M E M O R A N D U M

Date: 21 March 2018

To: Michael P. Luisi, Chairman, MAFMC

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

Subject: Report of the March 2018 SSC Meeting

The SSC met in Baltimore on the 13th and 14th of March 2018. The main objectives of the meeting were to develop new ABC specifications for Blueline Tilefish in light of the results of the recent SEDAR benchmark assessment and affirm (or develop new) ABC specifications for Golden Tilefish based on a data update (Attachment 1). Other topics discussed at the meeting included a presentation and discussion of the new design developed by the Northeast Fisheries Science Center (NEFSC) for the Surfclam and Ocean Quahog survey, the state of the ecosystem report and associated risk assessment, and continuing development of criteria for setting coefficients of variation (CVs) for overfishing limits (OFLs) by the SSC.

A total of 14 SSC members were in attendance either in person or via webinar (Attachment 2), which constituted a quorum. Also attending were MAFMC staff, staff from the NEFSC (via webinar), and representatives from the South Atlantic Fishery Management Council staff and SSC, ASMFC, Rutgers, 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/march-13-14).

New Design for Surfclam and Ocean Quahog Survey

Larry Jacobson and Dan Hennen (NEFSC) presented an overview of proposed changes to the design of the NEFSC's Surfclam and Ocean Quahog Survey that were developed by a working group 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. Preliminary ideas were discussed with the SSC at its May 2017 meeting. Recommendations from the working group for the new sampling design include: (1) targeting one species at a time and avoiding very poor habitat to increase sample density on good habitat; (2) achieving optimal allocation to the extent possible; (3) using species-specific stratification schemes based on current strata, avoiding sampling areas with no/low density target species; (4) reducing the number of new strata by combining old ones to improve allocation and variance estimates; (5) using historical catch (carefully), in addition to location and depth to identify strata; (6) being at sea every year (i.e., eliminate the gear testing

year), alternating the Georges Bank region with the Southern region; (7) maintaining the current survey periodicity for Surfclams (every three years) and reducing the frequency for Ocean Quahogs to once every six years; and (7) staying off rocky ground to avoid gear damage.

The opinion of the working group is that the proposed new design for the survey seems unlikely to hurt either the Surfclam or Ocean Quahog assessment; will increase the precision with no reduction in sampling frequency for Surfclams, and increases in precision will outweigh the reduction in sampling frequency for Ocean Quahogs; require less travel time during the survey; and lead to better spatial resolution for understanding characteristics like patch density, spatial correlation in size and age structure, and recruitment.

SSC members questioned the basis for stratification in the new design, pointing out that, ideally, stratification should be based on densities of Surfclams and Quahogs. Discussion also focused on what should constitute the ideal number of strata, and the ability to use information collected during the "off years" of the survey to enhance understanding of the biological characteristics and habitat requirements of the target species.

An SSC special review panel, chaired by Ed Houde, along with Mike Wilberg, Rob Latour, and Olaf Jensen, will undertake a greater in-depth review of the proposed design and report back to the full SSC at the May 2018 meeting.

State of the Ecosystem Report

Sarah Gaichas presented the draft 2018 Mid-Atlantic State of the Ecosystem Report produced by the Northeast Fisheries Science Center. The presentation reviewed the purpose of the report, changes for 2018, and main messages. The aim of the report is to inform fishery managers on an annual basis regarding ecosystem status and trends that are relevant to fishery management decision making. The report is designed to be short (~20 pages) and to use non-technical language. As in 2017, the report is organized to align indicators with overarching management objectives. The 2018 report was further revised to emphasize synthesis across indicators rather than reporting of individual indicators, and to include a wider range of expertise in the planning, synthesis, and reporting through a series of workshops. MAFMC staff (Rich Seagraves) attended the organizational workshop in July 2017, and his suggestions were implemented in the 2018 report, including adding indicators for protected species-fishery interactions (new section), and for species entering the MAFMC region from the south. In addition, the SSC had requested indicators for harmful algal blooms in Chesapeake Bay and for regional mariculture production. Other changes for 2018 included consolidation of report sections to integrate habitat indicators into the resource species section, and to link lower trophic levels and fish productivity in an ecosystem conditions and productivity section. Further, aggregate species categories were consolidated and simplified, and trend analysis was updated to reflect recent simulation analysis evaluating trend detection in time series with varying levels of autocorrelation.

The SSC requested a clearer definition of "Mid Atlantic" be included in the report (such as a map). Further, some important ecosystem dynamics happen at larger scales than the Mid Atlantic, so the SSC requested more rationale for the scale of indicators, and that indicators

specific to the Mid-Atlantic region be clearly delineated from indicators representing a larger region. The SSC noted that some work had been done between the US and Canada to assemble survey information on species throughout the continental shelf across the international border and suggested that this information be examined and included if available and relevant.

The SSC commented that the indicators presented in the report generally align with the overall objectives, that the objectives are the right ones to look at, and that this is a good starting point; however, there may be better indicators than the ones presented. For example, gross revenue is just a proxy for economic performance, which could be refined. Similarly, recreational participation is driven by both management and other influences well outside MAFMC management, such as availability of leisure time and competing recreational opportunities. As such, the SSC encourages more in-depth analysis of the social and economic indicators in the report.

The ecosystem indicators in the 2017 Mid-Atlantic State of the Ecosystem report formed the basis for a risk assessment designed to support EAFM for the Mid-Atlantic Fishery Management Council in 2017. This risk assessment was developed as a Council product with NEFSC support. Risk assessment is the initial step in the Council's defined process for integrating ecosystem interactions into fishery management. Through a series of workshops with Council committees and stakeholders, the risk assessment was defined to encompass risks of concern to the Council (Risk Elements), why they are of concern (Risk Definitions), and what indicators are available to evaluate risk. A total of 33 Risk Elements were considered across five categories (Ecological, Economic, Social, Food Production, and Management), and 25 were carried forward for analysis after review by the Council. Risk Rankings (low, low-moderate, moderate-high, high) were defined based on iterative discussions with the Council committee and stakeholders over the course of several months. In most cases, risk rankings were tied to trends in indicator time series, with higher risk assigned to declining trends. The risk assessment report was accepted by the Council in December 2017 as a basis for moving forward with EAFM in the region and is considered a living document that can be updated with ecosystem indicators from the State of the Ecosystem reporting.

The SSC commented that risk rankings based on trends may be problematic if there is a threshold where a trend may not be capable of being reversed. Although trend-based risk rankings were discussed by the MAFMC Ecosystems and Ocean Planning Committee as an acceptable first pass for risk elements where thresholds are unspecified or unknown, the SSC commented that more clearly specified performance measures would be useful to better evaluate risks to meeting Council objectives in future EAFM risk assessments.

Criteria for Setting CVs for OFLs

The SSC continued discussions from the SSC's September 2017 meeting and considered a revised draft of a framework for setting the Coefficient of Variation (CV) for the Overfishing Limit (OFL). The Acceptable Biological Catch (ABC) for any stock is a function of the Council's risk policy for overfishing, the control rule for reducing fishing mortality in response to stock abundance, and the uncertainty of the estimated catch when the threshold fishing mortality rate is applied. The uncertainty of the OFL is quantified as its relative precision or CV.

The SSC has consistently applied the principle that variation of the OFL is underestimated by the variability estimated within the assessment model. This arises because such variability is conditional on a single model without explicit consideration of less plausible, but viable alternative models.

Following the September meeting, the OFL CV Working Group met with scientists at the Northeast Fisheries Science Center (NEFSC) and separately had a conference call prior to this meeting. The SSC's focus in this meeting was to discuss recommendations from the OFL CV Working Group and to finalize the framework for setting the CV of the OFL. Recommendations from the Working Group included:

- Provide further justification for the CV levels currently applied to OFLs for MAFMC stocks and assign three levels that should encompass most stock assessment results.
- Include a new criterion, "Data Quality," for evaluating uncertainty.
- Consider an option of allowing an SSC-defined CV apart from the three levels.
- Consider two hypothetical applications of the framework to MAFMC stocks.

After much discussion, the SSC agreed that the appropriate CVs for OFL estimates would be 60%, 100%, and 150%. Results of MSE simulations provided by Dr. John Wiedenmann for Summer Flounder, Scup, and Butterfish suggested that control rules based on 60% and 100% typically performed well with respect to conservation objectives and long-term yield. Average negative impacts for short-term yields were typically less than 10%. Dr. Wiedenmann did not consider highest level of CV (i.e., 150%), but it would be expected that achievement of the conservation objectives would be enhanced and reductions in short-term yields would be greater.

The SSC agreed to include a ninth criterion in the framework, labeled as Data Quality. Inclusion of this criterion recognizes that the types and quality of available data are primary determinants of the utility of any assessment model. Important fishery-independent data considerations include survey design, survey coverage, and efficiency of survey gear. For fishery-dependent data, the accuracy and precision of landings and discards are critical considerations. Finally, stock assessments are, in general, greatly improved when natural mortality rates are known, by the inclusion of age data for surveys and removals, and when stock definition has a biological, rather than strictly an operational, basis.

Several suggestions for modifying the framework criterion were suggested. The SSC did not explicitly discuss the two example applications (Summer Flounder and Black Sea Bass) apart from noting that they supported the previous decisions to use the lowest CV of 60% for both species.

The SSC elected to exclude an SSC-defined option for setting the OFL CV. This option was considered inconsistent with previously accepted principles underlying the use of three bins. In particular, it was noted that a continuously varying CV that might be derived from a scoring function would likely be an exercise in false quantification. Such a scoring function would undoubtedly involve arbitrary weightings of various metrics and could be misleading. The final selection of an appropriate CV for the OFL would be informed by the consideration of the nine criteria, but ultimately would be based on the expert judgment of the SSC. It was noted that the

current MAFMC policy does allow the acceptance of a specific recommendation for an alternative CV, should one arise from a given stock assessment. It is anticipated that this would be a rare event.

The SSC suggested that the draft framework report be finalized to include the above recommendations and to incorporate a more general description of why these considerations are important for setting catch limits. The target audience for the report should include all Council stakeholders as well as the general public. The SSC discussed adding a section to the report that reviews how other SSCs are using CVs for OFLs in their ABC-setting processes (or not) but decided that this important issue should be addressed in a stand-alone document.

Blueline Tilefish

The status of the Blueline Tilefish stock along the Atlantic Coast was assessed in 2017 as part of the Southeast Data, Assessment, and Review (SEDAR) process. Due to the paucity of data north of Cape Hatteras, the SSC for the South Atlantic Fishery Management Council (SAFMC) recommended an ABC for only the portion of the stock south of Cape Hatteras. Through an agreement with the MAFMC, a joint SSC working group was formed essentially to: (1) develop an ABC recommendation to the two SSCs for the portion of the stock north of Cape Hatteras; and (2) recommend a method by which that ABC can be split between the subarea from Cape Hatteras to the VA/NC border, which is under SAFMC jurisdiction, and the subarea north of the NC/VA border, which is under MAFMC jurisdiction. The working group was able to recommend an ABC by using the DLMTool, run by Mike Schmidtke (under contract with the MAFMC) with assistance from Nikolai Klibansky (SEFSC Beaufort).

In the absence of reliable fishery dependent indices, the joint working group considered the use of the SUNY-Stony Brook fishery-independent sampling of Blueline Tilefish and Golden Tilefish in the MAFMC area, including the area north of Cape Hatteras under SAFMC jurisdiction (Frisk et al 2018), as a means to scientifically apportion the ABC based on resource distribution. After several adjustments recommended by the joint working group, stratified proportional estimates of Blueline Tilefish caught in the survey north and south of the VA/NC border result in an allocation of 56% of the north of Cape Hatteras ABC to the MAFMC and 44% to the SAFMC.

Mike Schmidtke presented his DLMTool analysis to the SSC, followed by a summary of the joint working group recommendations by Scott Crosson, chair of the group. Matt Seeley (MAFMC staff) then presented an overview of the specifications process, the stock status based on the most recent SEDAR assessment, recent fishery performance, and staff's recommendation for setting an ABC for the subarea north of the VA/NC border.

The SSC was generally concerned about the relatively high level of scientific uncertainty in many aspects of the DLMTool analysis; however, the SSC ultimately agreed that it represented the best science information available and was an improvement over the previous DLMTool analysis used by the SSC in 2016 to set ABC specifications. The SSC also concluded that the MSY estimate based on the DLMTool analysis is an estimate of the OFL, not the ABC (as

recommended by the joint working group), which enabled the SSC to use the P* approach and the Council's risk policy in setting ABC specifications. It is worth noting that in early May 2018 the SAFMC SSC will be using the same information and joint working group recommendations to develop an ABC for Blueline Tilefish in the subarea between Cape Hatteras and the VA/NC border.

The SSC's responses to the Terms of Reference provided by the MAFMC (*in italics*) are as follows:

For Blueline Tilefish (north of the Virginia-North Carolina border), 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 determined that the approach to estimating the ABC for Blueline Tilefish qualifies it as a stock for which there is an OFL estimate, based on the DLMTool analysis. The SSC will derive an OFL CV to determine the ABC.

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.

Based on the DLMTool analysis, the OFL estimate for this stock north of Cape Hatteras is **107.2 mt (236,329 pounds**). The SSC treats this value as an OFL because it is an MSY proxy that comes out of the methods employed in the analysis.

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

The SSC applied its OFL CV draft protocol to determine the OFL CV bin for this stock. Data quality is most characteristic of the highest OFL CV bin (150%), with no reliable abundance indices. Catch estimates are unreliable and natural mortality rates are unknown. The set of all plausible models gave highly divergent results, and no retrospective analysis was performed. There is no independent estimate of scale, and no ecosystem factors were accounted for in the assessment. There is no estimate of recruitment, no estimate of prediction error, and the assessment accuracy under different fishing pressures is unknown because the level of fishing pressure is unknown. The DLMTool management strategy evaluation (MSE) was not performed. Based on this information the SSC selected the highest OFL CV bin (150% CV).

Since the SSC lacked information on the estimate of stock biomass relative to B_{MSY}, a ratio of $B/B_{MSY} = 1$ was applied as a default value for the P* (i.e., P* = 0.4 under the MAFMC's risk policy). The SSC also assumed a typical life history (similar to Golden Tilefish). The resultant ABC estimate is **81.42 mt (179,500 pounds**) for the stock north of Cape Hatteras.

The SSC was asked to provide an ABC recommendation for the subarea north of the NC/VA border (subarea that is under the management purview of the MAFMC) and decided to use a

56% allocation for that subarea based on the recommendation of the joint working group. This allocation recommendation was based on a fishery independent survey (Frisk et al. 2018) due to the lack of reliable fishery-dependent (catch) data. The joint working group decided that landings histories were not indicative of stock distribution, primarily due to the recent and rapid rise of landings in the MAFMC jurisdiction while the fishery was largely unregulated, and to the constant shift of regulations by both Councils as they reacted to documented (SAFMC) and potential (MAFMC) overfishing in their respective jurisdictions. Landings histories exhibit wide fluctuations from year to year in both subareas, and the working group could not separate which were due to regulatory histories and which were due to underlying changes in the abundance and distribution of stock. This was the same conclusion reached by the Review Panel of SEDAR 50.

The SSC notes that the survey upon which the allocation recommendation is based represents only one year of study, and certainty in the allocation value based on information from this survey will undoubtedly improve if additional years of survey data are collected. The SSC also recognizes that other allocation methods may be developed by using information in addition to biological data. Based on the allocation method recommended by the joint working group, the ABC for the MAFMC-managed portion of the stock is therefore **45.6 mt (100,520 pounds)**. This ABC specification is for fishing years 2019, 2020, and 2021.

The SSC will review the following information in 2019 and 2020 to determine whether the ABC specifications should change: (1) any regulatory changes and how they may have altered fishery performance; (2) total catch by fishery sector; (3) size distribution in the catch; (4) spatially explicit catch, including recreational; and (5) CPUE and size distributions from fishery independent surveys.

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

- The model used by the SSC to set the ABC assumes that the Blueline Tilefish stock is a single stock, but the stock in the subarea north of Cape Hatteras could not be assessed with the portion of the stock to the south due to data limitations.

- The DLMTool implies a great deal of uncertainty with input data and the underlying population model. For example, growth parameters used in modeling were not directly estimated for Blueline Tilefish, but from other species. The DLMTool may have limited accuracy even if the assumptions are met.

- The catch time series was developed from a Delphi method and remains uncertain. Decisions about which portion of the time series to use in modeling affects the CV input substantially.

- The steepness parameter for the stock recruitment relationship was based on estimates from the SEDAR 32 assessment and the Shertzer and Conn (2012) paper, but it remains highly uncertain.

- The DLMTool assumes that the carrying capacity and productivity of Blueline Tilefish in waters north of Cape Hatteras is constant. It is unclear whether the spatial expansion of

the fishery since its inception represents increasing awareness of the fish as a target or increasing spatial range of its population as result of climate change (and hence increasing productivity).

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 data were available to allow the SSC to include specific ecosystem considerations in determining ABC.

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

1. Improvements in the accuracy of the catch time series with improved spatial resolution would be an important enhancement to estimating ABCs in the future.

2. Implementation of additional fishery-independent sampling will enhance understanding of the dynamics and biological characteristics of the stock and the range of management procedures that can be applied in estimating ABC.

3. The most recent information on stock structure of Blueline Tilefish indicates a single population along the Atlantic seaboard. The level of genetic exchange estimated suggests a high degree of connectivity in the population, but it is uncertain whether this occurs through early life stage distribution or movement of adults within the population. Consequently, the potential for localized depletion of fish in specific areas is unknown and worthy of study. There is a potential to leverage work on this species with similar research on Golden Tilefish.

4. The selectivity of the commercial fishery in the northern part of the range needs to be determined.

5. No age data are used in the current assessment because of uncertainty in age determination. Research into the reliability of aging and determination of growth parameters would provide additional approaches to assessing the stock and should be a high research priority **well in advance** of future assessments.

6. There are dynamic non-equilibrium methods that are not yet in DLMTool that may be more appropriate and should be investigated.

7) The materials considered in reaching its recommendations.

- 2018 Blueline Tilefish Fishery Performance Report

- 2018 Blueline Tilefish Advisory Panel Information Document

- Staff Memo on 2019-2021 Blueline Tilefish Specifications

- MAFMC/SAFMC Blueline Tilefish ABC Working Group Information

  o Joint Mid- and South Atlantic Blueline Tilefish Subcommittee TORs
  o Schmidtke Memo: Blueline Tilefish ABC Recommendation for north of Cape
    Hatteras, NC
  o Blueline Tilefish DLMTool Final Report (Schmidtke and MAFMC/SAFMC Working
    Group)
  o Blueline Tilefish Working Group Report
  o Blueline Tilefish Working Group Presentation
  o Fisheries-independent pilot survey for Golden & Blueline Tilefish throughout the
    range from Georges Bank to Cape Hatteras (Frisk et al. 2018)
  o SEDAR 50 Report

All documents listed above are available on the SSC meeting website:
http://www.mafmc.org/council-events/2018/march-2018-ssc-meeting

*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.

Golden Tilefish

José Montañez (MAFMC staff) briefed the SSC on the stock status, regulations, recent fishery
performance, and the data update provided by the Northeast Fisheries Science Center (NEFSC)
for Golden Tilefish. Last year, based on an assessment update undertaken by the NEFSC, the
SSC recommended a three-year average ABC of **742 mt (1.636 million pounds)** for fishing
years 2018, 2019, and 2020. The average ABC over the three-year period was calculated based
on the F_{MSY} proxy, an assumed lognormal coefficient of variability around OFL of 100%, the
assumption that the ABC is taken each year, and applying the Council's risk policy for a typical
life history. The SSC recommended that these ABCs be re-examined annually in light of
substantial changes in the size distribution in the catch or in the spatial distribution of the fishery,
which will be particularly important as the 2013 year class fully recruits to the fishery.

The data update provided by the NEFSC is consistent with the expectations of the SSC as the
2013 year class moves through the fishery. Therefore, the SSC recommends **no change** to ABC
specifications for the 2019 fishing year. The only concern raised by the SSC relates to the
influence of the IFQ system on landings and how this may affect the longer use of CPUE data
given the timing and size selectivity of the fishery is changing.

c: SSC Members, Warren Elliott, Chris Moore, Brandon Muffley, Matt Seeley, Jessica Coakley, José Montañez,
Mike Schmidtke, Paul Nitschke, Dan Hennen, Larry Jacobson, John Wiedenmann, Scott Crosson, Mike Errigo,
Marcel Reichert, Jan Saunders

Mid-Atlantic Fishery Management Council
Scientific and Statistical Committee Meeting

13-14 March 2018
Baltimore, MD

Agenda

Tuesday, 13 March 2018

1:00   NEFSC clam dredge survey redesign: SSC review and recommendations (Hennen/Jacobson)

3:00   NEFSC Mid-Atlantic State of the Ecosystem Report (Gaichas)

- Overview of Council's Risk Assessment and alignment with SOE report

4:00   Review and approve OFL CV discussion document

5:00   Other topics: National SCS meeting, SSC Species and Topic leads

5:30   Adjourn

Wednesday, 14 March 2018

8:30   Develop Blueline Tilefish 2019-2021 ABC specifications (Schmidtke/Seeley)

- Review of joint MAFMC and SAFMC Blueline Tilefish working group deliberations and recommendations
- Review of updated DLMTool results

11:00 Golden Tilefish data and fishery update; review of implemented 2019 ABC (Montañez)

12:30 Adjourn

MAFMC Scientific and Statistical Committee
13-14 March 2018
Baltimore, Maryland

Meeting Attendance

<u>Name</u>	<u>Affiliation</u>
SSC Members in Attendance:	
John Boreman (SSC Chairman)	NC State University
Mark Holliday	NMFS (Retired)
Sarah Gaichas	NMFS Northeast Fisheries Science Center
Ed Houde	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
SSC Members participating via webinar:	
Dave Secor	University of Maryland - CBL
Paul Rago	NMFS (retired)
Yan Jiao	Virginia Tech
Cynthia Jones	Old Dominion University
Mike Frisk	SUNY Stony Brook
Others in attendance:	
Jessica Coakley (3/13 only)	MAFMC staff
Brandon Muffley	MAFMC staff
José Montañez	MAFMC staff
Matt Seeley (3/14 only)	MAFMC staff
Mike Luisi (3/14 only)	MAFMC Chair
Paul Nitschke (via webinar, 3/14 only)	NMFS Northeast Fisheries Science Center
Larry Jacobson (via webinar, 3/13 only)	NMFS Northeast Fisheries Science Center
Dan Hennen (via webinar, 3/13 only)	NMFS Northeast Fisheries Science Center
Mike Schmidtke (3/14 only)	ASMFC
Marcel Reichert	SAFMC SSC Chair
Mike Errigo (3/14 only)	SAFMC staff
Scott Crosson (3/14 only)	SAFMC SSC
George Sedberry (via webinar)	SAFMC SSC
Greg DiDomenico (3/13 only)	Garden State Seafood Association
John Wiedenmann (via webinar, 3/13 only)	Rutgers