



Mid-Atlantic Fishery Management Council
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P. Weston Townsend, Chairman | Michael P. Luisi, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: April 1, 2024
To: Wes Townsend, Chairman, MAFMC
From: Paul J. Rago, Ph.D., Chair, MAFMC Scientific and Statistical Committee (SSC)
Subject: Report of the March 19, 2024 SSC Meeting

Executive Summary

Mid-Atlantic State of the Ecosystem (SOE) Report

The SOE Report for 2024 includes key findings related to continuing decline in seafood production and profits, reduction in recreational harvests, initiation of offshore wind energy sites, and a major die off of sea scallops in the Elephant Trunk management area in response to a summer heat wave in 2022. In 2023, high temperatures and nutrients included record hypoxia in Chesapeake Bay and local mortality events in New Jersey coastal waters. A summer phytoplankton bloom in the Gulf of Maine shattered all historical records. Bycatch of harbor porpoise and gray seals have been below thresholds, but the North Atlantic Right Whale population is decreasing.

The SSC greatly appreciated the thoroughness of the SOE report, the availability of the data, transparency of the process, and the responsiveness of the team to annual requests for modifications.

Overview and Update on NEFSC Cooperative Research Program Activities

The SSC received an overview of several Northeast Fisheries Science Center (NEFSC) Cooperative Research Program activities that included the use of Study Fleet CPUE information in recent assessments, enhanced collection of biological data from *Illex* and Longfin Squid fisheries, and development of a pilot hook-and-line survey.

The SSC appreciated both the comprehensive overview of these projects and their focus on immediate utility in ongoing stock assessments. The increase in biological sampling for squid will provide the fine-scale temporal information necessary for modeling and management of these annual species. Several suggestions for standardization of information from the pilot hook-and-line survey were proposed. It was noted that the new survey must not only be statistically sound, but also be properly integrated with existing measures of relative abundance.

Overfishing Limit (OFL) Coefficient of Variation (CV) Sub-Group Update

Recent analyses in the literature suggest that an OFL CV of 60% may be too low for most stocks. While the current three-bin approach will be retained, the SSC Sub-group has suggested the likelihood of selecting an OFL CV of 60% will likely be reduced. The Sub-Group recommended elimination of three of the nine criteria used to define the OFL. These criteria were deemed less useful and subject to misinterpretation. A tiered system of evaluation was proposed in which three criteria (data quality, model appropriateness, and retrospective pattern) would primarily determine the overall OFL CV bin. It was noted that poor data or inappropriate models cannot be overcome with increased sophistication in other aspects of the assessment.

The OFL CV Sub-Group will meet at the end of April to finalize recommendations that will be considered by the SSC at its May meeting. The final set of recommendations will be presented to the Council in June. If approved, the revised criteria will be used by the SSC in July for its determination of ABCs for recent stock assessments.

Background

The SSC met via webinar on March 19th 2024, addressing the following topics:

- Ecosystem Science Activities including the State of the Ecosystem Report for Mid-Atlantic Region
- Overview of NEFSC Cooperative Research Activities
- Summary of Overfishing Limit (OFL) Coefficient of Variation (CV) Sub-Group
- Other business

See Attachment 1 for the meeting's agenda. An Executive Summary provides a quick summary of the primary conclusions of the SSC.

All but two SSC members were able to participate in the one-day meeting (Attachment 2). Other participants included Council members, Council staff, NEFSC and GARFO staff, and representatives of industry, stakeholder groups, and the public. NEFSC scientists led the sessions on the State of the Ecosystem and Cooperative Research and were joined by their

colleagues from the Center. A special thanks to Brandon Muffley—he guided the SSC’s work before, during, and after the meeting.

I thank Sarah Gaichas, Brandon Beltz (NEFSC), and Brandon Muffley for their excellent meeting notes, and members of the SSC and Council staff for their comments on an early draft of this report.

All documents referenced in this report can be accessed via the SSC’s meeting website <https://www.mafmc.org/ssc-meetings/2024/march19>. This report uses many acronyms: a comprehensive guide is listed in Attachment 3.

Mid-Atlantic State of the Ecosystem Report

Sarah Gaichas presented the 2024 State of the Ecosystem (SOE) for the Mid-Atlantic. Her presentation included an overview of the major trends, highlights of significant changes, and a summary of responses by the team of over 80 scientists who contributed to the report. The updated report includes a report card on current ecosystem properties, a greater focus on management risks, and a new section highlighting significant events in 2023. The report was well received by the SSC who complimented Sarah and her team for the comprehensive nature of the report, transparency of methods, accessibility of the underlying data, and ongoing responsiveness to requests for improvements.

Highlights from the SOE report included:

- Seafood production and profits continued to decline and remain low relative to historical trends.
- Recreational opportunities are increasing but the diversity of the effort appears to be declining.
- There are no significant trends in the stability of fisheries but ecological trends are variable in recent years.
- Bycatch of harbor porpoise and gray seals has been below thresholds, but the North Atlantic Right Whale population is decreasing although calf production increased in the past year.
- Significant events in 2023 include:
 1. Initial construction of two offshore wind energy sites
 2. A major scallop die-off in the Elephant Trunk management area as a result of a heat wave.
 3. High temperatures caused hypoxia and local mortality events in NJ coastal waters.
 4. Hypoxia in Chesapeake Bay was a record low for recent years.
 5. A summer phytoplankton bloom in the Gulf of Maine shattered all historical records.
 6. The Gulf of Maine bottom heatwave was the highest on record.

Questions and Comments by the SSC included:

- Consider looking at changes in variance for various time-series analyses. Examples might include use of sliding windows. Visual examination of the cold pool dynamics suggests higher inter-annual variability in recent years.
- The small-to-large fish ratio can be difficult to interpret since the numerator and denominator can change independently. Consider adjusting the small to large fish metric for increases in large fish vs spikes in recruitment. One way to address this concern is to express anomalies of both quantities and the ratio.
- Fine-scale information on the spatial and temporal extent of heatwaves and their documented effects on scallops suggest that similar analyses for other sessile and even some mobile species will be very useful to management. Potential effects on fishing behavior by vessels in the Study Fleet will be useful. Heatwaves may also influence interpretation of fishery independent surveys through changes in catchability.
- Outputs from stock assessments are effectively synthesized in many areas of the report. One relatively easy-to-obtain metric that could be included in subsequent reports is “surplus production” (= recruitment plus somatic growth less other mortality), which requires only estimates of changes in biomass and total catch between years.
- Concerns were expressed about the coarseness of the information, especially for indices that depend on economics and social factors. For example, fine-scale information on fleet dynamics in response to costs are difficult to quantify by fleet and region. Cost information is restricted to vessels with federal permits, representing about 50% of overall effort. Non-federally permitted vessels are assumed to behave similarly to federal vessels but this has not been validated and make it difficult to estimate net from gross revenue. Some of these concerns may be addressed as ESPs (Ecosystem and Socio-economic Profiles) become more common and available. Currently, the National Academy of Sciences is addressing various measures of environmental justice. Their report will have relevance to the SOE report and ESPs.
- The SSC asked presenters about the types of information sources that are currently limiting further progress. Responses included a need for more focused information on changes in system level productivity and guidance from managers. Simulation analyses may be useful for identifying the types of controls that are robust to uncertainty.

Questions and Comments by Council and Public included:

- Concerns were expressed about indicators for North Atlantic Right Whales and the need for even finer scale information relevant to the construction and operation of wind energy areas. Additional information on Canadian regulations would be useful to include.
- Ecosystem monitoring cruises are strongly supported, but the number and duration of cruises appears to be declining. Can non-profit organizations assist in establishing priorities for such cruises?
- Further clarification of indices of recreational fishing opportunities would be useful, especially the effects of catch rates, bag and size restrictions, and season length. It was noted that such measures are complex and affected by overall fishing effort, variations among sectors, and the complexity of fishing regulations.

Questions and Comments on SOE Prioritization included:

- The SSC appreciated the open process of setting priorities for future SOE reports. Suggestions to involve the SSC's Ecosystem and Economic Working Groups were well received.
- The determination of change points in underlying processes is an important aspect of the SOE. The SSC looks forward to the results of ongoing analyses to characterize the statistical properties of such changes and ensure appropriate interpretation by readers.

NEFSC Cooperative Research Program Activities

Anna Mercer, NEFSC, provided an overview of ongoing collaborative research with industry and its utility for stock assessments and management. Projects summarized included:

- Development of a pilot hook-and-line survey that may have general utility for estimating abundance within wind energy areas that may not be accessible with traditional trawl gear.
- Use of study fleet data to understand fine-scale behavior of vessels, particularly near wind energy areas.
- Standardized CPUE data from the Study Fleet have been incorporated into recent Research Track Assessments (RTA) for Spiny Dogfish, Golden Tilefish, Black Sea Bass, and *Illex* Squid.
- Major new programs to collect weekly biological data (length, weight, ages) from commercially-landed *Illex* and Longfin Squid. This project requires close coordination with major processors and has already resulted in a 100-fold increase in the number of sampled squid compared to traditional port sampling.
- A pilot program to increase biological sampling for recreationally caught Atlantic Cod and other species is under development. A recent RTA assessment of Atlantic Cod recommended increasing the number of cod stocks in US waters from two to four. This has put a premium on acquisition of finer scale biological data.
- Collaborative work on the biological oceanography of squid continues with weekly meetings of biologists, oceanographers, and commercial harvesters. Results from these meetings were included in the recent RTA for *Illex* Squid and will be included in the ongoing Longfin Squid RTA.

The SSC appreciated both the comprehensive overview of these projects and their focus on immediate utility in ongoing stock assessments. Several suggestions for standardization of information from the proposed hook-and-line survey were proposed. It was noted that the new survey must not only be statistically sound, but also be properly integrated with existing measures of relative abundance.

The industry-based supplemental sampling for port samples should be valuable for upcoming assessments as well as serving as a basis for an optimal port sampling design. The SSC encouraged the transition from pilot to operational programs and highlighted the need for dedicated resources to aid this transition. Presently, support for many programs has come from

successful competitive grant proposals rather than base funding. Offshore wind development will demand new methods to allow continuation of comparable historical time series. A potential data source, currently underutilized, is the Vessel Monitoring System (VMS) data. Integration of VMS data with traditional Vessel Trips Reports, Study Fleet, and Observer datasets could lead to greater use of such data in estimating relative abundance.

A member of the public inquired about the inclusion of information from private anglers in cooperative research efforts. Such involvement is considered desirable but there presently are no systematic programs.

Overfishing Limit (OFL) Coefficient of Variation (CV) Sub-Group Update

Paul Rago provided an overview of the results of three meetings of the Sub-Group since the last SSC meeting in October 2023. These meetings led to a set of initial recommendations for improving the process for deriving the uncertainty of the OFLs. The current rubric considers nine factors when setting the OFL CV to one of three levels (60%, 100%, or 150%). It has been employed and refined since 2020. Recommendations addressed the utility of the current OFL CV bins, the possibility of dropping three criteria, and the utility of a tiered system that distinguishes primary from secondary criteria. The recommendations and rationale are as follows:

- Recent empirical studies and historical simulation research suggest that a CV of 60% may be too low for almost all assessments. Information is insufficient to recommend new bins, but evidence suggests that a CV of 60% may be infrequently applied.
- A review of SSC reports over the past four years suggests several criteria are difficult to interpret or aspirational rather than operational. The Sub-Group recommended deletion of the following three criteria:
 - Criteria 7—Informed by prediction error
 - Criteria 8—Assessment accuracy under different fishing pressures
 - Criteria 9—Informed by simulation analyses or full MSE

The deleted criteria can be folded into existing criteria if appropriate on an assessment-specific basis.

- The decision process for defining the CV must be deliberative, transparent, and open. Presently, the synthesis of these criteria is based on a synthesis of criteria-specific recommendations. However, it is also evident that certain factors are more important than others. For example, poor or limited data quality cannot be overcome by modeling approaches regardless of their sophistication. In recognition of this principle and a desire to avoid an artificial scoring algorithm the Sub-Group recommended defining two tiers of criteria. The first tier includes data quality, model appropriateness and identification, and uncertainty informed by retrospective analyses. The second tier includes uncertainty informed by comparisons with empirical studies, ecosystem factors, and appropriate stanzas of recruitment.

The SSC generally approved of the draft recommendations, but sought clarification on several topics. Members wanted more information on the conclusion that a 60% CV was optimistic. An empirical review of worldwide stock assessments suggested that assessments were rarely this precise. Earlier MSE modeling research suggested that even modest departures from baseline model formulations caused severe degradation of forecasts and, consequently, inappropriate catch recommendations.

The OFL CV ultimately relies on a measure of the overall productivity of the stock. Separating the joint effects of fishing from environmental effects is always challenging, but becomes more so with improved management that shifts the balance from factors that are controllable (fishing mortality) to those that are less controllable (environment).

An important recommendation was that the Sub-Group should conduct a trial application (dress rehearsal) of the new approach prior to the SSC's July meeting. The SSC emphasized that the derivation of the CV limit was not a "grade" on the assessment, but rather a structural feature of our current ability to understand the stock's dynamics. The SSC suggested that further consultations with the stock assessment lead scientists would be helpful with respect to evaluating some criteria.

Some members of the public expressed disappointment about the proposed recommendations. In particular, the reduced likelihood of selecting a OFL CV of 60% implies a greater buffer between the OFL and the ABC. The SSC noted that this effect is greatest when the stock is between 50% and 100% of Bmsy. For stocks above Bmsy, the reductions in ABC associated with a higher OFL CV are negligible. When the stock falls below 50% of Bmsy, the stock is overfished and rebuilding is required. In such circumstances, harvest policies for rebuilding may diverge from the Council's risk policy, depending on the expected rebuilding time horizon and the targeted probability of rebuilding. The SSC agreed with a recommendation from the public to better explain and highlight the effects of selecting higher levels of uncertainty. Another commenter expressed concerns about differing levels of uncertainty between commercial and recreational harvests. Presently, the ABCs are based on the overall uncertainty of the OFL rather than the uncertainty of component fisheries. If such a distinction were applied, the rubric for defining the OFL CV would need to be changed and the computational details of separate ABC would need to be worked out. It was noted that the Council had discussed separate ABCs several years ago but did not implement this as part of their risk policy.

The OFL CV Sub-Group will meet at the end of April to finalize recommendations to be considered by the SSC at its May meeting. The final set of recommendations will be presented to the Council in June. If approved, the revised criteria will be used by the SSC in July for its determination of ABCs for recent stock assessments.

Other Business

- Plans for the national meeting of the eight regional SSCs are continuing. The meeting will be held August 26-28, 2024 in Boston and will be hosted by the NEFMC. The theme for the meeting will be the application of ABC control rules in a changing environment with a focus on integration of ecosystem and social science considerations, and implications for rebuilding plans. Potential speakers have been identified for keynote addresses, and regional case studies. Approximately four SSC members per Council will be supported to attend. The plenary sessions of the meeting will be broadcast via webinar but in listen-only mode.
- A Biological Reference Points Workshop, supported by a CINAR grant, was held at SMAST in January 2024. Four SSC members from MAFMC attended in person. Mike Wilberg and Paul Rago presented summaries of current methods and recent research findings.
- Housekeeping business included identification of species leads for assessments, a schedule of upcoming peer reviews, and solicitation of SSC reviewers for a number of upcoming Management and Research Track Assessments.

Attachment 1



Mid-Atlantic Fishery Management Council Scientific and Statistical Committee Meeting

March 19, 2024 via Webinar

AGENDA

Tuesday, March 19, 2024

- 10:00 Welcome/Overview of meeting agenda (P. Rago)
- 10:05 Ecosystem Science Activities (S. Gaichas)
- 2024 NEFSC Mid-Atlantic State of the Ecosystem Report
 - 2024 Ecosystem Approach to Fisheries Management (EAFM) Risk Assessment Update
 - SSC Ecosystem Work Group – update on work group progress
- 12:30 Lunch
- 1:30 Overview and Update on NEFSC Cooperative Research Program Activities (A. Mercer, NEFSC)
- 2:30 Overfishing Limit (OFL) Coefficient of Variation (CV) Sub-Group Update (P. Rago)
- Review and provide feedback on draft sub-group recommendations
- 3:30 Break
- 3:45 Other Business
- Scientific Coordination Sub-Committee 8th National Workshop
 - Defining Biological Reference Points Workshop
 - Species/topic lead assignments
 - Stock assessment updates: 2024-2025 schedule and peer review needs
 - 2024 SSC meeting schedule – topics, locations, needs
- 5:00 Adjourn

Note: agenda topic times are approximate and subject to change

Attachment 2

MAFMC Scientific and Statistical Committee

March 19, 2024

Meeting Attendance via Webinar

Name

Affiliation

SSC Members in Attendance:

Paul Rago (SSC Chairman)	NOAA Fisheries (retired)
Tom Miller	University of Maryland – CBL
Ed Houde	University of Maryland – CBL (emeritus)
John Boreman	NOAA Fisheries (retired)
Jorge Holzer (March 8 th only)	University of Maryland
Yan Jiao	Virginia Tech University
Rob Latour	Virginia Institute of Marine Science
Mike Frisk	Stony Brook University
Brian Rothschild	Univ. of Massachusetts-Dartmouth (emeritus)
Olaf Jensen	U. of Wisconsin-Madison
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
Geret DePiper	NOAA Fisheries NEFSC
Mark Holliday	NOAA Fisheries (retired)
Andrew Scheld	Virginia Institute of Marine Science

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

Brandon Muffley	MAFMC staff
Anna Mercer	NEFSC
Greg DiDomenico	Lund's Fisheries
Mike Waine	American Sportfishing Association
Michelle Duval	MAFMC
Will Poston	American Saltwater Guides Assoc.
Meghan Lapp	Seafreeze Ltd.

Attachment 3. Glossary

ABC—Acceptable Biological Catch
AIC—Akaike’s Information Criterion
 B_{msy} —Biomass at maximum sustainable yield
CV—Coefficient of Variation
DEA—Data Envelopment Analysis (DEA)
DFO—Department of Fisheries and Oceans, Canada
ESP—Ecosystem and Socio-economic Profiles
EAFM—Ecosystem Approach to Fisheries Management
F—Instantaneous rate of fishing mortality
FSV—Fishery Survey Vessel
GARFO—Greater Atlantic Region Fisheries Office
HCR—Harvest Control Rule
M—Instantaneous rate of natural mortality
MAFMC – Mid-Atlantic Fishery Management Council
MRIP—Marine Recreational Information Program
MTA—Management Track Assessment
MSC—Marine Stewardship Council
MSE—Management Strategy Evaluation
NEFMC – New England Fishery Management Council
OFL—Overfishing Limit
 P^* —Probability of overfishing
 q —catchability coefficient parameter
RHL—Recreational Harvest Limit
RSA—Research Set Aside
RSC—Research Steering Committee
RTA—Research Track Assessment
R/V—Research Vessel
SOE—State of the Ecosystem
 SSB_{msy} —Spawning stock biomass at maximum sustainable yield
SSC—Scientific and Statistical Committee
 v —availability parameter