biomass have not been done. ● Different configurations of WHAM were used as were comparisons with different indices and sensitivities. ● The RTA used a full multinomial ALK. The 2022 MTA used the multinomial Age-Length Key to only fill in missing data. ● A companion model used a forage fish index as a covariate to determine MRIP CPUE. 	100% - 150%
Ecosystem factors accounted	<ul style="list-style-type: none"> ● Aspects of the ecosystem seem to be changing in recent years. ● The prior 2015 benchmark assessment used a thermal niche model to assess survey catchability of Bluefish, but thermal niche modeling was not found to improve the assessment. ● Bluefish have a low CVA ranking (Hare et al. 2016). ● A companion model used a forage fish index as a covariate to determine MRIP CPUE. ● Now have age-specific M 	100%
Trend in recruitment	<ul style="list-style-type: none"> ● For the past decade until 2022 estimates of recruitment have been below average (126 Million). ● Recruitment has been approximately 15% below average over the last decade, except in 2013 when recruitment was higher. ● The highest recruitment occurred in 1989 and the lowest in 2019 (approximately 3-fold variability). ● Terminal year recruitment is estimated at 137 Million, above average and the highest since 2005. 	100%
Prediction error	<ul style="list-style-type: none"> ● Removals in 2023 were considered to be the ABC (13,890 MT) with projection carried forward to 2025 using the $F_{rebuild}$ (2024= 7,929 MT; 2025=9,903 MT) Projections used 5-year average for M, maturity, selectivity and weight-at-age. Not retrospectively adjusted. ● The MRIP calibration results in different patterns across the species that rely on this measure, hence increasing uncertainty. Because this stock is a very large recreational utilization (>80% of the catch), it is heavily influenced by MRIP estimates. ● Finally, the mode of fishing shows a trend to increasing shore fishing in the most recent years because shore fishing has a larger adjustment in MRIP than the other categories. 	100%
Assessment accuracy under different fishing pressures	<ul style="list-style-type: none"> ● Fishing mortality has varied over a 3-fold range during the assessment period, with a major decline in 2018, and a decrease in 2022 to 0.152, 64% of the overfishing threshold. ● Over the past decade F has fluctuated around the series average of $F = 0.35$, but has been steadily declining since 2018. These levels of F should be sufficient for an age-structured stock assessment. 	60% - 100%
Simulation analysis/MSE	<ul style="list-style-type: none"> ● No formal MSE-type analyses have been conducted for this stock. 	NA

Attachment 5: OFL CV matrix for Scup

Final 2023 OFL CV Decision Criteria Table for Scup - July 2023

Decision Criteria	Summary of Decision Criteria Considerations	Assigned OFL CV Bin (60/100/150)
<p>Data quality</p>	<p>Surveys</p> <ul style="list-style-type: none"> ● Synoptic surveys over the stock area include the NEFSC spring and autumn bottom trawl surveys, but these surveys show large interannual fluctuations that reflect availability rather than abundance in any single year. ● Surveys generally rarely catch fish age three and older, although older ages are present in commercial and recreational catch at ages. Other surveys do not cover the entire stock area, and most catch few fish over age 2. The inclusion of multiple state surveys, which by themselves are geographically restricted, enable broader coverage of the stock area in aggregate. ● Covid-related issues limited coverage of state and federal surveys in recent years (2020-2022). <p>Landings and discards</p> <ul style="list-style-type: none"> ● Commercial landings have been well sampled for length and age since 1995. Some concern about declining commercial port sampling in 2022 should this continue because older age groups are caught in the commercial fishery.. ● Commercial discards have been fairly well sampled since 2000, although discard observations are highly variable and skewed. ● New MRIP data are now being used to estimate recreational landings and discards. ● About 53% of the estimated total catch and discards in weight in 2022 was from the recreational fishery. ● Length sampling of recreational landings has generally been adequate since 1988. ● Recreational discard is low. ● Covid-related issues introduced uncertainty into catch estimates, requiring imputation methods for 2020-2022 estimates. 	<p>60%</p>
<p>Model appropriateness and identification process</p>	<ul style="list-style-type: none"> ● The assessment model is based on a complex statistical catch-at-age model (ASAP SCAA). ● Catch is modelled as four fleets (commercial and recreational landings and discards). ● Life history does not require special modelling adjustments. ● Addition of new selectivity block improved the model diagnostics for the 2021 and 2023 management track assessments. 	<p>100%</p>

	<ul style="list-style-type: none"> ● A significant portion of the stock biomass is represented by the plus group, which is assumed to be lightly exploited because of the selectivity pattern applied. ● About 25 different configurations were explored in the 2015 benchmark. ● The effect of new MRIP estimates on continued validity of prior sensitivity analyses depends on the magnitude of the change. Because the proportion of landings attributable to new MRIP estimates is relatively low, we could expect sensitivity analyses to remain valid. ● Biological reference points were updated in the 2023 management track assessment. 	
Retrospective analysis	<ul style="list-style-type: none"> ● Retrospective patterns were not degraded from earlier assessment results following the addition of the 2013-present selectivity block. ● Adjusted 2022 SSB estimates were outside the model-estimated 90% confidence intervals, thus a retrospective adjustment was made for both for the determination of stock status and for projections of catch and biomass in 2024 and 2025. ● General trends in retrospective patterns for SSB, R, and F have been consistent for the past five assessments. ● Retrospective adjustment application at 90% CI threshold results in a discontinuity 	100%
Comparison with empirical measures or simpler analyses	<ul style="list-style-type: none"> ● Age structure in fishery and survey catches has been expanding since the 1990s. ● Aggregate survey indices remain near time series highs. ● Several large recruitment events likely gave rise to survey index highs. ● Given the potential effects of availability in any given year, swept area estimates of biomass are less reliable than for some other stocks. ● No empirical estimates of scale are available. 	100%
Ecosystem factors accounted	<ul style="list-style-type: none"> ● No ecosystem factors were considered in the assessment, but mean weights at age and maturity at ages 2 and 3 continue to decline. ● Previous assessments examined thermal habitat models to evaluate factors affecting availability, but no strong signals were observed. ● Scup are considered moderately vulnerable to climate effects in the Hare et al. (2016) report. 	100%
Trend in recruitment	<ul style="list-style-type: none"> ● Recruitment has been consistent with no apparent trend; although the year classes in 2014 and (especially) 2015 were above average, the 2016 – 2021 year classes were below average. ● R/SSB has declined over the time series and has remained low, as would be expected as a result of the large stock size. ● OFL projections were sampled from estimated recruitment for 1984-2022; the SSC found this to be appropriate. 	60%

Prediction error	<ul style="list-style-type: none"> ● Comparisons of previous and current model predictions of SSB, F, and recruitment were presented. Updated MRIP data led to relatively little change in estimates of F and SSB of Scup. ● The retrospective pattern has become more pronounced over time leading to underestimation of SSB and overestimation of F. This has been adjusted for in the current assessment. ● Difficult to obtain prediction error estimates with high uncertainty in management of recreational removals 	100%
Assessment accuracy under different fishing pressures	<ul style="list-style-type: none"> ● The assessment is responsive to changes in fishing pressure. Fishing mortality declined by more than four-fold over the assessment series, while SSB increased more than ten-fold. ● In the most recent years, fishing mortality rates have been moderate and at levels expected for management targets. ● Fishing mortality in the past 19 years has been low, but increases in SSB, R, C, and survey indices are consistent. 	60%
Simulation analysis/MSE	<ul style="list-style-type: none"> ● No formal MSE-type analyses have been conducted for this stock. 	NA

Attachment 6: OFL CV matrix for Summer Flounder

Final OFL CV Decision Criteria Table for Summer Flounder – July 2023

Decision Criteria	Summary of Decision Criteria Considerations	Assigned OFL CV Bin (60/100/150)
Data quality	<p>Surveys</p> <ul style="list-style-type: none"> ● R/V Bigelow indices take account of trawl efficiency estimates at length from ‘sweep-study’ experiments and individual tow area swept measurements ● Data rich assessment with many fishery-independent surveys incorporated and with relatively good precision of the fishery dependent data. <p>Landings and discards</p> <ul style="list-style-type: none"> ● Landings and discards are thought to have good precision. ● Estimates of recreational catch came from calibrated MRIP time-series. with low CVs ● Weights of commercially discarded summer flounder are well estimated. weights of recreational discards from a wide variety of sources. 	60%
Model appropriateness and identification process	<ul style="list-style-type: none"> ● The research track assessment (SAW-66) included consideration of alternative models (sex-specific ASAP and sex-specific state space, sex structured SS3 model, and sex age length model SAL), model configurations, and sensitivity analyses of key assumptions. ● Alternative models that successfully converged showed similar stock trends and stock status. ● Management Track (MT) assessment evaluated changes due to effective sample sizes and CVs ● The assessment notes that growth appears to have decreased in recent years and maturity may be changing, which are both accounted for in the assessment. 	60%
Retrospective analysis	<ul style="list-style-type: none"> ● No major persistent retrospective patterns were identified in the most recent model. 	60%
Comparison with empirical measures or simpler analyses	<ul style="list-style-type: none"> ● The last benchmark assessment included a comparison with swept area biomass. Simple to more complex models have generally shown consistent estimates of biomass. ● Swept area numbers at age now included directly in the assessment model with q around 0.5 	60%
Ecosystem factors accounted	<ul style="list-style-type: none"> ● No ecosystem factors were included in the assessment. ● No factor (“driver”) was identified as strongly influencing the spatial shift in spawner biomass or the level of recruitment. 	100%

	<ul style="list-style-type: none"> Classified as "moderate climate vulnerability" by Hare et al. (2016). 	
Trend in recruitment	<ul style="list-style-type: none"> The most recent 12-year recruitment series is used for OFL projections, because near-term future conditions are more likely to reflect recent recruitment patterns than those in the entire assessment time series. There has been no consistent temporal trend in stock-wide recruitment for the past 12 years. This 12 year period has lower overall recruitment than the earlier portion of the time series. The breakpoint between recruitment periods appears appropriate. Some surveys suggested a strong 2018 year class in the north vs the south in the 2021 assessment, but have subsequently flattened out Biggest change relative to previous MT is the reduced recent recruitment 	100%
Prediction error	<ul style="list-style-type: none"> Prior assessments were largely consistent prior to the change in MRIP estimates (and since this change), but the scale change with changes in assumptions about the MRIP data is substantial. Forecast error plots comparing current and previous assessments showed consistent bias for F and SSB 	100%
Assessment accuracy under different fishing pressures	<ul style="list-style-type: none"> Fishing mortality has been relatively high during the time series such that the data should be informative about fishing mortality rates and abundance. Substantial expansion of age structure under lower F rate as well as recovery of SSB. 	60%
Simulation analysis/MSE	<ul style="list-style-type: none"> An MSE was recently conducted to evaluate alternatives for managing the recreational portion of the fishery. Did not test the performance of the assessment or uncertainty in OFL, rather the performance management measures given the response of recreational fishery to regulations. Gave general insight into impacts of data uncertainty and stock distribution shifts. 	NA

Attachment 7: Glossary (cumulative from previous SSC reports)

AA—Area Allocation Approach
ABC—Acceptable Biological Catch
ACCSP—Atlantic Coastal Cooperative Statistics Program
AGEPRO—Age Projection software
APAIS—Access Point Angler Intercept Survey
ASMFC—Atlantic States Marine Fisheries Commission
 B_{msy} —Biomass at Maximum Sustainable Yield
CAMS—Catch Accounting and Monitoring System
CCC—Council Coordination Committee
CIE—Center for Independent Experts
CPUE—Catch Per Unit Effort (Catch=Landings+ Discards)
CV—Coefficient of Variation
DFO—Department of Fisheries and Oceans, Canada
ESP—Ecosystem and Socio-economic Profiles
 F_{msy} —Fishing mortality at maximum sustainable yield
FSV—Fishery Survey Vessel
FMAT—Fishery Management Action Team
GARFO—Greater Atlantic Region Fisheries Office
HCR—Harvest Control Rule
LPUE—Landings per Unit Effort
M—Instantaneous Rate of Natural Mortality
MRIP—Marine Recreational Information Program
MTA—Management Track Assessment
MSE—Management Strategy Evaluation
NEFSC—Northeast Fisheries Science Center
NRHA—Northeast Regional Habitat Assessment
OFL—Overfishing Limit
P*—Probability of Overfishing
PSE—Proportional Standard Error
RHL—Recreational Harvest Limit
RTA—Research Track Assessment
R/V—Research Vessel
SCS—Scientific Coordination Subcommittee
SEDAR—Southeast Data, Assessment, and Review
 SSB_{msy} —Spawning stock biomass at maximum sustainable yield
SSC—Scientific and Statistical Committee
UTID-- Universal Trip Identifier
VAST—Vector Autoregressive Spatio-Temporal
WHAM—Woods Hole Assessment Model