

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

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M E M O R A N D U M

DATE: August 2, 2010
TO: Richard B. Robins, Jr., Chairman, Mid-Atlantic Fishery Management Council
FROM: John Boreman, Ph.D., Chairman, MAFMC Scientific and Statistical Committee
Subject: Report of July 2010 Meeting of the MAFMC Scientific and Statistical Committee

The Scientific and Statistical Committee (SSC) of the Mid-Atlantic Fishery Management Council (MAFMC) met on 28-29 July 2010 to review stock assessment information and develop acceptable biological catch (ABC) recommendations for four species under the management purview of the MAFMC: scup, black sea bass, summer flounder, and bluefish. A total of 9 of the 16 SSC members were in attendance, which represented a quorum as defined by the SSC standard operating procedures. Also in attendance were representatives of the MAFMC, MAFMC staff, Northeast Fisheries Science Center, (NEFSC), ASMFC, and the public (see the attendance list, Attachment 1). The SSC discussed committee membership. SSC member Rob Latour has been granted a leave-of-absence from the SSC until January 2011 while he is on research leave from VIMS. SSC member Chris Moore has resigned from the SSC because he is now executive director of the MAFMC. Finally, this was the last SSC meeting for Scott Crosson, who has taken a position with the Southeast Fisheries Science Center in Miami, FL. The SSC will be providing the MAFMC with recommendations for replacements for Chris and Scott.

We followed the same approach to setting the ABC for each species. Initially, the MAFMC staff lead for a given species described the assessment history, the most recent survey and landings information, and the basis for the most recent quota set by the MAFMC. The species lead for the SSC then provided additional comment, including a summary of the issues identified in the joint SSC/Monitoring Committee pre-decisional conference call. Finally, the public was then invited to comment, but only on scientific uncertainty issues for the species. Following this comment period, the SSC species lead led the SSC discussion on selection of an ABC for the 2011 fishing year. Once the discussion was completed, the SSC developed a consensus recommendation in response to the terms of reference provided by the MAFMC. The terms of reference were the same for each of the four species. The SSC also determined which of the four levels best described the status of assessment information for each species, based on the ABC control rule in the proposed omnibus amendment currently in development.

The following represents the consensus responses by the SSC to the ABC terms of reference provided by the MAFMC for each of the four species considered in the 28-29 July 2010 meeting.

Scup

1) The materials considered in reaching its recommendation;

- Terceiro, M. 2010. Stock assessment for scup 2010. U. S. Department of Commerce, Northeast Fisheries Science Center Reference Document 10-16; 86 p.
- Terceiro, M. 2009. Stock assessment for scup for 2009. U. S. Department of Commerce, Northeast Fisheries Science Center Reference Document 09-18; 82 p.
- Miller, T. J., R. Muller, R. O'Boyle and A. A. Rosenberg. 2009. Report of the Review Panel for the Northeast Data Poor Stocks Working Group. January 2007. 34 p.
- Northeast Data Poor Stocks Working Group. 2009. The Northeast Data Poor Stocks Working Group Report, December 8-12, 2008 Meeting. Part A. Skate species complex, deep sea red crab, Atlantic wolffish, scup, and black sea bass. US Department of Commerce, Northeast Fisheries Science Center Reference Document. 09-02; 496 p.
- MAFMC Staff Memo dated 30 June 2010: Scup Management Measures for 2011

2) The level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold;

Derived directly from the stock assessment, the OFL is based on an F_{MSY} proxy of $F_{40\%} = 0.177$; the OFL is specified at 67.53 million pounds for 2011 (derived as the 50th percentile of yield at $F_{40\%} = 0.177$).

3) The level of catch (in weight) associated with the acceptable biological catch (ABC) for the stock. The ABC will be selected based on the overfishing definition contained in the FMP and to reflect the level of scientific uncertainty inherent in the stock assessment such that the recommended ABC is less than or equal to the overfishing limit in line with the intent of the Act and the National Standard 1 Guidelines;

The SSC recommends an ABC based on 75% of F_{msy} ($F = 0.133$), and results in an ABC of 51.7 million pounds. This catch level is based on the 50th percentile of catch at $F = 0.133$ and has associated landings of 42.9 million pounds. The SSC unanimously supported the DPSWG panel's concerns about rapid increases in quota to meet the revised MSY.

4) If possible, the probability of overfishing associated with catches associated with the OFL and ABC recommendations (if not possible, provide a qualitative evaluation);

It is not possible for the SSC to provide the probability distribution function (pdf) associated with the OFL since significant sources of uncertainty were not taken into account in the assessment. The ABC is roughly equivalent to a $P^* = 40^{\text{th}}$ percentile, based on an assumed lognormal OFL distribution that has a $CV = 100\%$. That CV of 100% is considered a reasonable characterization of uncertainty for the OFL distribution.

5) *The most significant sources of scientific uncertainty associated with determination of OFL and ABC;*

The estimates of biomass and fishing mortality from the scup stock assessment are likely to be non-robust because the assessment model contains very little information on the abundance of old age classes. It is the SSC's understanding that the assessment model only includes indices of abundance for the first two age classes, and the effective sample size for the age composition of the fishery catch appears to be low, which means that the model will have little ability to determine if the build-up of old individuals is actually occurring or if it is only an artifact of the model. The scup stock assessment predicts that the abundance of age 7+ scup has increased substantially since the early 2000s. This increase of old individuals has a very large effect on the estimated spawning stock biomass (SSB), overall biomass, and fishing mortality. Because of this behavior the model is likely to continue to predict increases in abundance of 7+ individuals with subsequent increases in biomass and SSB, and updated assessments with the current model will not be able to resolve the issue. The current model, because of its reliance on indices of abundance for the first two age classes, is much more sensitive to changes in recruitment than changes in SSB. The available data on the age-composition of the fishery catches and surveys do not show a pattern of increasing abundance in the age 7+ categories. Thus, use of the assessment estimates of SSB and biomass rely on this build-up of old fish, which are not corroborated by the available data.

Other significant sources of uncertainty associated with the scup assessment:

- While older age scup (age 3+) are represented in the catch used in the assessment model, ages 3+ are not represented in the survey data that were used as input to the model. As a result, the dynamics of the older ages of scup are driven solely by catches and inferences regarding year class strength.
- Commercial discard estimates are imprecise and represent a considerable portion of the total catch.
- Uncertainty exists with respect to the estimate of natural mortality (M) used in the assessment.
- Uncertainty in the stock status due to uncertainties in the estimates of both the stock's biomass and biological reference points as a proxy was used for F_{MSY} .
- The assessment does not contain a characterization of uncertainty for the OFL and other biological reference points;
- Recruitment appears high in recent years, but it is unclear how these recent high levels would compare to historical levels of recruitment;
- Survey indices are particularly sensitive to scup availability, which results in high inter-annual variability; and
- Concern about the application of trawl calibration coefficients (ALBATROSS IV vs BIGELOW) that are being used for the first year, and their influence on the selectivity pattern and results of the assessment.

6) A certification that the recommendations provided by the SSC represents the best scientific information available.

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

Assessment Level Specification

Level 3 (see attachment 2 for assessment level specification criteria)

Special Comments

Because of the uncertainty with the stock assessment, the SSC would recommend scup be considered for a peer-reviewed benchmark.

Black Sea Bass

1) The materials considered in reaching its recommendation;

- Shepherd, G. R. and J. Nieland. 2010. Black sea bass 2010 stock assessment update. US Department of Commerce, Northeast Fisheries Science Center Reference Document. 10-13; 25 p.
- Shepherd GR. 2009. Black sea bass 2009 stock assessment update. US Department of Commerce, Northeast Fisheries Science Center Reference Document. 09-16; 30 p.
- Miller, T. J., R. Muller, R. O'Boyle and A. A. Rosenberg. 2009. Report of the Review Panel for the Northeast Data Poor Stocks Working Group. January 2007. 34 p.
- Northeast Data Poor Stocks Working Group. 2009. The Northeast Data Poor Stocks Working Group Report, December 8-12, 2008 Meeting. Part A. Skate species complex, deep sea red crab, Atlantic wolffish, scup, and black sea bass. US Department of Commerce, Northeast Fisheries Science Center Reference Document. 09-02; 496 p.
- MAFMC Staff Memo dated 30 June 2010: Black Sea Bass Management Measures for 2011

2) The level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold;

Derived directly from the stock assessment, the OFL would be based on an F_{MSY} proxy of $F_{40\%} = 0.42$, and the OFL is specified at 7.64 million pounds for 2011 (derived as the 50th percentile of yield at $F_{40\%} = 0.42$). However, the SSC is concerned about the high uncertainty in the OFL that is not well characterized in the assessment. There are large uncertainties related to the stock structure, life history, and stock assessment, including the lack of uncertainty characterizations for the model output and biological reference points.

3) The level of catch (in weight) associated with the acceptable biological catch (ABC) for the stock. The ABC will be selected based on the overfishing definition contained in the FMP and to reflect the level of scientific uncertainty inherent in the stock assessment such that the recommended ABC is less than or equal to the overfishing limit in line with the intent of the Act and the National Standard 1 Guidelines;

The SSC recommends an ABC of 4.5 million pounds, which is based on catch history rather than on F , when compared to the OFL and F_{MSY} . The recommendation of a constant catch reflects the SSC's concerns about the reliability of the assessment results, the strong retrospective pattern in biomass, the deviation of survey estimates of stock biomass and model-predicted biomass in recent years, the potential for stock structure within the management unit, and intra-model comparisons which may not adequately characterize the uncertainty. The SSC used this approach in developing its final recommendations to the MAFMC for the 2010 fishing year. Following the approach adopted by the SSC after remand from the MAFMC to the SSC for black sea bass in December 2009, the constant catch level is based upon the catch level in 2008 because of concerns raised by the Monitoring Committee over the impact of conservation measures in 2009.

4) If possible, the probability of overfishing associated with catches associated with the OFL and ABC recommendations (if not possible, provide a qualitative evaluation);

The assessment did not provide a pdf associated with the OFL, and significant sources of uncertainty were not taken into account. For example, sensitivity analyses of M and an evaluation of sex-specific M s, and their potential contribution to the uncertainty in the assessment results would be worthwhile. The ABC of 4.5 million pounds would be the 28th percentile of the OFL, assuming a $CV = 100\%$ for a lognormal distribution of the pdf associated with the OFL.

5) The most significant sources of scientific uncertainty associated with determination of OFL and ABC;

- Atypical life history strategy (protogynous hermaphrodite);
- Strong annual retrospective pattern in biomass evident for the last 3 years;
- Uncertainty in stock status because of the lack of uncertainty estimation for the biological reference points (proxy used for F_{MSY}) and model output;
- Assessment assumes a completely mixed stock, while tagging analyses suggest otherwise;
- Uncertainty exists with respect to M — because of the unusual life history strategy the current assumption of a constant M in the model for both sexes may not adequately capture the dynamics in M ;
- No uncertainty characterization for the OFL; and
- Concern about the application of trawl calibration coefficients (ALBATROSS IV vs BIGELOW) that are being used for the first year, and their influence on the selectivity pattern and results of the assessment.

6) A certification that the recommendations provided by the SSC represents the best scientific information available.

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

Assessment Level Specification

Level 4 (see Attachment 2 for assessment level specification criteria)

Summer Flounder (Fluke)

1) The materials considered in reaching its recommendation;

- Terceiro, M. 2010. Stock assessment of summer flounder for 2010. US Department of Commerce, Northeast Fisheries Science Center Reference Document. 10-14; 133 p.
- Terceiro, M. 2009. Stock assessment of summer flounder for 2009. US Department of Commerce, Northeast Fisheries Science Center Reference Document 09-17; 132 p.
- Northeast Fisheries Science Center. 2008. 47th Northeast Regional Stock Assessment Workshop (47th SAW) Assessment Report. US Department of Commerce, Northeast Fisheries Science Center Reference Document. 08-12a; 335 p.
- Northeast Fisheries Science Center. 2008. 47th Northeast Regional Stock Assessment Workshop (47th SAW) Assessment Summary Report. US Department of Commerce, Northeast Fisheries Science Center Reference Document. 08-11; 22 p.
- MAFMC Staff Memo dated 30 June 2010: Summer Flounder Management Measures for 2011

2) The level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold;

Derived directly from the stock assessment, based on an F_{MSY} proxy of $F_{35\%} = 0.310$, the OFL is specified at 40.4 million pounds for 2011 (derived as the 50th percentile of yield at $F_{35\%} = 0.310$).

3) The level of catch (in weight) associated with the acceptable biological catch (ABC) for the stock. The ABC will be selected based on the overfishing definition contained in the FMP and to reflect the level of scientific uncertainty inherent in the stock assessment such that the recommended ABC is less than or equal to the overfishing limit in line with the intent of the Act and the National Standard 1 Guidelines;

The SSC recommends an ABC based on F_{TARGET} , $F_{40\%}$, which is $F = 0.255$, and results in an ABC of 33.95 million pounds. This catch level is based on the 50th percentile of catches at $F = 0.255$, and has associated landings of 29.48 million pounds. The SSC expressed concern about the retrospective pattern in recruitment, and the implication of this pattern on the apparently large 2009 year class, which in turn may have a strong influence on the projected rebuilding horizon. The SSC used AGEPRO to examine the potential implication of this pattern on projected SSB if the observed recruitment retrospective

continued, thereby resulting in a realized 2009 age class reduced by half in subsequent assessments. The annual retrospective pattern over the last three years has resulted in overestimation of recruitment ranging from 54% to 80%; thus, the halving of the 2009 year class does not represent an overly conservative assumption. Halving of the 2009 year class indicated the stock would still be expected to rebuild by January 1, 2013 (based on November 1, 2012 SSB calculation) under the proposed ABC.

4) If possible, the probability of overfishing associated with catches associated with the OFL and ABC recommendations (if not possible, provide a qualitative evaluation);

It is not possible to provide a pdf associated with the OFL since significant sources of uncertainty were not taken into account in the assessment. The ABC is roughly equivalent to a $P^* = 40^{\text{th}}$ percentile, based on an assumed lognormal OFL distribution that has a CV = 100%. That CV of 100% is considered a reasonable characterization of uncertainty for the OFL distribution.

5) The most significant sources of scientific uncertainty associated with determination of OFL and ABC;

- Strong annual retrospective pattern in recruitment evident for the last three years;
- Uncertainty in stock status because of lack of uncertainty estimation for the biological reference points (proxy used for F_{MSY});
- Uncertainty exists with respect to the estimate of M ;
- No uncertainty characterization for the OFL;
- Concern about the application of trawl calibration coefficients (ALBATROSS IV vs BIGELOW) that are being used for the first year, and their influence on the selectivity pattern and results of the assessment.

6) A certification that the recommendations provided by the SSC represents the best scientific information available.

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

Assessment Level Specification

Level 3 (see Attachment 2 for assessment level specification criteria)

Bluefish

1) The materials considered in reaching its recommendation;

- Northeast Fisheries Science Center. 2005. 41st Northeast Regional Stock Assessment Workshop (41st SAW). 41st SAW assessment report. US Department of Commerce, Northeast Fisheries Science Center Reference Document. 05-14; 237 p.

- Atlantic States Marine Fisheries Commission. 2010. Bluefish assessment summary. Atlantic States Marine Fisheries Commission Bluefish SASC, June 2010. 16 p.
- MAFMC Staff Memo dated 30 June 2010: Bluefish Management Measures for 2011

2) The level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold;

Derived directly from the stock assessment, based on an $F_{MSY} = 0.19$, the OFL is specified at 39.621 million pounds for 2011 (derived as the 50th percentile of yield at $F_{35\%} = 0.19$).

3) The level of catch (in weight) associated with the acceptable biological catch (ABC) for the stock. The ABC will be selected based on the overfishing definition contained in the FMP and to reflect the level of scientific uncertainty inherent in the stock assessment such that the recommended ABC is less than or equal to the overfishing limit in line with the intent of the Act and the National Standard 1 Guidelines;

The SSC recommends an ABC based on $F_{REBUILD}$, $F = 0.15$, and results in an ABC of 31.744 million pounds. This catch level is based on the 50th percentile of catches at $F = 0.15$.

4) If possible, the probability of overfishing associated with catches associated with the OFL and ABC recommendations (if not possible, provide a qualitative evaluation);

It is not possible to provide a pdf associated with the OFL since significant sources of uncertainty were not taken into account in the assessment. Based on the values provided in the assessment document, there is a low probability of exceeding the OFL when constraining the fishery to the ABC. However, the SSC notes that the values of uncertainty provided in the assessment document incorporate uncertainties in only a few elements of the assessment and do not include the impact of significant uncertainties, such as the bimodal selectivity curve, missing elements in the age-length keys, and the highly seasonal nature of the commercial and recreational fisheries.

5) The most significant sources of scientific uncertainty associated with determination of OFL and ABC;

- There is a significant level of missing data involved in the age-length keys (ALKs), which are critical for development of the catch at age matrix.
- Concern about the application of trawl calibration coefficients (ALBATROSS IV vs BIGELOW) that are being used for the first year, and their influence on the selectivity pattern and results of the assessment. Also, some near shore areas previously sampled by the ALBATROSS IV are unavailable for sampling by the BIGELOW.
- Commercial discards are assumed to be insignificant, which may not be the case.
- Much of population biomass (~40%) is in the aggregated 6+ age group for which there is relatively little information.
- Weight at age is assumed to be constant for the period 2004+. This has potentially substantial implications for estimates of population biomass, especially biomass relative to B_{msy} .
- Questions have been raised about the uncertainty in the MRFSS estimates in general, and are particularly relevant here given the highly episodic nature of bluefish catches in the recreational fisheries coast wide.

- The basis for the unusual bimodal selectivity curve used in the ASAP model is not well understood.

6) A certification that the recommendations provided by the SSC represents the best scientific information available.

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

Assessment Level Specification

Level 3 (see Attachment 2 for assessment level specification criteria)

Attachments

cc:

Members, MAFMC SSC, R. Seagraves, J. Coakley, J. Armstrong, Lee Anderson

ATTENDANCE

28 July 2010

Rich Seagraves
Jessica Coakley
Lee Anderson
Rick Robins
John Boreman
Tom Miller
Mike Wilberg
Mike Frisk
Scott Crosson
Cynthia Jones
Jason Link
Edward Houde
Doug Lipton
Yan Jiao
Fred Serchuk
Mike Ruccio
Greg DiDomenico
Adam Nowalsky
Kristen Cervoli
Toni Kearns

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MAFMC Vice Chair
MAFMC Chair
SSC Chair – NCSU
SSC Vice-chair, UMCES
SSC Member, UMCES
SSC Member, Stony Brook Univ
SSC Member, NC DMF
SSC Member, Old Dominion Univ
SSC Member, NMFS/NEFSC
SSC Member, UMCES
SSC Member, UMCP
SSC Member, Va Tech
SSC Liaison, NMFS/NEFSC
NMFS/NER
GSSA
RFA
Pew Foundation
ASMFC

29 July 2010

Same attendees as 28 July, plus
Jim Armstrong
Kate Taylor

MAFMC Staff
ASMFC

Assessment Level Specification Criteria

The levels of stock assessments, their characteristics, and procedures for determining ABCs are defined as follows:

Level 1: Level 1 represents the highest level to which an assessment can be assigned. Assignment of a stock to this level implies that all important sources of uncertainty are fully and formally captured in the stock assessment model and the probability distribution of the OFL calculated within the assessment provides an adequate description of uncertainty of OFL. Accordingly, the OFL distribution will be estimated directly from the stock assessment. In addition, for a stock assessment to be assigned to Level 1, the SSC must determine that the OFL probability distribution represents best available science. Examples of attributes of the stock assessment that would lead to inclusion in Level 1 are:

- Assessment model structure and any treatment of the data prior to inclusion in the model includes appropriate and necessary details of the biology of the stock, the fisheries that exploit the stock, and the data collection methods;
- Estimation of stock status and reference points integrated in the same framework such that the OFL calculations promulgate all uncertainties (stock status and reference points) throughout estimation and forecasting;
- Assessment estimates relevant quantities including F_{MSY} ¹, OFL, biomass reference points, stock status, and their respective uncertainties; and
- No substantial retrospective patterns in the estimates of fishing mortality (F), biomass (B), and recruitment (R) are present in the stock assessment estimates.

The important part of Level 1 is that the precision estimated using a purely statistical routine will define the OFL probability distribution. Thus, all of the important sources of uncertainty are formally captured in the stock assessment model. When a Level 1 assessment is achieved, the assessment results are likely unbiased and fully consider uncertainty in the precision of estimates. Under Level 1, the ABC will be determined solely on the basis of an acceptable probability of overfishing (P^*), determined by the Council's risk policy (see alternatives in section 5.2.2), and the probability distribution of the OFL.

Level 2: Level 2 indicates that an assessment has greater uncertainty than Level 1. Specifically, the estimation of the probability distribution of the OFL directly from the stock assessment model fails to include some important sources of uncertainty, necessitating expert judgment during the preparation of the stock assessment, and the OFL probability distribution is deemed best available science by the SSC. Examples of attributes of the stock assessment that would lead to inclusion in Level 2 are:

- Key features of the biology of the stock, the fisheries that exploit it, or the data collection methods are missing from the stock assessment;
- Assessment estimates relevant quantities, including reference points (which may be proxies) and stock status, together with their respective uncertainties, but the uncertainty is not fully promulgated through the model or some important sources may be lacking;
- Estimates of the precision of biomass, fishing mortality rates, and their respective reference points are provided in the stock assessment; and
- Accuracy of the MFMT and future biomass is estimated in the stock assessment by using *ad hoc* methods.

¹ With justification, F_{MSY} may be replaced with an alternative maximum fishing mortality threshold to define the OFL.

In this level, ABC will be determined by using the Council's risk policy (see alternatives in section 5.2.2), as with a Level 1 assessment, but with the OFL probability distribution based on the specified distribution in the stock assessment.

Level 3: Attributes of a stock assessment that would lead to inclusion in Level 3 are the same as Level 2, except that

- The assessment does not contain estimates of the probability distribution of the OFL or the probability distribution provided is not considered best available science by the SSC.

Assessments in this level are judged to over- or underestimate the accuracy of the OFL. The SSC will adjust the distribution of the OFL and develop an ABC recommendation by applying the Council's risk policy (see alternatives in section 5.2.2) to the modified OFL probability distribution. The SSC will develop a set of default levels of uncertainty in the OFL probability distribution for this level based on literature review and a planned evaluation of ABC control rules. A control rule of 75% of F_{MSY} may be applied as a default if an OFL distribution cannot be developed.

Level 4: Stock assessments in Level 4 are deemed to have reliable estimates of trends in abundance and catch, but absolute abundance, fishing mortality rates, and reference points are suspect or absent. Additionally, there are limited circumstances that may not fit the standard approaches to specification of reference points and management measures set forth in these guidelines (i.e., ABC determination). In these circumstances, the SSC may propose alternative approaches for satisfying the NS1 requirements of the Magnuson-Stevens Act than those set forth in the NS1 guidelines. In particular, stocks in this level do not have point estimates of the OFL or probability distributions of the OFL that are considered best available science. In most cases, stock assessments that fail peer review or are deemed highly uncertain by the SSC will be assigned to this level. Examples of potential attributes for inclusion in this category are:

- Assessment approach is missing essential features of the biology of the stock, characteristics of data collection, and the fisheries that exploit it;
- Stock status and reference points are estimated, but are not considered reliable;
- Assessment may estimate some relevant quantities including biomass, fishing mortality or relative abundance, but only trends are deemed reliable;
- Large retrospective patterns usually present; and
- Uncertainty may or may not be considered, but estimates of uncertainty are probably substantially underestimated.

In this level, a simple control rule will be used based on biomass and catch history and the Council's risk policy.