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

M E M O R A N D U M

Date: 25 July 2018

To: Michael P. Luisi, Chairman, MAFMC

From: John Boreman, Ph.D., Chair, MAFMC Scientific and Statistical Committee

Subject: Report of the July 2018 SSC Meeting

The SSC met in Baltimore on the 17th and 18th of July 2018. The main objectives of the meeting were to develop new ABC specifications for Chub Mackerel, Summer Flounder, and Bluefish, and affirm (or develop new) ABC specifications for Black Sea Bass and Scup based on data updates (Attachment 1). Other topics discussed at the meeting included updates on the progress being made by the SSC Surfclam OFL Working Group, the NRCC Assessment Scheduling Working Group, and revisions to the State of the Ecosystem Report prepared annually by the Northeast Fisheries Science Center.

A total of 10 SSC members were in attendance on July 17th and 11 members were in attendance on July 18th (Attachment 2), which constituted quorums for both days. Also attending were MAFMC staff, staff from the NEFSC, and representatives from Pew Charitable Trust and Lund's Fisheries. Documents referenced in the report can be accessed via the SSC's meeting website (http://www.mafmc.org/ssc-meetings/2018/july-17-18).

Chub Mackerel

Julia Beaty (MAFMC staff) reviewed the status of management and summarized her literature review of the advisory panel's comments and the life history, catch history, stock structure, and population dynamics of Chub Mackerel. Julia drew on information published on the species and closely related species in other parts of the world. She also presented several catch time series options for the SSC to consider in developing the ABC recommendation. Based on her summary, the SSC concluded that insufficient information exists to assess the status and trends of the Chub Mackerel stock in the northwest Atlantic region and instead relied on expert judgment to derive an ABC recommendation.

Responses by the SSC to the terms of reference provided by the Council (*in italics*) are as follows:

1

For Chub Mackerel, the SSC will provide a written report that identifies the following for fishing years 2021-2023:

1) The level of uncertainty that the SSC deems most appropriate for the information on which the acceptable biological catch (ABC) determination was made, based on criteria listed in the Omnibus Amendment.

The SSC determined that an OFL cannot be specified based on the available information.

2) If possible, the level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold or, if appropriate, an OFL proxy, and the geographic range associated with the OFL.

No OFL could be calculated.

3) The level of catch (in weight) and the probability of overfishing associated with the ABC for the stock, and the geographic range associated with the ABC, the number of fishing years for which the ABC applies and, if possible, interim metrics that can be examined to determine if multi-year specifications need reconsideration prior to their expiration.

The SSC recommends **2,300 mt** (= 5.07 million pounds) as a placeholder ABC for fishing years 2021-2023. This value does not exceed the observed highest catch in the fishery (2013), but permits limited fishery growth beyond the current limit specified in the temporary forage measures established by the MAFMC, thus permitting additional data collection. The expert judgment of the SSC is that this level of catch is unlikely to result in overfishing given the general productivity of this species in fisheries throughout the world, combined with the relatively low fishery capacity in our region. The SSC is requesting specific data collection in association with this ABC, and may revert to a lower value if data cannot be collected to assess the risk associated with the higher ABC.

Lacking information on stock structure, the SSC assumes that the geographic range associated with the ABC spans from the New England Council through the South Atlantic Council jurisdictions.

Interim metrics (data to be collected) should include catch and effort information in the directed Chub Mackerel fishery, age and length composition in the catch and fishery independent surveys, and spatial distribution of catch.

4) The most significant sources of scientific uncertainty associated with determination of OFL and/or ABC.

- Stock size and productivity cannot be determined, there is no information to determine reference points for stock biomass levels, and little information exists to determine reference points for fishing mortality rates.

- There is no information the source of recruits; it is unknown whether Chub Mackerel are episodic in the Mid-Atlantic, whether this is a range expansion with localized spawning, or neither.
- There is no information on predation mortality, or on the role of Chub Mackerel in predator diets.
- There is very high uncertainty in recreational landings and discards.
- Observer coverage on fisheries likely to catch Chub Mackerel may be low (*Illex* fleet, Mid-Atlantic small mesh bottom trawl).

5) Any ecosystem considerations, particularly with regard to Chub Mackerel's role as forage for predators in the Mid-Atlantic, that the SSC took into account in determining the ABC, including the basis for those considerations.

No ecosystem considerations were included. The SSC was unable to evaluate Chub Mackerel's role as forage by using the information available; however, MAFMC has recently funded a study to examine predator prey relationships.

6) Prioritized research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation and/or improve the assessment level.

- Catch and effort information in the directed Chub Mackerel fishery.
- Age and length composition in the catch and fishery independent survey.
- Spatial distribution of catch.
- An expanded fishery should allow for the collection of more information on how this stock responds to fishing in our region.
- Recruitment, and an egg survey in the South Atlantic.
- Stock structure and definition. Potential habitat area occupied by Chub Mackerel in the Western Atlantic to compare with Chub Mackerel productivity in the Eastern Atlantic.
- Ageing precision and validation.
- Information on Chub Mackerel diet that may help establish links to ecosystem productivity to assess potential stock productivity.

7) The materials considered in reaching its recommendations.

- Staff memo: ABC considerations
- AP Fishery Performance Report
- Fishery Information Document
- MSB May 15, 2018 AP and Committee Meeting Summary
- NEFSC survey data on Chub Mackerel
- Growth and Reproduction of Atlantic Chub Mackerel (Scomber colias) in the Northwest Atlantic (Daley 2018)
- Summary of Dr. Robert Leaf's current Chub Mackerel research
- 2015 Pacific Chub Mackerel stock assessment
- Pacific Chub Mackerel stock assessment review (STAR) panel meeting report
- Global phylogeography of mackerels of the genus *Scomber* (Scoles et al. 1998)

- Chub Mackerel literature review by MAFMC staff
- Eggs and larvae of *Scomber scombrus* and *Scomber japonicus* in continental shelf waters between Massachusetts and Florida (Berrien 1977)

All documents listed above are available on the SSC meeting website: http://www.mafmc.org/ssc-meetings/2018/july-17-18.

8) A certification that the recommendations provided by the SSC represent the best scientific information available.

The ABC recommendation is based on best expert judgment that this level of catch is unlikely to result in overfishing. There is insufficient information for the SSC to certify the ABC as best scientific information available. The ABC represents a placeholder level of harvest, which will support fishery development and improved data collection and analysis.

Black Sea Bass

Julia Beaty (MAFMC staff) and Gary Shepherd (NEFSC) briefed the SSC on the management history and recent NEFSC data update for Black Sea Bass. Julia also summarized the relevant sections of the Fishery Performance Report prepared by the MAFMC and ASMFC Joint Summer Flounder/Scup/Black Sea Bass Advisory Panels. The data update indicates that Black Sea Bass biomass continues to be high; the 2015 year class appears to be above average in both the northern and southern surveys, as well as appearing in the 2017 fishery discard data. The SSC noted the decline in the 2018 NEFSC trawl survey index in the northern region and a corresponding increase in the index for southern region. NEFSC attributes this observation to timing: a shift in the spring distribution of Black Sea Bass relative to the demarcation line between the north and south regions resulting from changes in survey timing likely influenced the 2018 indices for both regions. Based on the information presented, the SSC concluded that there was no compelling reason to change its previous ABC recommendation for 2019.

Scup

Julia Beaty (MAFMC staff) and Mark Terceiro (NEFSC) briefed the SSC on the management history and recent NEFSC data update for Scup. Julia also summarized the relevant sections of the Fishery Performance Report prepared by the MAFMC and ASMFC Summer Flounder/Scup/Black Sea Bass Advisory Panels. According the NEFSC's data update, the NEFSC fall 2015 and spring 2016 survey biomass indices were record highs for the time series, although both seasonal indices then decreased; the NEFSC 2017 fall survey did not sample the scup assessment strata, and so no 2017 fall index is available. The MADMF spring and fall 2017, RIDFW spring and fall 2016, URIGSO 2015-2017, CTDEP spring 2016-2017, NYDEC 2016-2017, and NEAMAP spring 2016 indices were also at or near record highs, while the NJDFW index decreased during 2013-2017. Some of the indices of recruitment (RIDFW, NYDEC,

NEFSC; age 0 fish) indicate the recruitment of a large year class in 2015, which is the likely cause for a higher proportion of commercial discards in recent years.

The biomass projections, which serve as the basis for the 2019 ABC, assumed that 87% of the 2017 ABC would be caught; however, preliminary catch information indicates that 113% of the 2017 ABC was caught. The SSC agreed that this is a source of implementation error in setting the 2019 ABC.

Based on the information presented, the SSC concluded that there was no compelling reason to change its previous ABC recommendation for 2019.

Summer Flounder

Kiley Dancy (MAFMC staff) and Mark Terceiro (NEFSC) briefed the SSC on the latest data update prepared by the NEFSC and the updated fishery performance plan prepared by the MAFMC and ASMFC Summer Flounder/Scup/Black Sea Bass Advisory Panels. The data update for 2018 includes catch, landings, and fishery independent survey indices through 2017. In addition, projections of stock biomass were provided for 2019. The projections used the 2016 stock assessment model run, updated to reflect realized catch from 2016 and 2017, and the assumption that the 2018 Acceptable Biological Catch (ABC) will be caught. The data update indicates that most state and federal survey indices of abundance, with the exception of Massachusetts and Delaware, have seen declines from their most recent peaks (generally during 2009-2012) through 2017, although most indices are variable in recent years, and some have shown signs of slight to moderate rebounding. The NEFSC fall survey was unable to sample the Summer Flounder strata in fall 2017; however, the NEFSC spring survey biomass index for Summer Flounder increased between 2017 and 2018. Indices of recruitment (age 0 fish) have generally been below average over the last 6-7 years. Recruitment indices in 2017 were highly variable among the various fishery-independent surveys.

A benchmark assessment of Summer Flounder is currently being conducted, and the results are expected by the end of 2018 or early 2019. Therefore, the OFL and ABC specifications recommended by the SSC for 2019 may change once the SSC has a chance to review the new benchmark assessment.

Responses by the SSC to the terms of reference provided by the Council (*in italics*) are as follows:

For Summer Flounder, the SSC will provide a written report that identifies the following for the 2019 fishing year:

1) The level of uncertainty that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the Omnibus Amendment.

> The SSC reviewed the data update and noted no information in the data that would require the SSC to revise its approach to setting ABC specifications.

The assessment model framework has not changed since the previous benchmark (SAW/SARC 57). Accordingly, the SSC maintained its determination that the assessment should be considered an "SSC-modified OFL" status.

2) If possible, the level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold or, if appropriate, an OFL proxy.

The 2019 OFL, assuming fishing at F_{MSY} (F=0.309), is anticipated to be **9,343 mt** (= 20.60 million pounds).

3) The level of catch (in weight) and the probability of overfishing associated with the acceptable biological catch (ABC) for the stock.

The SSC continued to apply its standard approach for implementing the Council's risk policy in estimating ABC. Assuming an OFL with a lognormal distribution having a 60% CV, and a stock status lower than B_{MSY}, the Council's policy, given a B/B_{MSY} ratio = 0.78, provides a P* = 0.300. This yields an ABC for 2019 of **6,988 mt** (= 15.41 million pounds).

The SSC notes it will re-evaluate the CV associated with the OFL when it receives the results from the next benchmark assessment.

4) The most significant sources of scientific uncertainty associated with determination of OFL and ABC.

- The ABC is based on an additional year's projection from the last updated assessment (2016).
- Retrospective patterns were evident in the assessment update that have substantial implications for the reliability of model projections and inferences regarding the status of the stock. The causes of the retrospective patterns are unknown, but might include changes in the following:
    1) Sources of mortality that are not fully accounted in the assessment. These could include:
        o Under-estimation of discards in both the commercial and recreational fisheries, and lower estimates of mortality rates applied to the discards than are actually occurring; and
        o Under-reported landings.
    2) Natural mortality, which may be underestimated – but the presence of older male flounder in the population suggest this is unlikely.
    3) Availability or catchability of fish due to changes in stock distribution.
- Changes in life history are apparent in the population – there have been changes in sex ratio, declines in maturity at age, declines in recruitment, and declines in weights at age.
- Potential changes in availability of fish to some fishery-independent 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, and any additional ecosystem considerations that the SSC took into account in selecting the ABC, including the basis for those additional considerations.

No specific, additional ecosystem information was provided to the SSC for consideration in forming its ABC recommendation.

6) Prioritized research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation and/or improve the assessment level.

1) Determine and evaluate the sources of the over-optimistic stock projections.
2) Conduct socio-economic research on the objectives and performance measures for the fishery to understand the balance of costs and benefits of ABC specifications.
3) The SSC recognizes the research recommendations provided in the last benchmark assessment report. Also, the SSC recommends research is conducted to:
   - Evaluate the causes of decreased recruitment and changes in recruitment per spawner in recent years;
   - Evaluate uncertainties in biomass to determine potential modifications to the OFL CV employed;
   - Evaluate fully the sex- and size distribution of landed and discarded fish, by sex, in the Summer Flounder fisheries;
   - Evaluate past and possible future changes to size regulations on retention and selectivity in stock assessments and projections;
   - Incorporate sex-specific differences in size at age into the stock assessment; and
   - Explore if and how changes in distribution and movement of the Summer Flounder stock may affect survey indices and fishery performance.

7) The materials considered in reaching its recommendations.

- Staff memo: 2019 Summer Flounder Management Measures
- 2018 Summer Flounder AP Fishery Performance Report
- 2018 Summer Flounder Data and Projection Update
- 2018 Summer Flounder Fishery Information Document

All documents listed above are available on the SSC meeting website: http://www.mafmc.org/ssc-meetings/2018/july-17-18.

8) A certification that the recommendations provided by the SSC represent the best scientific information available.

To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.

Bluefish

Matt Seeley (MAFMC staff) and Mark Terceiro (NEFSC) briefed the SSC on the latest data update prepared by the NEFSC and the updated fishery performance plan prepared by the MAFMC and ASMFC Bluefish Advisory Panels. An updated assessment of Bluefish is expected by April 2019. Therefore, the OFL and ABC specifications recommended by the SSC are for 2019 only. According to the data update, total fishery catch for Bluefish in 2017 was 100% of the 2017 ABC. The commercial length frequency distribution of Bluefish in 2017 was similar to the previous two years; the recreational length frequency distribution of Bluefish in 2017 is more spread out, not showing the bi-modal distribution seen in previous years. Vessel repairs caused a significant delay in the NEFSC Fall Bottom Trawl Survey, and as a result the fall NEFSC survey abundance index for Bluefish was not calculated. All the available fishery-independent indices of recruitment for 2017, except the NJ ocean trawl survey, showed a decrease from 2016 values.

Responses by the SSC to the terms of reference provided by the Council (*in italics*) are as follows:

For Bluefish, the SSC will provide a written report that identifies the following for the 2019 fishing year:

1) The level of uncertainty that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the Omnibus Amendment.

> The SSC was provided with only a data update in 2018. Accordingly, the SSC maintained its evaluation of the level of uncertainty associated in the assessment. The SSC continues to categorize the Bluefish assessment as an SSC-modified OFL.

2) If possible, the level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold or, if appropriate, an OFL proxy.

> The SSC noted that the F_{msy} proxy of $F_{40\%}$ might be inappropriate for Bluefish, a highly productive species (Thorson et al. 2012; Rothschild et al. 2012). A proxy of $F_{35\%}$ is indicated by various published meta-analyses for the order Perciformes.

> Based on the evidence provided to the SSC in the 2018 data update, the SSC determined there was no compelling reason to change the OFL from its previous determination. Accordingly, using $F_{35\%}$, the SSC recommends an OFL for 2019 of **12,688 mt** (= 27.97 million pounds).

3) The level of catch (in weight) and the probability of overfishing associated with the acceptable biological catch (ABC) for the stock.

The SSC was not provided with stock projections. Recent catches have been consistent with previous projections. Thus, the SSC carried forward its 2018 recommendation for ABC for 2019. Accordingly, the ABC for 2019 is **9,895 mt** (= 21.82 million pounds).

4) The most significant sources of scientific uncertainty associated with determination of OFL and ABC.

- The SSC-recommended ABC is based on rolling over a projection from 2016 for 2018 for an additional year.
- Uncertainty in the stock recruitment relationship adds to uncertainty in appropriate reference points.
- The uncertainty in MRIP sampling overall, which is the most influential data in the assessment. Questions have been raised about the uncertainty in the historical MRFSS/MRIP estimates in general, and are particularly relevant here given the highly episodic nature of Bluefish catches in the recreational fisheries coast wide.
- Approximately 60% of the population biomass is in the aggregated 6+ age group for which there is relatively little information.
- Commercial discards are assumed to be insignificant, which may not be the case.

5) Ecosystem considerations accounted for in the stock assessment, and any additional ecosystem considerations that the SSC took into account in selecting the ABC, including the basis for those additional considerations.

The ABCs were not modified by the SSC based on ecosystem considerations.

The stock assessment included ecosystem considerations:

- An index of habitat suitability was calculated based on a thermal niche model. It was fit as a covariate to survey catchability but did not improve model fits.
- Diet compositions from multiple surveys were included as auxiliary information.

6) Prioritized research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation and/or improve the assessment level.

- Develop a fishery-independent index that better captures older, larger fish, which would reduce reliance on MRIP sampling.
- Develop Bluefish-specific MSY reference points or proxies.
- Evaluate species associations with recreational angler trips targeting Bluefish to potentially modify the MRIP index used in the assessment.
- Low frequency (long term) environmental variability may have caused changes in the timing of the movement of juvenile Bluefish through the region that, in turn, may have affected availability. Changes in the selectivity of age-0 Bluefish in the survey relative to water column or surface temperature and date should be examined.

- Evaluate methods for integrating disparate indices produced at multiple spatial and temporal resolutions into a stock-wide assessment model, especially for a migratory species like Bluefish.
- Initiate fishery-dependent and fishery-independent sampling of offshore populations of Bluefish.

7) The materials considered in reaching its recommendations.

- Staff memo: 2019 Bluefish Management Measures
- 2018 Bluefish AP Fishery Performance Report
- 2018 Bluefish Data Update
- 2018 Bluefish Fishery Information Document

All documents listed above are available on the SSC meeting website: http://www.mafmc.org/ssc-meetings/2018/july-17-18.

- Thorson, J. T., J. M. Cope, T. A. Branch, and O. P. Jensen. 2012. Spawning biomass reference points for exploited marine fishes, incorporating taxonomic and body size information. Canadian Journal of Fisheries and Aquatic Sciences 69: 1–13 (2012).
- Rothschild, B. J., Y. Jiao, and S.-Y. Hyun. 2012. Simulation Study of Biological Reference Points for Summer Flounder. Transactions of the American Fisheries Society 141: 126-136.

8) A certification that the recommendations provided by the SSC represent the best scientific information available.

To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.

Other Business

Surfclam OFL Working Group: Brandon Muffley (MAFMC staff) updated the SSC on progress being made by the SSC Surfclam OFL Working Group. The Working Group comprises Mike Wilberg, Tom Miller, Brian Rothschild, Paul Rago, and Dan Hennen (NEFSC), and was created to further refine Dan Hennen's methodology for estimating a Surfclam OFL. A report of the entire Working Group will be developed and presented to the SSC that will outline analyses and outcomes that provide a clear path/decision process for OFL and ABC recommendations. This report will likely use a lot of the information contained in the report Dan presented to the SSC in May 2018. Information and details on stock-wide biomass estimates from the benchmark stock assessment will also be added to the Working Group report, since this information will also be considered by the Working Group as a possible method to determine an OFL/ABC.

Given other commitments and scheduling conflicts, the Working Group felt it was overly optimistic to get all of the work done and documents ready for the in-person SSC meeting in

September 2018. The group did not express any concerns about completing the tasks and getting the SSC together prior to the Council imposed deadline (February 2019 Council meeting). The Working Group will have another call (likely a webinar) in the early fall to discuss the results of Dan's analyses, and to step through the process of making OFL and ABC recommendations using the different approaches (i.e., assessment results and swept area biomass results) for both 2019 and 2020.

State of the Ecosystem Report: Sarah Gaichas reported on work being done by NEFSC on the annual State of the Ecosystem Report to address information needs of user groups, including the Councils. A workshop with user group representatives is planned for August that will be devoted to refining the report; Brandon Muffley will attend and represent MAFMC interests.

NRCC Assessment Scheduling Working Group: John Boreman and Brandon Muffley briefly discussed progress being made by the Working Group assigned by the NRCC to develop a process for scheduling stock assessments. This process includes defining and developing guidelines for the different levels of assessments, based on the type of peer review needed, and balancing assessment needs of the Councils and ASMFC with workload capabilities of NEFSC. A full SSC briefing is scheduled for the September 2018 SSC meeting, by which time the Working Group should be in the final stages of assessment scheduling development.

c: SSC Members, Warren Elliott, Chris Moore, Brandon Muffley, Kiley Dancy, Julia Beaty, Matt Seeley, Mark Terceiro, Gary Shepherd, Tony Wood, Jan Saunders

Mid-Atlantic Fishery Management Council
Scientific and Statistical Committee Meeting

July 17-18, 2018

Hyatt Place Inner Harbor

511 South Central Avenue, Baltimore, MD, 21201

AGENDA

Tuesday, July 17, 2018

12:30   Chub Mackerel ABC specifications for 2021-2023 (J. Beaty)

3:00   Black Sea Bass data and fishery update; review of previously recommended 2019 ABC (J. Beaty)

4:30   Scup data and fishery update; review of implemented 2019 ABC (J. Beaty)

5:30   Adjourn

Wednesday, July 18, 2018

8:30   Summer Flounder ABC specifications for 2019; data and fishery update (K. Dancy)

10:30   Bluefish ABC specifications for 2019; data and fishery update (M. Seeley)

12:30   Adjourn

MAFMC Scientific and Statistical Committee
17-18 July 2018
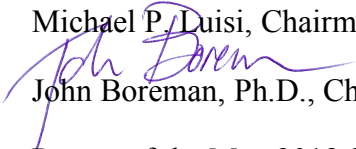Baltimore, Maryland

Meeting Attendance

Name	Affiliation

SSC Members in Attendance:

John Boreman (SSC Chairman)	NC State University
Tom Miller (SSC Vice-Chairman)	University of Maryland – CBL
Sarah Gaichas	NMFS Northeast Fisheries Science Center
Ed Houde	University of Maryland – CBL (retired)
Mike Wilberg	University of Maryland - CBL
Olaf Jensen	Rutgers
Dave Secor	University of Maryland - CBL
Paul Rago	NMFS (retired)
Yan Jiao	Virginia Tech
Cynthia Jones (7/19 only)	Old Dominion University
Wendy Gabriel	NMFS Northeast Fisheries Science Center

Others in attendance:

Kiley Dancy	MAFMC staff
Julia Beaty (7/17 only)	MAFMC staff
Brandon Muffley	MAFMC staff
Matt Seeley (7/18 only)	MAFMC staff
Mike Luisi (7/17 only)	MAFMC Chair
Mark Terceiro (by phone)	NMFS Northeast Fisheries Science Center
Gary Shepherd (by phone, 7/17 only)	NMFS Northeast Fisheries Science Center
Tony Wood (by phone, 7/18 only)	NMFS Northeast Fisheries Science Center
Emily Gilbert	NMFS GARFO
Caitlin Starks	ASMFC
Kirby Rootes-Murdy (7/18 only)	ASMFC
Jeff Kaelin (7/17 only)	Lund's Fisheries
Purcie Bennett-Nickerson (7/17 only)	Pew Charitable Trust

M E M O R A N D U M

Date: 18 May 2018

To: Michael P. Luisi, Chairman, MAFMC

From: John Boreman, Ph.D., Chair, MAFMC Scientific and Statistical Committee

Subject: Report of the May 2018 SSC Meeting

The SSC met in Baltimore on the 8th and 9th of May 2018. The main objectives of the meeting were to develop new ABC specifications for Atlantic Mackerel in light of the results of the recent SAW/SARC benchmark assessment and affirm (or develop new) ABC specifications for Longfin Squid, *Illex* squid, Butterfish, Surfclam, and Ocean Quahog based on data updates (Attachment 1). Other topics discussed at the meeting included a presentation and discussion of the MRIP transition to new sampling designs for the catch and effort surveys and a report from the SSC panel assigned to review the proposed re-design of the Northeast Fisheries Science Center's Surfclam and Ocean Quahog Survey.

A total of 14 SSC members were in attendance each day (Attachment 2), which constituted quorums. Also attending were MAFMC staff, staff from the NEFSC and NMFS Headquarters, and representatives from VIMS, Pew, SeaFreeze, Lund's Fisheries, Sea Watch International, Wallace and Associates, and the Garden State Seafood Association. Documents referenced in the report and associated meeting presentations can be accessed via the SSC's meeting website (http://www.mafmc.org/ssc-meetings/2018/may-8-9).

MRIP Fishing Effort Survey Update

Kelly Denit and John Foster (NMFS Headquarters) briefed the SSC on the status of implementing the new fishing effort survey under the Marine Recreational Information Program (MRIP), as well as progress in calibrating MRIP data collected on catch and effort using new survey designs with the time series of data from previous years (1981-2017). The main part of the discussion and questions from the SSC centered around factors influencing or driving the large increase in effort estimates between the old coastal household telephone survey and the new fishing effort (mail-in) survey. The "gate keeper" effect caused by the telephone survey (person who answered the phone) biased how that survey got to anglers in a household; the mail-in survey allows for a more complete survey coverage and has a much higher response rate. Discussion also addressed how the new intercept and mail-in surveys will lead to improvements in the precision of the catch estimates, and how the new survey weights the sampling of households with licensed fishermen versus the general population of households in coastal states.

The SSC was re-assured that the calibrated estimates linking the data currently being collected under the new MRIP catch and effort surveys with the data series dating back to 1981 will be released on July 2nd.

Atlantic Mackerel

Kiersten Curti (Northeast Fisheries Science Center) presented the most recent benchmark assessment for Atlantic Mackerel, which was approved by the SARC (SARC 64), followed by a summary by Jason Didden (MAFMC staff) of the fishery performance report and staff recommendations. John Boreman, who chaired the SARC review of the benchmark assessment, summarized the SARC panel findings. Besides accepting the benchmark assessment, the SARC panel concluded that the stock is currently overfished (spawning stock biomass is below one-half of SSB_{MSY}) and experiencing overfishing (the fishing mortality rate is above the F_{MSY} threshold). Dr. Curti provided stock biomass projections for several management scenarios, including a five- or seven-year stock rebuilding strategy, based on the biological reference points in the benchmark assessment.

Responses by the SSC to the terms of reference provided by the Council (*in italics*) are as follows:

For Atlantic Mackerel, the SSC will provide a written report that identifies the following for fishing years 2019-2021:

1) The level of uncertainty that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the Omnibus Amendment.

The SSC acknowledges the tremendous progress made for Atlantic Mackerel, a stock that previously required *ad hoc* ABC specifications. The SSC accepted the overfishing limit (OFL) estimate for 2019 provided in the assessment and determined the level of uncertainty of OFL in the assessment requires an SSC-specified coefficient of variation (CV).

2) For 3A below, if possible, the level of catch (in weight) associated with the overfishing limits (OFLs) based on the maximum fishing mortality rate threshold or, if appropriate, an OFL proxy.

New biological reference points were proposed in the benchmark assessment, which were reviewed and accepted by SARC 64. Unable to parameterize a stock recruitment relationship, SAW 64 recommended $F_{40\%}$ be used as a proxy for F_{MSY} and total spawning stock biomass at $F_{40\%}$ ($SSB_{40\%}$) be used as the proxy for the stock biomass reference point. The $F_{40\%}$ value produced an F_{MSY} proxy of 0.26.

Updated projections produce an OFL of **31,764 MT** for 2019 from the F_{MSY} proxy of 0.26 applied to the projected 2019 biomass and assuming preliminary 2017 catch and expected 2018 catch. OFL will change for 2020 and 2021, based on the expected catch scenario.

3) Provide the acceptable biological catch (ABC) for the stock under the following Council risk policy alternatives for Atlantic Mackerel:

A. Consistent with the current risk policy typically used by the SSC, the level of catch (in weight) and the probability of overfishing associated with the ABC for the stock, the number of fishing years for which the ABC specification applies and, if possible, interim metrics that can be examined to determine if multi-year specifications need reconsideration prior to their expiration.

Trends in the egg production ratio of northern to southern contingents suggests varying composition over time. Such differences may be attributable to varying recruitment or exploitation between contingents. Analyses of ecosystem factors suggest potential climatic influences on distribution patterns and biological production. High levels of recruitment before 1975 were not incorporated into the final model due to uncertainty about re-establishing similar levels of recruitment under current conditions. This reduces the overall estimates of B_{MSY} and associated yields.

Catches varied over nearly two orders of magnitude but have oscillated downward from the late 1960s to present. Fishing mortality has varied over an order of magnitude over the same period, but age-specific selectivity obscures the force of mortality on the population when the age composition is truncated. The recovery of the population in response to increases in recruitment and relaxation of fishing mortality suggests that estimates are reasonably accurate. Management strategy evaluations were not conducted to test the robustness of model performance under these levels of fishing mortality.

In developing its OFL CV determination, the SSC considered the following areas and make the observations noted.

Data Considerations: The development of a stock-wide egg production index for Atlantic mackerel constituted a major advance for this assessment. The pattern in the time series of the NEFSC spring bottom trawl survey was substantially different to the pattern evident in the stock-wide egg production index, in the catch time series, and in the abundance time series estimated in the assessment model. Tracking of cohorts in the trawl survey and total catch-at-age is detectable for strong cohorts, but occasionally inconsistent for weaker cohorts. Missing catch in Canadian fisheries averages about 5000 mt per year. Recreational catches and discards were generally a minor proportion of total removals

Model considerations: Three alternative age-based models were considered (ASAP, SAM, CCAM). All three models considered Atlantic Mackerel as a single unit stock and did not include any contingent dynamics known to be present empirically. The ASAP model was the preferred model for management. Over 150 model configurations of the ASAP model were evaluated in a logical progression for model identification and sensitivity.

Retrospective adjustment: No important retrospective patters were apparent in the ASAP results.

Comparison with empirical scale: Even though an independent, empirical index of population scale is lacking (because all data are used in the assessment), the ASAP model appears to be robust with respect to both trend and scale.

Trend in recruitment: There was no trend in recruitment evident in the three assessment models evaluated (ASAP, SAM and CCAM). However, there were differences among the models with respect to terminal year estimates of recruitment, which were particularly important given the incomplete sampling of the 2015 year class. The ASAP model estimates of terminal recruitment were about two to three times higher than the SAM and CCAM estimates and also less precise. These discrepancies in the terminal year abundance have important implications for biomass projections. This source of model uncertainty may have substantial consequences for the reliability of the short-term projections based on the ASAP model.

Assessment accuracy under different fishing pressures: Although the overall trend in abundance has been a downward trend, and the overall trend in fishing pressure has been generally upwards, the SSC was convinced that there was sufficient interannual contrast in the pattern of stock biomass and fishing mortality to be informative.

Simulations/ MSE: No MSE was conducted.

Ecosystem factors accounted: The assessment assumed a constant $M = 0.2$ for all ages and across time. However, the role of Atlantic Mackerel as an important forage species suggest this assumption introduces uncertainty into short-term population projections.

Collectively, the attributes of the Atlantic Mackerel assessment suggest a high degree of confidence in the results, but the SSC expressed particular concern about the reliance of the OFL on a moderately high and uncertain terminal year recruitment estimate in the ASAP model; comparably high estimates were not obtained in the SAM or CCAM models. Furthermore, lack of confirmation of the strength of the 2015 year class in commercial landings or bottom trawl surveys suggests that a CV of 100% is appropriate for estimation of ABC.

Based on the assumption that the OFL CV is 100% with a lognormal distribution, and a typical life history, the ABC recommendations for 2019-2021 are as follows:

> 2019: **19,025 mt**, P* = 0.269
>
> 2020: **26,183 mt**, P* = 0.333
>
> 2021: **33,001 mt**, P* = 0.386

Interim metrics:

- Age structure in the fishery, as well as the survey
- Continued evidence of the influence of the 2015 year class (and other strong year classes)
- Egg index

- Fishery performance reports (especially factors influencing catch)

B. Consistent with the Council's proposed risk policy change for using a 5-year Atlantic Mackerel rebuilding timeline (see staff memo), the level of catch (in weight) for the stock associated with a 5-year rebuilding fishing mortality rate, the number of fishing years for which the ABC applies and, if possible, interim metrics that can be examined to determine if multi-year specifications need reconsideration prior to their expiration.

[The SSC notes that both options B and C (Options 2 and 3 in the staff memo) suggest a more aggressive harvest policy than the Council would use under the P* approach for both an overfished stock and for a stock at or above its target biomass. Both options result in a smaller difference between the ABC and OFL than the SSC would recommend under the standard risk policy for a stock above its target biomass.]

ABCs for 2019-2021 based on a 5-year rebuilding F (F = 0.237):

> 2019: **29,184 mt**
>
> 2020: **32,480 mt**
>
> 2021: **35,195 mt**

Interim metrics:

- Age structure in the fishery, as well as the survey
- Continued evidence of the influence of the 2015 year class (and other strong year classes)
- Egg index
- Fishery performance reports (especially factors influencing catch)

C. Consistent with the Council's proposed risk policy change for using a 7-year Atlantic Mackerel rebuilding timeline (see staff memo), the level of catch (in weight) for the stock associated with a 7-year rebuilding fishing mortality rate, the number of fishing years for which the ABC applies and, if possible, interim metrics that can be examined to determine if multi-year specifications need reconsideration prior to their expiration.

ABCs for 2019-2021 based on a 7-year rebuilding F (F = 0.252):

> 2019: **30,868 mt**
>
> 2020: **34,016 mt**
>
> 2021: **36,551 mt**

Interim metrics:

- Age structure in the fishery, as well as the survey

- Continued evidence of the influence of the 2015 year class (and other strong year classes)
- Egg index
- Fishery performance reports (especially factors influencing catch)

4) The most significant sources of scientific uncertainty associated with determination of OFL and ABC.

- The estimated size of the most recent year class in the assessment (substantially higher than most recent recruitments) drives assumptions about rebuilding times, OFLs, and ABCs;
- Conversion of egg survey results to the spawning stock biomass estimate;
- The assessment is sensitive to the distribution of Atlantic Mackerel, which has been changing and may continue to change;
- Trawl survey representation of abundance and age structure;
- The assumption of fixed natural mortality rate and data gaps associated with major predators of mackerel; and
- Missing catch information from bait and recreational fisheries in Canada.

5) Ecosystem considerations accounted for in the stock assessment, particularly with regard to Atlantic Mackerel's role as forage for predators in the Mid-Atlantic, and any additional ecosystem considerations that the SSC took into account in selecting the ABC, including the basis for those additional considerations.

An ecosystem criterion was applied in determination of OFL CV (but was not the primary consideration). The SSC did not include specific ecosystem considerations in the ABC.

Working papers prepared for the assessment addressed habitat changes, changing availability, and changes to the fishery. The information contained in the working papers provided useful background for the assessment and contributed to the model identification process, as well as the decision on which portion of the recruitment time series to use.

The SAW 64 did not explicitly account for predation mortality in the assessment. Ancillary analysis contained as a working document and considered by the working group indicated low incidence in the diets of fishes sampled within the NEFSC bottom trawl survey. Predation by highly migratory species, sharks, marine mammals, and birds remains unknown.

6) Prioritized research or monitoring recommendations that would reduce the scientific uncertainty in the ABC recommendation and/or improve the assessment level.

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. This recommendation requires a continuation of the work done to identify and quantify Atlantic Mackerel eggs collected in the survey. Continuing collaboration with both the fishing industry and Canadian scientists to maintain the assessment is also recommended by the SSC.

In addition, the SSC recommends:

- Ensuring all components of the fishery (e.g., emerging jig fishery) are sampled biologically;
- Investigating acoustic survey methods for Atlantic Mackerel;
- Investigating methods for using the egg survey as an absolute estimate of spawning stock biomass; and
- Investigating eDNA methods for Atlantic Mackerel.

7) The materials considered in reaching its recommendations.

- SAW 64: Summary Report / Assessment Report / Panelist Reports
- Atlantic Mackerel Data Update for 2019 Specifications
- Mackerel Rebuilding Memo for Council
- Mackerel Projections (P*) (Excel file)
- Mackerel Projections (rebuilding) (Excel file)
- 2018 Atlantic Mackerel, Squid, Butterfish AP Fishery Information Document
- 2018 Atlantic Mackerel, Squid, Butterfish AP Fishery Performance Report
- MSB Staff Memo

All documents listed above are available on the SSC meeting website: http://www.mafmc.org/ssc-meetings/2018/may-8-9

8) A certification that the recommendations provided by the SSC represent the best scientific information available.

To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.

Illex Squid, Longfin Squid, and Butterfish

Jason Didden (MAFMC staff) presented the data updates prepared for *Illex* squid, Longfin Squid, and Butterfish prepared by the NEFSC, along with the respective fishery performance reports prepared by the advisory panel. The 2017 fall NEFSC survey indices for the three species were not computed because a substantial proportion of habitat was not sampled (vessel mechanical problems). Landings of *Illex* squid increased in 2016, and in 2017 reached the third highest level (22,516 mt) since the 1987 origin of the US fishery, and the fishery was closed in September 2017 when 95% of the annual quota was met. The 2017 preliminary landings statistics for Longfin Squid, while incomplete, were down from 2016 by about half. Landings of Butterfish in 2017 were 3,666 mt, the highest since the resumption of the directed fishery; estimates of fishery discards for 2017 were not available in time for the SSC meeting. Based on this information, as well as the information contained in the fishery performance reports, the SSC concluded that no adjustments to the standing ABC recommendations for *Illex* squid, Longfin Squid, and Butterfish were necessary for the 2019 fishing year.

Surfclams and Ocean Quahogs

Dan Hennen (NEFSC) presented survey and fishery updates for Atlantic Surfclam and Ocean Quahog, and Jessica Coakley (MAFMC staff) summarized the fishery performance reports and MAFMC staff recommendations. Based on the information presented, the SSC concluded that no changes to the standing ABC recommendations for the 2019 fishing year were necessary for either species.

Following his update of the survey and fishery catch information for Surfclam, Dan Hennen presented a method he developed for calculating a proxy for the Surfclam OFL. Several SSC members expressed interest in working with Dan to refine the method so it can be considered for use with a P* approach to estimating an ABC. Pending approval from the Council and NEFSC, a joint SSC/NEFSC working group will be established for this project with delivery of the results at a future SSC meeting.

New Design for Surfclam and Ocean Quahog Survey

The Northeast Fisheries Science Center is proposing changes to the design of the NEFSC's Surfclam and Ocean Quahog Survey as developed by a working group (WG) of NEFSC and MAFMC staff, academic partners, and other interested parties. The goals of the proposed changes are to improve the precision and utility of survey data used in stock assessments and to use survey resources more efficiently. NEFSC requested the MAFMC to have its SSC review the proposed new survey design to ensure that it will assist the SSC in development of scientific advice and improve management of the clam resources by the Council.

In the March 2018 SSC meeting, Larry Jacobson and Dan Hennen (NEFSC) presented an in-depth description of the proposed survey changes, their basis, and the anticipated improvements in scientific information resulting from the new survey design. Subsequently, an SSC Review Panel, comprising Ed Houde (Chair), Olaf Jensen, Rob Latour, and Mike Wilberg, undertook a detailed review of the proposed changes, based on the following terms of reference jointly developed by the NEFSC and SSC:

> 1A. Will the alternative survey design options recommended in the NEFSC report substantially improve 1) survey data, 2) stock assessment model results, and 3) management advice for surfclams and ocean quahogs?
>
> 1B. Review the report's justifications, evaluations, and recommendations to conduct separate surveys for surfclams and ocean quahogs. Will the recommended design improve the Council's ability to assess and manage these resources?
>
> 2. Are recommended options for the redesign of the NEFSC clam survey appropriate based on 1) life history and biology of surfclams and ocean quahogs, 2) ongoing climate induced distributional shifts, and 3) fishery patterns? Do answers differ for surfclams and ocean quahogs?
>
> 3. Critique the report's recommendations for surfclams and ocean quahogs, with respect to proposed changes in survey scheduling and the reduction in survey spatial coverage.

4. Review and evaluate proposed stratifications in the sampling design recommended by the NEFSC WG. Are the recommended strata, primarily defined by depth and location, appropriate or would an alternative stratification plan, e.g., based on clam abundances, be preferable?

5. Will the proposed changes in the surfclam and ocean quahog survey compromise ability to utilize the lengthy historical time series of survey data in future assessments?

6. Will the recommended changes in survey design affect observation and estimation of biological characteristics, such as length-weight relationships and growth rates? What are the likely effects?

In this meeting, Ed Houde presented the following findings of the Review Panel:

- The WG's proposed design revises the current survey design, resulting in substantial reductions in area covered by the survey, and proposes separate surveys for Surfclam and Ocean Quahog in contrast to the current combined-species survey.
- The Review Panel, while in overall agreement with the WG's recommended new design, recognized that alternative design approaches could have been considered.
- The new design proposes a survey frequency similar to that currently conducted for Surfclam, which will increase precision of the surveys, improve estimates of abundance, and is likely to improve management advice for this species. Improvements for Ocean Quahog and utility for management are likely, but less certain because of reduced frequency of the proposed surveys for this species.
- Alternative approaches to survey designs were noted by the Review Panel and discussed relative to the design-based approaches proposed by the WG. The Review Panel recommended model-based spatial simulations be undertaken to support longer-term consideration and research on survey design for the clam species.
- The Review Panel also noted that the WG had not considered habitat and environmental variables (beyond location and depth) to optimize survey design. The WG argued that its recommended stratification largely avoids discontiguous strata, but the Review Panel noted that such stratification has merit under some circumstances.
- The Review Panel believes that multivariate techniques for survey optimization (i.e., finding a design that minimizes some combination of the variances for both species) are available that could have been tested to define an appropriate base case against which to compare a survey design in which each species is surveyed separately. Further research and in-depth consideration of alternative stratification schemes is recommended.
- The Review Panel believes there will be little loss of historical information if the new survey design is adopted. It also is unlikely that there will be a loss of biological data and information.
- It is noted that, if the new proposed survey design is adopted, a change in stock assessment schedules for Surfclam and Ocean Quahog will be necessary. Current assessments are conducted on a 3-4-year timetable. If the new design is adopted, assessment for Surfclam would be conducted every four years and that for Ocean Quahog every six years.
- The WG believes that a decadal reconsideration of survey design will be adequate for these species. This may be sufficient, although some evaluation is desirable. The Review Panel recommends that a new Term of Reference be added to the stock assessment protocol for these species that addresses the possible need for re-evaluation of survey designs during deliberations for each stock assessment.

In addition to its findings, the Review Panel provided ten short- and longer-term recommendations to the NEFSC WG for its consideration.

A main topic of SSC discussion of the Review Panel's report was the potential impact on the clam dredge survey (as well as the clam fisheries) of proposed wind farms and associated transmission cables that are contemplated for the Northeast US Continental Shelf, which could be extensive. SSC members also expressed concern about "edge effect" in the survey caused by a shift in distribution of Surfclam and Ocean Quahog induced by climate change. Dan Hennen responded that the overlap of sampling strata for Surfclam with those for Ocean Quahog would enable detection of such an effect, and the survey design could be adjusted accordingly.

The SSC endorsed the report from the Review Panel and agreed to adopt it as a product of the committee. The SSC also looks forward to seeing the formal response from the NEFSC to the report's findings and recommendations.

c: SSC Members, Warren Elliott, Chris Moore, Brandon Muffley, Jason Didden, Jessica Coakley, José Montañez, Kiersten Curti, Dan Hennen, Kelly Denit, John Foster, Jan Saunders

Mid-Atlantic Fishery Management Council
Scientific and Statistical Committee Meeting

8-9 May 2018
Baltimore, MD

Agenda

Tuesday, May 8, 2018

10:00   MRIP FES update (K. Denit/J. Foster)

11:00   Atlantic Mackerel benchmark assessment; Council rebuilding framework (K. Curti/J. Didden)

12:30   Lunch

1:30   Develop Atlantic Mackerel ABC recommendations

   • Current risk policy approach and rebuilding plan options

3:00   Illex, Longfin Squid, and Butterfish data and fishery updates; review of implemented 2019 ABCs (J. Didden)

5:00   Adjourn

Wednesday, May 9, 2018

8:30   Surfclam and Ocean Quahog data and fishery update; review of implemented 2019 ABCs (D. Hennen/J. Coakley)

11:00   NEFSC clam dredge survey SSC Working Group review (E. Houde)

12:30   Adjourn

MAFMC Scientific and Statistical Committee
8-9 May 2018
Baltimore, Maryland

Meeting Attendance

Name	Affiliation

SSC Members in Attendance:

John Boreman (SSC Chairman)	NC State University
Tom Miller (SSC Vice-Chairman)	University of Maryland – CBL
Mark Holliday	NMFS (Retired)
Sarah Gaichas	NMFS Northeast Fisheries Science Center
Ed Houde (5/9 only)	University of Maryland – CBL (retired)
Lee Anderson	University of Delaware (retired)
Mike Wilberg	University of Maryland - CBL
Brian Rothschild	UMass Dartmouth (retired)
Rob Latour	VIMS
Olaf Jensen	Rutgers
Dave Secor	University of Maryland - CBL
Paul Rago	NMFS (retired)
Yan Jiao	Virginia Tech
Cynthia Jones (5/8 only)	Old Dominion University
Wendy Gabriel	NMFS Northeast Fisheries Science Center

Others in attendance:

Jessica Coakley	MAFMC staff
Jason Didden (5/8 only)	MAFMC staff
Brandon Muffley	MAFMC staff
José Montañez	MAFMC staff
Chris Moore (5/9 only)	MAFMC staff
Kiersten Curti (5/8 only)	NMFS Northeast Fisheries Science Center
Dan Hennen (5/9 only)	NMFS Northeast Fisheries Science Center
Greg DiDomenico (5/8 only)	Garden State Seafood Association
Jeff Kaelin (5/8 only)	Lund's Fisheries
Kelly Denit (5/8 only)	NMFS Headquarters
John Foster (5/8 only)	NMFS Headquarters
Jay Peterson (5/8 only)	NMFS Headquarters
John Manderson (5/8 only)	NMFS Northeast Fisheries Science Center
Doug Christel (5/8 only)	NMFS GARFO
Purcie Bennett-Nickerson (5/8 only)	Pew Charitable Trust
Guy Simmons (5/9 only)	SeaFreeze
Roger Mann (5/9 only)	VIMS, Council member
David Wallace (5/9 only)	Wallace and Associates
Tom Alspach (5/9 only)	Sea Watch International