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

MEMORANDUM

Date: February 1, 2017

To: Council

From: Brandon Muffley, Staff

Subject: Black Sea Bass 2017 – 2019 Specifications

The Council and the Atlantic States Marine Fisheries Commission's Summer Flounder, Scup, and Black Sea Bass Board (Board) will consider 2017 – 2019 specifications for black sea bass. In 2015, two-year specifications were implemented for black sea bass, establishing catch and landings limits for the 2016 and 2017 fishing years. The 2017 specifications were implemented with the expectation they would be revisited upon completion of the benchmark stock assessment. The assessment successfully passed peer review in December 2016 and provided updated projections in which to establish 2017 – 2019 specifications. The following materials are enclosed for Council and Board consideration of this subject:

1) Monitoring Committee recommendations for black sea bass from January 26, 2017 meeting

2) January 2017 Scientific and Statistical Committee meeting report

3) Staff memo on 2017-2019 black sea bass specifications dated January 12, 2017

Note: the February 6, 2017 Advisory Panel webinar summary, once finalized, will be posted to the Council's website as a supplemental document for the February briefing materials.

Summer Flounder, Scup, and Black Sea Bass Monitoring Committee: January 26, 2017
2017-2019 Black Sea Bass Specifications and 2017 Black Sea Bass Recreational Measures

Monitoring Committee Attendees: Bob Glenn (MA DMF), Greg Wojcik (CT DEEP), John Maniscalco (NY DEC), Peter Clarke (NJ F&W), Jason McNamee (RIDEM), Rich Wong (DNREC), Steve Doctor (MD DNR), Katie May Laumann (VMRC), Gary Shepherd (NMFS NEFSC), Kiley Dancy (MAFMC Staff), Brandon Muffley (MAFMC Staff), Kirby Rootes-Murdy (ASMFC Staff), Emily Gilbert (NMFS GARFO);

Other Attendees: Rob O'Reilly (VMRC; Council Demersal Committee Chair), Kevin Chu (NMFS GARFO), Purcie Bennett-Nickerson (Pew)

The Monitoring Committee met on Thursday, January 26, 2017 in Baltimore, MD to recommend 2017-2019 black sea bass Annual Catch Limits (ACLs), Annual Catch Targets (ACTs), commercial quotas, and recreational harvest limits, based on the January 25 recommendations of the Scientific and Statistical Committee (SSC). In addition, the Monitoring Committee developed recommendations for 2017 recreational management measures for black sea bass.

Black Sea Bass Catch and Landings Limits for 2017-2019

The Monitoring Committee reviewed the SSC recommendations for 2017-2019 and the associated staff recommendations for ACLs and ACTs (Table 1). While most of the Committee supports setting three-year specifications, the group agrees that catch and landings limits should be revisited each year. The Committee notes that the Council may wish to request an assessment update in 2018 to update 2019 specifications. This is due to the decline in the highly influential 2011 year class combined with the potentially large 2015 year class, which is not considered in the assessment since recruitment is measured as age-1 fish. A 2018 assessment update may also be able to incorporate the revised Marine Recreational Information Program (MRIP) catch time series resulting from the revised effort estimation methodology. In addition, the Monitoring Committee plans to closely evaluate actual 2017 discards compared to projected discards, given the substantial recommended increase in quotas in 2017. In general, the Monitoring Committee notes that the group should further evaluate how to consider expected changes in discards resulting from changes in quota. The Committee considered adjusting the projected commercial discards for 2017 due to the expectation that discards will decrease with an increase in quota. However, the Committee notes the uncertainty associated with the discard estimates, as well as a potential for increased discards of undersized fish due to a potentially large 2015 year class. Therefore, the Committee believes that the 3-year average used as a basis for discard projections is appropriate to account for this uncertainty.

The Committee agrees with the staff recommendation of no reduction in catch from the recreational and commercial ACLs, such that the ACTs are set equal to the ACLs. The Committee notes that commercial landings have been very close to the commercial quotas over the last five years (2011 – 2015) with less than a 2% percent difference on average between

landings and the quota over this time. The Committee believes the calculation for projecting commercial discards for 2017 is appropriate given changes to the commercial quota while accounting for stock dynamics. Discard projections and apportionments for 2018 – 2019 will be re-considered by the Committee next year. Therefore, the Committee does not recommend any reduction in the commercial ACL to the commercial ACT.

The recreational fishery has had a history of large overages since 2012 and overages are projected to occur again in 2016. However, the Committee notes that these recreational overages occurred when the black sea bass stock was rapidly expanding and availability to recreational anglers was very high. At the same time, due to the lack of an approved stock assessment for black sea bass the recreational harvest limits were set at levels not reflective of the large and increasing stock abundance. With the new benchmark stock assessment information, analysis indicates that recreational harvest limits during the last few years would have been significantly higher (i.e. approximately double those implemented) if they had been set using the recent assessment model, and overages would likely not have occurred to the same degree. Catch limits were not scaled appropriately with biomass prior to 2017 making consideration of performance difficult. The Technical and Monitoring Committees will continue to evaluate management uncertainty in the recreational fishery, the predictability and uncertainty in recreational catch estimates, and the influence of recreational regulations on harvest. The Monitoring Committee recommends no reduction in the recreational ACLs to the recreational ACTs.

The Committee agrees with the staff justification for not applying the recreational or commercial Accountability Measures (AMs) triggered in 2017 for 2015 overages. However, the group is supportive of the framework action initiated by the Council to revise the current commercial AMs, and recommends that this action be expanded to also cover summer flounder and scup.

Black Sea Bass 2017 Recreational Measures

Based on the SSC recommended Acceptable Biological Catch (ABC) and the Monitoring Committee's agreement with the staff-recommended recreational ACL and ACT for 2017, the resulting recommended recreational harvest limit (RHL) for 2017 is 4.29 million pounds (1,945 MT). This represents a 52% increase from the 2016 RHL and the highest limit since RHLs were first implemented in 1998. However, preliminary recreational data indicate that black sea bass harvest is projected to be 4.67 million pounds in 2016, the highest landings since 1995. When evaluating the 2016 projected harvest compared to the Monitoring Committee-recommended RHL of 4.29 million pounds, an approximate 8% reduction in landings would be needed in 2017. Current data available is preliminary and only through Wave 5, with Wave 6 projected based upon 2015 proportions of landings by wave. In the event that harvest totals change significantly when complete preliminary (mid-February) and/or final (mid-April) data is released, additional adjustments (up or down) may be required but this will be difficult to accomplish at the state level given the timing of fishing seasons and state regulatory processes.

The 2016 recreational harvest estimate in weight is the highest since 1995; while landings in number of fish have been relatively stable for the last three years (within 8% of each other). The Committee notes that increased harvest in weight is largely driven by the 2011 year class that continues to grow and increase the average weight of landed fish (Figure 1). Even if recreational removals, in numbers, remained constant or declined, the total removals by weight are expected to

continue to increase. These changes in the size/weight of sea bass continue to confound the current adjustments under ad-hoc regional management, which are typically made in numbers of fish and don't necessarily account for changes in fish weight.

The Monitoring Committee supports the continuation of ad-hoc regional management for the recreational fishery in 2017, but has a number of concerns with this strategy. It has not constrained harvest estimates in recent years but this is likely due to low catch limits, high fish availability in the north, and MRIP estimate variability. Measures adopted by states after repeated reductions in recent years have resulted in large regional differences between the Northern and Southern Regions, and disparate measures among states in the Northern Region. Complex sets of measures, including splits by mode, season, and sector, continue to be implemented, contrary to previous recommendations of the Monitoring and Technical Committees. A new approach that prioritizes consistency, from both an analytical and regulatory perspective, is recommended. The Committee noted the differences in the fishery between the Southern Region (DE-NC) and Northern Region (NJ-MA) such as the availability in numbers and size of fish, the small contribution (approximately 4%) of southern states harvest to the coastwide harvest, and the difference in harvest from state vs. federal waters. Since the implementation of ad hoc regional management, the Southern Region measures have aligned with the implemented federal measures each year. **The Committee agrees with the staff recommendation that federal measures should remain *status quo* in 2017, with a 12.5-inch minimum size, a 15-fish possession limit, and open seasons from May 15 – September 19 and October 22 – December 31.**

The Committee also recommends the preliminary 8% reduction estimated for 2017 not be applied and recreational management measures for Northern Region states remain *status quo*. The Committee's rationale and justification for status quo is as follows:

- Harvest by recreational fisheries is believed to be heavily dependent upon fish availability so a declining population should result in declining harvest. The 2016 benchmark stock assessment indicates that spawning stock abundance is projected to decline by approximately 15% between 2016 and 2017. With that decline, the Monitoring Committee expects a corresponding decline, albeit not one-to-one, in availability to recreational anglers. Therefore, under the same recreational measures the Committee expects recreational harvest to be stable or decline in 2017 due to lower availability.
- Fishing mortality has been declining over the last four years and was 25% below Fmsy-proxy in 2015, indicating that the management measures that have been in place have controlled fishing mortality and allowed the stock to grow.
- As additional justification for status quo measures, the Committee notes that the recreational harvest estimates are statistics generated by a statistical sampling program and therefore each annual estimate of harvest is not just an average point estimate but also contains uncertainty around the average estimate. This uncertainty estimate is generated by MRIP and is represented as a percent standard error. Given this uncertainty, the Committee believes that holding accountability to a single point estimate of this statistically derived quantity is not a correct usage of the information. Figure 2 below shows the estimated recreational harvest relative to the implemented recreational harvest limits, with the error surrounding those recreational harvest estimates represented as 95% confidence limits.

These confidence limits are calculated by taking the proportional standard error (PSE), converting it back to a standard error, and then applying the following equation:

95% confidence limits = mean ±(1.96*standard error)

- The Committee proposes that in any given year, if the error around the harvest estimate in the current year overlaps with the RHL for the following year, status quo be a preferred option for the following year's management. The Committee wishes to stress that this procedure is valid in both directions. In other words, the Committee is recommending status quo for 2017, but the Committee would also have recommended status quo in 2003 and 2009 as well, years where the average harvest estimates were moderately below the recreational harvest limit and under previous evaluations would have allowed for some level of liberalization. This accountability to not just evaluate the average estimate but the 95% confidence interval around that estimate will promote stability in recreational measures from year to year, and will limit making small surgical predictive adjustments in ways that the data do not support.
- The Committee recommends using this calculation of uncertainty each year, and further suggests that this procedure not be used in years when the PSE exceeds 20, therefore a PSE of 20 will represent a maximum level of imprecision to allow for this procedure.

- The Committee notes the implementation of the 95% confidence limits is a first evaluation at utilizing this approach to assess the uncertainty in the single point harvest estimate and its relation to the RHL. Other statistics or descriptors of the variance may be more appropriate to prevent adjustments in measures when there are relatively minor differences between the projected harvest point estimate and the RHL (e.g. 68% confidence interval or straight application of the MRIP generated PSE). Evaluating the trade-offs between stability in management measures and the risks associated to the population and fishery need to be considered. The Committee will continue to further refine this approach and determine most appropriate evaluation to apply to this process. Its worth noting, that utilizing either the 95% confidence interval approach or the MRIP generated PSE (assuming the preliminary 2016 PSE estimate of 8.7%) would result in the same conclusion of *status quo* for 2017.
- There is another layer of uncertainty that exists in setting management measures year to year. This has to do with the retrospective performance of the specifications. Figure 2 shows the performance of projecting harvest from year t to year t+1 versus the recreational harvest limit. Accounting for this uncertainty is more difficult than for the annual precision of the final estimate, but the Committee commits to looking in to new ways of setting specifications that explicitly account for both uncertainty in management strategies chosen as well as providing more information to managers on trade-offs and relative risk from these choices. This will take time and will manifest itself as a management strategy evaluation for recreational black sea bass
- Another layer of support for the lack of risk associated with remaining at status quo in 2017 came from the benchmark assessment process. During this process, various iterations of recreational harvest levels were introduced to test the sensitivity of population and fishing mortality projections to those scenarios. It was found during this sensitivity testing that the

harvest needed to be inflated by 15% or greater before any impacts were seen in fishing mortality, and only minor impacts were seen in the estimated biomass levels. This is due to the fact that the recreational harvest is only one component of the overall removals, and it takes a significant increase to impact the overall population dynamics. The Committee will commit to running some simulations with the approved stock assessment to quantitatively prove that a small buffer can be allowed on the terminal year estimate of the recreational harvest without endangering stock status if warranted or desired.

The Committee believes the approach above comports with National Standard 2 (NS2) for the following reasons:

- The guidelines for NS2 state that it is meant to "elevate the importance of evaluating the uncertainty and associated risk of the scientific information to inform fishery management decisions". Previous processes ignored the uncertainty associated with using the MRIP estimates as a point estimate. This leads to instability and large management changes from year to year, thus increasing the risk of management uncertainty thereby inflating its potential for negatively impacting the fishery. The new procedure outlined above explicitly incorporates the uncertainty in the estimated recreational harvest limit and uses the information as intended by the MRIP program, potentially promoting more stability in management from year to year.
- NS2 promotes objectivity as one of its main criteria for best scientific information available (BSIA). The guideline for NS2 state "Scientific information should be accurate, with a known degree of precision, without addressable bias, and presented in an accurate, clear, complete, and balanced manner" (50 CFR 600.315). The approach outlined above meets this criteria by acknowledging the uncertainty in the MRIP statistical estimate, and accounting for it explicitly in the setting of measures to achieve the RHL. Additionally on the topic of balance, the development of a set of control rules for usage of MRIP annual estimates allows for the balanced use of this information from year to year, keeping from adjusting harvest up or down from year to year when the uncertainty in the estimate does not support that accountability.
- NS2 also promotes transparency and openness in its BSIA. The guidelines for NS2 state "Scientific information products should describe data collection methods, report sources of uncertainty or statistical error, and acknowledge other data limitations" (50 CFR 600.315). The process as outlined above acknowledges the statistical nature of the annual MRIP estimates and accounts for the limitations of both the data source and the ability to account for the variability in the annual specification setting process when the envelope of uncertainty is larger than the difference between the mean estimate value and the recreational harvest limit.
- The committee contends that this procedure does not violate the prohibition of exceeding the RHL. The statistical estimate of MRIP annual harvest amounts have uncertainty around them, and this leads to an inability to say with any confidence that the estimate is different from not just the point estimate, but the interval around that estimate. This is a basic principal of statistics and is why the National Standards highlight uncertainty as such an important aspect of fisheries science and management.

The Monitoring Committee notes that similar to issues emerging with summer flounder, there are grave concerns regarding the ability to forecast harvest estimates the following year based upon

harvest estimates from the prior year. Factors influencing actual harvest (fish availability, angler effort, etc.) combined with MRIP estimate variability make the outcome highly uncertain. Greater regulatory consistency across states and/or regions combined with multi-year stability is likely to improve this process. Forcing recreational fisheries to react to annual targets does not allow for consistency or the ability to evaluate factors influencing harvest. The current system does not acknowledge the timing, resolution, or variability of harvest estimates. The regular incorporation of confidence limits to develop lower and upper bounds around point estimates to be used when determining if management changes are necessary is the first logical step towards greater efficacy. **Taking advantage of the successful stock assessment, the Monitoring Committee intends to further develop this idea and perhaps combine it with a biological reference point based control rule.**

If the 2016 recreational harvest estimates are higher than projected or it is determined that the 8% reduction is required, the Committee recommends making any necessary adjustments in the state measures in the Northern Region (Massachusetts through New Jersey). The Committee did indicate that New Jersey's recreational fishery does not fit into either region and should be considered a separate region for any modifications to management measures. **If** thee 8% reduction is required and the adjustments to the Northern Region states measures **do not** address the required reduction, a backup set of measures would need to be implemented that would be expected to constrain landings to the RHL. If the ad-hoc regional measures developed through the Commission's process do not address the required reduction, **then** the Committee recommends backup coastwide measures including a 15-inch TL minimum size, a 3 fish possession limit, and an open season from June 15-September 15. These measures represent some of the most restrictive size, possession, and seasonal limit across all states.

The Committee also discussed a number of items to be considered within the Council/ASMFC amendment or framework/addendum processes to modify the FMP. The National Standard 1 guidelines state that if an ACL is exceeded more than once in a four year period, the "system of ACLs and AMs should be re-evaluated, and modified" to "improve its performance and effectiveness."[1] The recreational black sea bass ACL has been exceeded in each of the past 4 years by an average of approximately 48 percent and its likely to be exceeded again in 2016; therefore, the Council should consider changes to the ACL and AM system to comply with this provision of the National Standard guidelines. The Committee also discussed potentially managing black sea bass based on fishing mortality rates instead of hard quotas and harvest limits. This management strategy would be similar to the approach taken by the ASMFC for some of their fisheries, most notably striped bass. Fishing mortality is a robust approach to evaluate the performance of the fishery and the response of the stock and could minimize the wide shifts in management measures. **The Monitoring Committee recommends that the Council and Board continue with the development of the initiated amendment to the FMP to explore alternative approaches to managing the recreational black sea bass fishery, in order to simplify and clarify the recreational process and regulatory framework for black sea bass, and reconcile inconsistencies in the Council and Commission FMPs.**

[1] 50 CFR 600.310(g)(4)

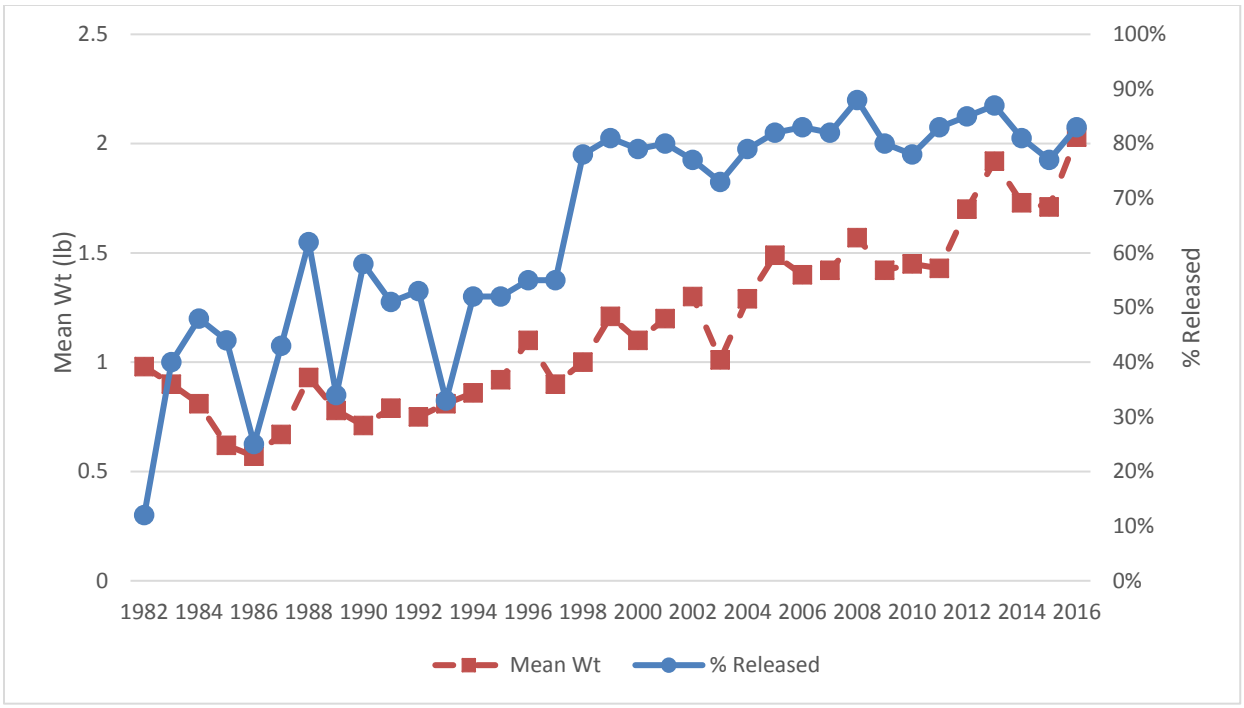

Figure 1. The average weight of recreationally harvested black sea bass and the percent of recreationally caught sea bass that are released.

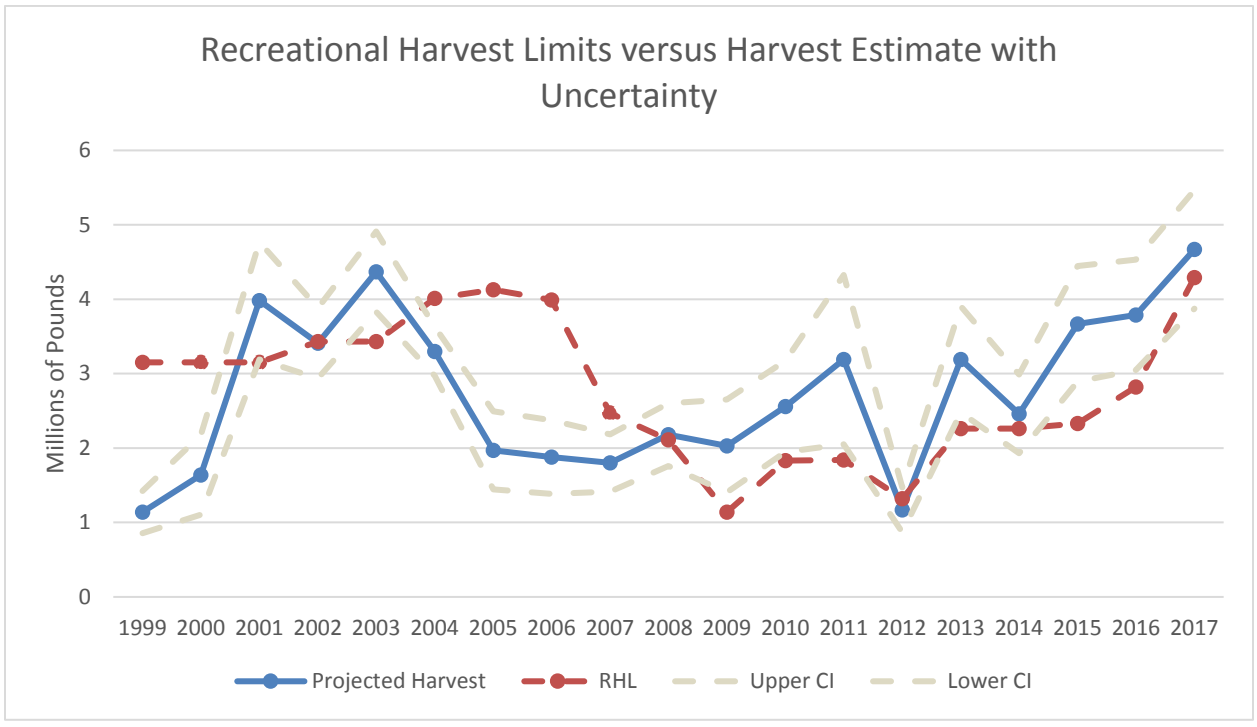

Figure 2: Recreational harvest limits since 1998 versus the recreational harvest estimates from the prior year. 95% confidence limits are represented around the harvest estimates and come from the actual years precision estimate.

Table 1: Staff-recommended multi-year catch and landings limits for black sea bass for 2017-2019.

Management Measure	2017		2018		2019		Basis
	mil lb.	mt	mil lb.	mt	mil lb.	mt	
OFL	12.05	5,467	10.29	4,669	9.18	4,163	Stock assessment projections
ABC	10.47	4,750	8.94	4,057	7.97	3,617	Stock assessment projections/staff recommended application of Council risk policy
ABC Landings Portion	8.41	3,814	7.18	3,258	6.40	2,904	80.3% of ABC, based on average 2013 – 2015 % landings portion of total catch
ABC Discards Portion	2.06	936	1.76	799	1.57	713	19.7% of ABC, based on average 2013 – 2015 % discards portion of total catch
Commercial ACL	5.09	2,311	4.35	1,974	3.88	1,760	49% of ABC landings portion (per FMP allocation) + 47.2 % of ABC discards portion
Commercial ACT	5.09	2,311	4.35	1,974	3.88	1,760	Commercial ACL, less deduction for management uncertainty
Projected Commercial Discards	0.97	442	0.83	377	0.74	336	47.2% of ABC discards portion, based on 2013-2015 average % discards by sector
Commercial Quota	4.12	1,869	3.52	1,596	3.14	1,423	Commercial ACT, less discards
Recreational ACL	5.38	2,439	4.59	2,083	4.10	1,858	51% of ABC landings portion (per FMP allocation) + 52.8 % of ABC discards portion
Recreational ACT	5.38	2,439	4.59	2,083	4.10	1,858	Recreational ACL, less deduction for management uncertainty
Projected Recreational Discards	1.09	494	0.93	422	0.83	376	52.8 % of ABC discards portion, based on 2013-2015 average % discards by sector
Recreational Harvest Limit	4.29	1,945	3.66	1,661	3.27	1,481	Recreational ACT, less discards

Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901
Phone: 302-674-2331 | Toll Free: 877-446-2362 | FAX: 302-674-5399 | www.mafmc.org
Michael 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: 27 January 2017

TO: Michael Luisi, MAFMC Chairman

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

SUBJECT: Report of the January 2017 Special SSC Meeting

The SSC met in Baltimore, MD, on 25 January 2017. The specific purpose of the meeting was to determine if the most recent benchmark stock assessment for Black Sea Bass and the associated SAW/SARC review provided sufficiently new information to change the SSC's ABC recommendations for the 2017 and subsequent fishing years. The meeting agenda is attached (Attachment 1).

A total of 16 SSC members were in attendance, which constituted a quorum (Attachment 2). Also in attendance, besides you, were MAFMC staff, staff from NMFS GARFO, and representatives from state agencies, the fishing industry, Rutgers University, the Pew Charitable Trust, and the Office of Senator Sheldon Whitehouse (RI). All documents and presentations cited in this report can be accessed via the MAFMC SSC website: http://www.mafmc.org/ssc-meetings/2017/jan-25

Gary Shepherd (NMFS NEFSC) and John Maniscalco (NY DEC) presented a detailed summary of the benchmark assessment to the SSC, followed by a presentation by Brandon Muffley of MAFMC staff recommendations. The latest benchmark assessment successfully cleared the SAW/SARC 62 peer review process, addressing many of the significant concerns raised during peer reviews of earlier assessments. The model used in the assessment was an age-structured assessment program (ASAP) for two spatial sub-units (North and South of Hudson Canyon). It should be noted that the use of spatial sub-units in the model was not based on biological characteristics of the stock, but rather as a means to facilitate development of a spatially explicit model. Conclusions reached by the SAW/SARC process were that: (1) the stock is not overfished and overfishing was not occurring in the assessment terminal year (2015); (2) the spawning stock biomass in 2015 is estimated to be 2.3 times higher than the target, and (3) the

fishing mortality rate in 2015 was 25% below the F_{msy} proxy. Based on the new information provided in the benchmark assessment via the SAW/SARC process, the SSC determined that its ABC recommendations for fishing years 2017 and beyond should be revised, and responded to the terms of reference provided by the MAFMC (in italics below):

For Black Sea Bass, the SSC will provide a written report that identifies the following for fishing years 2017-2019:

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 substantial improvement in the stock assessment for Black Sea Bass. The SSC accepted the overfishing limit (OFL) estimate provided in the assessment, and determined the level of uncertainty of OFL in the assessment requires an SSC-specified coefficient of variation (CV).

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

The SSC accepts the OFL proxy ($F_{40\%} = 0.36$) used in the assessment. Based on results of the combined, two-area model, the OFLs are:

Year	OFL (M lbs)	OFL (mt)
2017	12.05	5,467
2018	10.29	4,669
2019	9.18	4,163

For each year of the specification, the SSC notes that $P_{overfishing} < 0.5$.

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 acknowledges the substantial effort invested by state and federal scientists that resulted in an improved assessment.

The SSC recommends using a CV associated with the OFL of 60%. This reduction from the default 100% value is based on the following observations:

- The assessment presented multiple alternative assessment models with different structures regarding observation and process errors, which were largely concordant.
- Spatially explicit models were implemented in the assessment, and there had been detailed efforts to explore the consequences of the misspecification of the spatial resolution of these models on perceptions of stock status.
- The level of uncertainty in catches, including the presence of a large recreational sector,

associated with this stock were similar to other stocks for which the SSC had used a 60% CV.
- There were broadly consistent patterns in the fishery independent indices, similar to other species for which the SSC adopted a 60% CV.

The SSC also notes that the assessment included a thorough analysis of the particulars of the life history of Black Sea Bass and, thus, recommends that no additional buffer for an atypical life history is necessary

Implementing the Council's risk policy based on a lognormal distribution with a CV of 60% around the OFL, and no additional buffer to account for the atypical life history, the SSC recommends the following ABC values for the next three fishing years:

Year	ABC (M lbs)	ABC (mt)
2017	10.47	4,750
2018	8.94	4,057
2019	7.97	3,617

The SSC notes that the ABCs given above assume that the catch will be equal to the ABC each year, without error. If the actual catches moving forward do not meet this assumption, the SSC may have to reconsider the values given in the table.

The SSC also notes the pattern of declining ABCs during the next three years. This pattern reflects the dynamic response of the population to a pattern of fishing at ABC, and is also reflective of the passage of the large 2011 year class out of the fishery.

Next year, the SSC will use the following interim metrics to determine if the ABC specification needs to be reconsidered:
- Catch levels
- Survey indices
- Effects of implementation of the new MRIP effort survey on current and historic recreational catch statistics

4) The most significant sources of scientific uncertainty associated with determination of OFL and ABC.
- The natural mortality rate (M) used in the assessment — because of the unusual life history strategy the current assumption of a constant M in the assessment model for both sexes may not adequately capture the dynamics in M;
- The spatial distribution of productivity within the stock range;
- The level, temporal pattern, and spatial distribution of recreational catches; and
- The nature of exchanges between the spatial regions defined in the assessment model.

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 assessment explored the role of benthic habitat, temperature, depth, and salinity as explanatory factors on exchange rates. No additional ecosystem considerations were included in the determination of ABC.

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

The SSC endorses the list of research recommendations included in the SARC report.

In addition, the SSC recommends:

1. Considering a directed study of the genetic structure in the population north of Cape Hatteras.
2. Increasing our understanding of movement rates and cues within the population.
3. Developing a reliable fishery independent index for Black Sea Bass beyond the existing surveys. This may require development and implementation of a new survey.
4. Additional monitoring and compliance investments to control ABCs at recommended levels that are necessary if predicted scientific outcomes for future stock biomasses are to be realized.
5. Evaluating the implications of range expansion to stock and fishery dynamics.
6. Understanding the importance of recruitment variability, given the role of individual, strong year classes in the dynamics of the population and the fisheries it supports.

7) The materials considered in reaching its recommendations.

- MAFMC Staff Memo
- Assessment Summary Report
- SARC 62 Peer Review Panel Summary Report
- SARC 62 Review Panelist Reports
- Working Papers reviewed by SARC
- Background Papers for SARC review
- Blalock and Shepherd (2016)
- Robinson et al. (in press)

These documents can be accessed via: http://www.mafmc.org/ssc-meetings/2017/jan-25

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.

c: SSC Members, Warren Elliott, Chris Moore, Rich Seagraves, Brandon Muffley, Kiley Dancy, Gary Shepherd, John Maniscalco, Jan Saunders

Attachment 1

Mid-Atlantic Fishery Management Council
Scientific and Statistical Committee Meeting
25 January 2017

Final Agenda

9:00 Introductions, review agenda (Boreman)

9:10 SAW/SARC 62 Black Sea Bass Assessment (Presenters: Shepherd and Maniscalco)

11:00 Review Staff Memo and 2017-2019 ABC Recommendations for BSB (Presenter: Muffley)

11:30 SSC 2017-2019 ABC Recommendations for BSB (SSC Discussion Lead: Jensen)

2:00 Adjourn

Attachment 2

MAFMC Scientific and Statistical Committee
25 January 2017 Meeting
Baltimore, MD

Name	Affiliation
SSC Members in Attendance:	
John Boreman (SSC Chairman)	NC State University
Tom Miller (SSC Vice-Chair)	University of Maryland - CBL
David Tomberlin	NMFS Office of Science and Technology
Mark Holliday	NMFS (Retired)
Doug Lipton	NMFS Headquarters
Sarah Gaichas	NMFS Northeast Fisheries Science Center
Ed Houde	University of Maryland – CBL
Wendy Gabriel	NMFS Northeast Fisheries Science Center
Olaf Jensen	Rutgers University
Lee Anderson	University of Delaware (Retired)
Yan Jaio	VA Tech
Brian Rothschild	UMass Dartmouth (Retired)
Rob Latour	VIMS
Dave Secor	University of Maryland - CBL
Paul Rago	NMFS (retired)
Mike Frisk	Stony Brook University
Others in attendance:	
Mike Luisi	MAFMC chair
Rich Seagraves	MAFMC staff
Brandon Muffley	MAFMC staff
Kiley Dancy	MAFMC staff
John Maniscalco	New York DEC
Gary Shepherd	NMFS Northeast Fisheries Science Center
Purcie Bennett-Nickerson	Pew Charitable Trust
Rob O'Reilly	Virginia MRC (MAFMC Council member)
Abigail Golden	Rutgers University
Adena Leibman	Office of Senator Sheldon Whitehouse (RI)
Greg DiDomenico	Garden State Seafood Association
Alexei Sharov	Maryland DNR
Emily Gilbert	NMFS GARFO

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

MEMORANDUM

DATE: January 12, 2017

TO: Chris Moore, Executive Director

FROM: Brandon Muffley and Kiley Dancy, Staff

SUBJECT: Black Sea Bass Specifications for 2017-2019

Executive Summary

In 2015, two-year specifications were implemented for black sea bass, establishing catch and landings limits for the 2016 and 2017 fishing years. These specifications were set with the understanding that the 2017 limits would likely be revised based on the results of December 2016 benchmark stock assessment. This benchmark assessment is complete and was reviewed in December 2016 and forms the basis for updated specifications recommendations. On January 25, 2017, the Council's Scientific and Statistical Committee (SSC) is scheduled to review the assessment and peer review results, and consider recommendations for annual Acceptable Biological Catch (ABC) levels for 2017-2019. Based on the recommendations of the SSC, the Monitoring Committee will meet on January 26 to recommend 2017-2019 sector-specific Annual Catch Limits (ACLs) and Annual Catch Targets (ACTs) for the commercial and recreational fisheries. In February 2017, the Council will meet jointly with the Atlantic States Marine Fisheries Commission's Summer Flounder, Scup, and Black Sea Bass Board (Board) to consider the SSC, Monitoring Committee, and Advisory Panel recommendations, and recommend revised catch and landings limits for 2017 and beyond.

Based on the results of the benchmark stock assessment, the black sea bass stock north of Cape Hatteras, NC was not overfished and overfishing was not occurring in 2015, the terminal year of the assessment. The model-estimated spawning stock biomass (SSB) in 2015 was 48.89 million lb (22,176 mt), 2.3 times the spawning stock biomass at maximum sustainable yield, SSB_{MSY} = 21.31 million lb (9,667 mt). The fishing mortality rate (F) in 2015 was 0.27, below the fishing mortality threshold reference point $F_{MSYPROXY} = F_{40\%} = 0.36$.

Using projections from the benchmark stock assessment, staff recommends setting three year specifications for black sea bass and an Acceptable Biological Catch (ABC) of 10.47 million pounds (4,750 mt) for 2017. This results in a commercial ACL of 5.09 million pounds (2,311 mt) and a recreational ACL of 5.38 million pounds (2,439). Staff recommend that the commercial ACT and the recreational ACT be set equal to their respective sector ACLs for 2017. After removing projected discards, the recommended 2017 commercial quota is 4.12 million pounds (1,869 mt) and the recommended

recreational harvest limit (RHL) is 4.29 million pounds (1,945 mt; Table 1). This represents a 53% increase in the commercial quota and a 52% increase in the RHL from the 2016 specifications.

For 2018, staff recommend an ABC of 8.94 million pounds (4,057 mt), a commercial ACL of 4.35 million pounds (1,974 mt), and a recreational ACL of 4.59 million pounds (2,083 mt). Staff recommend that the commercial and recreational ACTs be set equal to their respective ACLs for 2018. After removing projected discards, the recommended 2018 commercial quota is 3.52 million pounds (1,596 mt) and the recommended recreational harvest limit is 3.66 million pounds (1,661 mt; Table 1). The declining recommended ABC between 2017 and 2018 is largely due to the extremely robust 2011 year class beginning to decline in abundance and exit the fishery.

For 2019, staff recommend an ABC of 7.97 million pounds (3,617 mt), a commercial ACL of 3.88 million pounds (1,760 mt), and a recreational ACL of 4.10 million pounds (1,858 mt). Staff recommend that the commercial and recreational ACTs be set equal to their respective ACLs for 2019. After removing projected discards, the 2019 recommended commercial quota is 3.14 million pounds (1,423 mt) and the recommended recreational harvest limit is 3.27 million pounds (1,481 mt; Table 1). Similarly to 2018, the 2019 recommended ABC continues to decline due to the 2011 year class.

As described in the July 2016 staff quota memo for black sea bass,[1] the Council and Commission's Monitoring and Technical Committees conducted a thorough review of current commercial management measures in 2015. No changes to black sea bass measures were adopted; however, Council and Board members indicated that additional exploration of some measures may be warranted, as described under "Other Management Measures" in this document. Additional data and analyses are needed to address the questions raised, and staff will continue to work with the Monitoring and Technical Committees on these issues. At this time, staff do not recommend any changes to the current commercial measures, including the 11-inch minimum fish size, mesh size requirements and seasonal thresholds, or pot/trap gear requirements.

Recreational management measures (possession limits, size limits, and seasons) that will be used to achieve the harvest limit for the recreational fishery in 2017 are being developed in parallel to changes in catch and landings limits, with the intention of implementing new measures as soon as possible in 2017. Specific recreational measures cannot be recommended until a revised 2017 ABC and recreational harvest limit are recommended by the SSC and Monitoring Committee. However, staff are working to compile the information necessary to recommend recreational adjustments as soon as possible once an updated harvest limit recommendation becomes available. A separate memo will be provided to the Monitoring Committee reviewing recreational fishery data and next steps for development of recreational measures.[2]

[1] http://www.mafmc.org/s/bsbquota-2016-memo.pdf.

[2] See Monitoring Committee meeting materials at: http://www.mafmc.org/council-events/2017/jan-bsb-monitoring-committee.

Table 1: Staff-recommended multi-year catch and landings limits for black sea bass for 2017-2019.

Management Measure	2017		2018		2019		Basis
	mil lb.	mt	mil lb.	mt	mil lb.	mt	
OFL	12.05	5,467	10.29	4,669	9.18	4,163	Stock assessment projections
ABC	10.47	4,750	8.94	4,057	7.97	3,617	Stock assessment projections/staff recommended application of Council risk policy
ABC Landings Portion	8.41	3,814	7.18	3,258	6.40	2,904	80.3% of ABC, based on average 2013 – 2015 % landings portion of total catch
ABC Discards Portion	2.06	936	1.76	799	1.57	713	19.7% of ABC, based on average 2013 – 2015 % discards portion of total catch
Commercial ACL	5.09	2,311	4.35	1,974	3.88	1,760	49% of ABC landings portion (per FMP allocation) + 47.2 % of ABC discards portion
Commercial ACT	5.09	2,311	4.35	1,974	3.88	1,760	Commercial ACL, less deduction for management uncertainty
Projected Commercial Discards	0.97	442	0.83	377	0.74	336	47.2% of ABC discards portion, based on 2013-2015 average % discards by sector
Commercial Quota	4.12	1,869	3.52	1,596	3.14	1,423	Commercial ACT, less discards
Recreational ACL	5.38	2,439	4.59	2,083	4.10	1,858	51% of ABC landings portion (per FMP allocation) + 52.8 % of ABC discards portion
Recreational ACT	5.38	2,439	4.59	2,083	4.10	1,858	Recreational ACL, less deduction for management uncertainty
Projected Recreational Discards	1.09	494	0.93	422	0.83	376	52.8 % of ABC discards portion, based on 2013-2015 average % discards by sector
Recreational Harvest Limit	4.29	1,945	3.66	1,661	3.27	1,481	Recreational ACT, less discards

Introduction

The Magnuson-Stevens Act (MSA) requires each Council's SSC to provide ongoing scientific advice for fishery management decisions, including recommendations for ABC, preventing overfishing, and maximum sustainable yield. The Council's catch limit recommendations for the upcoming fishing year(s) cannot exceed the annual ABC recommendations of the SSC. In addition, the Summer Flounder, Scup, and Black Sea Bass Monitoring Committee established by the Fishery Management Plan (FMP) is responsible for developing recommendations for management measures designed to achieve the recommended catch limits.

Multi-year specifications may be set for black sea bass for up to three years at a time. The SSC must recommended ABCs that addresses scientific uncertainty, while the Monitoring Committee must recommend annual catch targets (ACTs) that address management uncertainty. Based on the SSC and Monitoring Committee recommendations, the Council will make a recommendation to the National Marine Fisheries Service (NMFS) Greater Atlantic Regional Administrator. Because the FMP is cooperatively managed with the Atlantic States Marine Fisheries Commission, the Commission's Summer Flounder, Scup, and Black Sea Bass Board will meet jointly with the Council to recommend black sea bass catch limits and management measures. In this memorandum, information is presented to assist the SSC and Monitoring Committee in developing recommendations for the Council and Board to consider for the 2017-2019 fishing years for black sea bass.

Additional relevant information about fishery performance and past management measures is presented in the June 2016 Black Sea Bass Fishery Information Document prepared by Council staff and the June 2016 Fishery Performance Report for black sea bass developed by the Council and Commission Advisory Panels. These documents, along with the relevant SARC 62 benchmark assessment documents, are available at: http://www.mafmc.org/ssc-meetings/2017/jan-25.

Recent Catch and Landings

According to the NMFS most recent and comprehensive commercial landings information[3], final commercial landings in 2015 were 2.30 million lb (1,042 mt), an increase from 2.18 million lb (989 mt) in 2014 which corresponds to an increase in the 2015 quota. Preliminary 2016 coastwide commercial landings, according to the NMFS weekly quota reports as of the week ending December 31, 2016, indicate landings totaled 2.52 million lb (1,141 mt) which accounts for 93% of the 2016 coastwide commercial quota (Table 2).

According to the Marine Recreational Information Program (MRIP) estimates, recreational landings in 2015 north of Cape Hatteras, NC were 3.79 million lb (1,719 mt), approximately 63% above the 2015 RHL of 2.33 million lb. In 2016, recreational landings through wave 5 (January-October 2016) are estimated to be 4.55 million lb (2,064 mt), and are projected to be 4.67 million lb (2,116 mt) through the end of 2016,[4] approximately 100% above the 2016 RHL.

[3] NMFS personal communication

[4] Projected using 2015 proportions of landings by wave (98% of 2015 landings occurred in waves 1-5).

Table 2: 2016 black sea bass commercial quota and landings by state for the week ending December 31, 2016.

State	Cumulative Landings (lb)	Quota (lb)[a]	Percent of Quota (%)
ME	0	--	--
NH	0	--	--
MA	353,640	--	--
RI	294,382	--	--
CT	26,231	--	--
NY	186,311	--	--
NJ	521,805	--	--
DE	95,149	--	--
MD	231,994	--	--
VA	487,141	--	--
NC	315,028	--	--
Other	4,418	--	--
Totals	**2,516,481**	**2,702,867**	**93**

[a] State-by-state quotas contained in the Commission's FMP are not administered or monitored in-season by GARFO. Source: NMFS Weekly Quota Report for week ending December 31, 2016.

Regulatory Review

Prior to the 2016 benchmark assessment, the most recent accepted benchmark assessment on black sea bass had been accepted in December 2008 by the Data Poor Stock Working Group (DPSWG) Peer Review Panel.[5] This assessment was based on a statistical catch at length, or "SCALE" model, and was last updated in 2012 with data through 2011. However, the SSC did not accept the Overfishing Limit (OFL) generated from this assessment, due to concerns about the unresolved uncertainty in the OFL related to potential stock structure within the designated management unit, life history, and natural mortality. The SSC designated the assessment as "Level 4," now known as an assessment for which the OFL cannot be specified given current state of knowledge or "Catch Based ABC." The SSC considered the following to be the most significant sources of uncertainty:

- Difficulty in determining appropriate reference points due to atypical life history strategy (protogynous hermaphrodite);
- Assessment assumes a completely mixed stock, while tagging analyses suggesting 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); and
- Concern about the application of trawl calibration coefficients (ALBATROSS IV vs BIGELOW) and their influence on the selectivity pattern and results of the assessment.

Because the SSC did not accept the OFL derived from this assessment, for the past several years the SSC has used alternative methods to recommend ABCs, as per the Council's risk policy. Each year from 2010-

[5] 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 Dept Commer, Northeast Fish Sci Cent Ref Doc. 09-02; 496 p. Available at http://www.nefsc.noaa.gov/publications/crd/crd0902/.

2012, the SSC recommended an ABC of 4.50 million lb (2,041 mt), based on a constant catch approach. For 2013-2015, the constant catch level was revised to 5.50 million lb (2,494 mt) after the SSC reviewed new information relative to fishery performance, abundance, and recruitment, and concluded that the continued application of the previous constant catch level was overly conservative.[6]

In September 2015, the SSC adopted a new, internally reviewed methodology for recommending catch limits for stocks where the OFL cannot be specified given the current state of knowledge. This approach used an MSE approach as developed by Carruthers et al. (2014)[7] to evaluate the relative performance of a suite of data limited analytical techniques.[8] Using this approach, the SSC recommended 2016 and 2017 ABCs of 6.67 million lb (3,024 mt). This resulted in a commercial ACL of 3.15 million lb (1,428 mt) and a recreational ACL of 3.52 million lb (1,597 mt). These measures are currently implemented for the 2017 fishing year, and would be revised if the SSC recommends ABCs based on new scientific information, and those recommendations are subsequently adopted by the Council and Board.

Of note, on December 21, 2016 the NMFS published revised final 2017 specifications for black sea bass due to the commercial fishery exceeding the 2015 ACL. The commercial fishery exceeded the 2015 commercial landings quota by 3.8%; while discards were over three times higher than anticipated and accounted for 44.4% of the total commercial catch. This resulted in the ACL being exceeded and a reduction in the 2017 commercial ACT by nearly 850,000 pounds.

Stock Status and Biological Reference Points

A benchmark stock assessment for black sea bass was peer-reviewed and approved at the 62nd Stock Assessment Review Committee (SARC 62) in December 2016.[9] To address concerns raised during the SAW/SARC 53 review (NEFSC 2012)[10] regarding potential spatial structure of the stock, the new assessment modeled sea bass as two separate sub-units (North and South) divided at approximately Hudson Canyon. As the result of this new information and changes to the modelling approaches, new biological reference points were developed as part of the assessment. Due to the lack of a stock/recruit relationship, a direct calculation of MSY and associated reference points (F and biomass) was not feasible and proxy reference points were approved for management use. Each sub-unit was modelled separately and the average F and combined biomass and spawning stock biomass (SSB) across sub-units were used to develop stock-wide reference points. Also of note, SSB calculations and SSB reference points include both males and females. The average fishing mortality threshold for black sea bass is $F_{MSY} = F_{40\%}$ (as $F_{MSYproxy}$) = 0.36, and the combined $SSB_{MSYproxy}$ is 21.3 million lb (9,667 mt). The minimum stock size threshold, ½ SSB_{MSY} is estimated to be 10.7 million lb (4,834 mt).

The 2016 benchmark assessment indicated that the black sea bass stock was not overfished and overfishing was not occurring in 2015, relative to the biological reference points. The average fishing mortality on

[6] See the January 2013 SSC meeting report: http://www.mafmc.org/s/SSC-Meeting-Report-January-30-2013.pdf.

[7] Carruthers, T, Punt, A, Walters, C, MacCall, A, McAllister, M, Dick, E, Cope, J. 2014. Evaluating methods for setting catch limits in data-limited fisheries. Fisheries Research. 153: 48 – 68.

[8] Additional information regarding application to Mid-Atlantic species, including the Data Limited Techniques final report, code, presentation, and SSC subcommittee peer review report can be found at: http://www.mafmc.org/ssc-meetings/2015/sept-16-17/.

[9] See 62nd Northeast Regional Stock Assessment Workshop (62nd SAW) Assessment Summary Report at http://www.nefsc.noaa.gov/publications/crd/crd1701/crd1701.pdf

[10] NEFSC. 2012. 53rd Northeast Regional Stock Assessment Workshop Assessment Report. UD Dept. Comm. NEFSC Center Reference Document 12-05, 559p.

ages 4-7 (F_{4-7}) in 2015 was estimated at F=0.27,which is 25% below the fishing mortality threshold of F=0.36. Total spawning stock biomass in 2015 was estimated at 48.9 million lb (22,199 mt) which is 2.3 times above the target $SSB_{MSYproxy}$ of 21.3 million (9,667 mt) and 4.6 times higher than the biomass threshold $SSB_{MSYproxy}$ of 10.7 million lb (4,834 mt). Total January 1 stock biomass in 2015 was estimated at 70.7 million lb (32,061 mt).

Retrospective analysis on a number of population characteristics was conducted for the North and South sub-units separately. The North sub-unit model runs produced a retrospective pattern that tended to underestimate SSB and overestimate F; while the opposite was true for the South sub-unit model (i.e. the model tended to overestimate SSB and underestimate F). After an evaluation of cross plots showing the median F and SSB from the base run and retrospectively adjusted runs for both North and South sub-units separately, the retrospectively adjusted values were outside the base run values +/- two confidence intervals. Retrospective adjustments were then made to each sub-unit separately and then combined to produce reference points for one unit stock. Retrospective adjusted estimates produced a slightly higher F and significantly higher SSB in the 2015 terminal year estimates. The 2015 retrospective adjusted reference points did not change stock status; therefore, it was determined retrospective adjusted F and biomass (SSB) related reference points were most appropriate and are provided here.

Recruitment estimated by the model was relatively constant through the time series except for large peaks from the 1999 and 2011 year classes. Average recruitment from 1989 – 2015 equaled 24.3 million fish with the 1999 year class estimated at 37.3 fish and the 2011 year class estimated at 68.9 million fish. Since 2012, recruitment has been average with the latest cohort (2014 year class) estimated to be 24.9 million fish. There is some evidence there may be a strong 2015 year class but additional catch and survey information is needed to determine its status.

Projections

Similar to the reference point calculations, projections were developed by summing each sub-unit specific projection and weighting the North-South ABC by catch proportions to create a unit stock projection. Retrospectively adjusted estimates in each sub-unit were also used to make projections. The 2017 – 2019 projections were calculated using a weighted iterative approach. The 2017 OFL projection is derived from the projected 2016 abundance and made under the assumption of fishing at the $F_{MSYproxy}$ (F=0.36) level. Since 2016 catch estimates were not yet available, it was assumed the 2016 catch equaled the 2016 ABC of 6.67 million lb (3,024 mt) and was apportioned to each sub-unit based on the 2013-2015 average catch for the sub-unit. To calculate the 2018 OFL estimate, its assumed the 2017 catch equaled the 2017 ABC with updated weighting of the North-South catch proportions and assuming fishing at the $F_{MSYproxy}$. This approach is then applied for the 2019 OFL projections.

The 2016 benchmark black sea bass stock assessment included OFL projections for 2017-2019. Prior to the current assessment, the SSC did not accept the OFL derived from the assessment used at the time and used alternative methods to set the ABC for black sea bass; therefore, there are no OFL comparisons that can be made from the current assessment. OFL projections show a substantial increase in 2017 at 12.05 million pounds (5,467 mt). As the extremely large 2011 year class abundance declines, OFL projections for 2018 and 2019 also decline. The OFL in 2018 would be 10.29 million pounds (4,669 mt), a 14.6% decline from 2017, and the 2019 OFL would be 9.18 million pounds (4,163 mt), a 10.8% decline from 2018.

Staff ABC Recommendations for 2017-2019

Staff recommend that three year specifications be set for black sea bass, for the 2017 through 2019 fishing years. Due to the lack of an approved stock assessment for several years, specification setting has changed a number of times since 2012 and on a some-what ad-hoc basis as new information and approaches were obtained and developed. This assessment provides a new understanding of the black sea bass stock and represents the best scientific information available for management. Implementing multi-year specifications will help provide increased predictability in management for fishermen, as well as administrative time savings that allowed the Council and Board to focus efforts on other management priorities. Staff recommend that the SSC and Monitoring Committee may want to revisit and evaluate these specifications in the future, particularly for 2019, due to the declining abundance (and catch) of the 2011 year class, the potential strong 2015 year class, and the expected future availability of revised MRIP effort and catch time series.

The latest stock assessment was successful at evaluating, addressing and incorporating many of the concerns and greatest sources of uncertainty that had plagued prior stock assessments. The current assessment model, while not explicitly modelling stock mixing and exchange rates, separated the black sea bass stock and modelled two sub-units (North and South with a separation at approximately the Hudson Canyon) to account to biological and fishery differences between the two sub-units. The Council's risk policy is concerned with whether the atypical life history has been accounted for in the assessment or not. The assessment conducted a number of simulations to evaluate the unique life history (i.e. protogynous hermaphroditism) of black sea bass. Results highlight the contribution of secondary males and indicate the stock is more robust to exploitation than previously thought. As a result, SSB calculations were defined as male and female mature biomass. This evaluation supports the application of a typical life history approach in calculating the ABC. The SAW/SARC also evaluated the appropriateness and use of retrospectively adjusted estimates for making projections and approved these estimates as most appropriate and consistent application in other fisheries of other retrospectively adjusted estimates.

Staff recommend using the retrospective adjusted ABC projections and applying the Council risk policy assuming a species with a typical life history and using an OFL CV of not greater than 60%. The resulting ABC projections are shown in Table 3.

Table 3: ABC total catch, landings, discards, fishing mortality (F) and Spawning Stock Biomass (SSB) based on projections (2017-2019) from the 2016 benchmark black sea bass stock assessment[11]. Projected catch, landings, discards, and SSB for 2017-2019 were calculated using an assumed typical life-history application and a 60% OFL CV.

Year	**ABC Total Catch** (mil lb)	**ABC Total Catch** (mt)	**Landings** (mil lb)	**Landings** (mt)	**Discards** (mil lb)	**Discards** (mt)	**F**	**P* Value**	**SSB** (mill b)	**SSB** (mt)
2016	6.67	3,024	5.53	2,510	1.13	514	0.27	n/a	41.11	18,647
2017	10.47	4,750	8.41	3,814	2.06	936	0.36	0.4	35.88	16,275
2018	8.94	4,057	7.18	3,258	1.76	799	0.36	0.4	31.29	14,183
2019	7.97	3,617	6.40	2,904	1.57	713	0.36	0.4	28.26	12,820

Other Management Measures

Recreational and Commercial Annual Catch Limits

As defined by the Omnibus ACLs and AMs Amendment (Amendment 15 to the Summer Flounder, Scup, and Black Sea Bass FMP), the ABC includes both landings and discards, and is equal to the sum of the commercial and recreational ACLs for black sea bass (Figure 1). The Monitoring Committee is responsible for recommending ACLs and ACTs derived from the ABC recommendations of the SSC. The catch projections provided by the Northeast Fisheries Science Center are not separated into projected landings and discards. Staff used data from the stock assessment to derive sector-specific ACL recommendations from the staff-recommended ABCs. Specifically, the recommended ABCs are apportioned into total landings and discards based on the 2013-2015 average which staff believes to be most representative of the current fishery. Based on this evaluation, the staff-recommended ABCs are apportioned into 80.3% landings and 19.7% discards.

Based on the allocation percentages in the FMP, 49% of the total allowable landings are allocated to the commercial fishery, and 51% to the recreational fishery. Discards are apportioned based on the contribution from each fishing sector using the most recent available three-year percentage contribution of discards by sector. Based on 2013-2015 discard data, 47.2% of discards were attributable to the commercial sector, and 52.8% to the recreational sector (Table 1). This updated discard information shows a much closer discard ratio between the commercial and recreational sector than previously calculated (for 2013-2014) which showed a 38% to 62% breakdown, respectively.[12] Recreational discards have remained relatively consistent from 2013 through 2015; while commercial discards increased significantly in 2014 and 2015, particularly in the North sub-unit trawl fishery.

[11] NEFSC (Northeast Fisheries Science Center). 2016. 62nd Northeast Regional Stock Assessment Workshop assessment summary report, prepublication draft.

[12] See the July 7, 2016 MAFMC staff memo at http://www.mafmc.org/s/bsbquota-2017-memo.pdf.

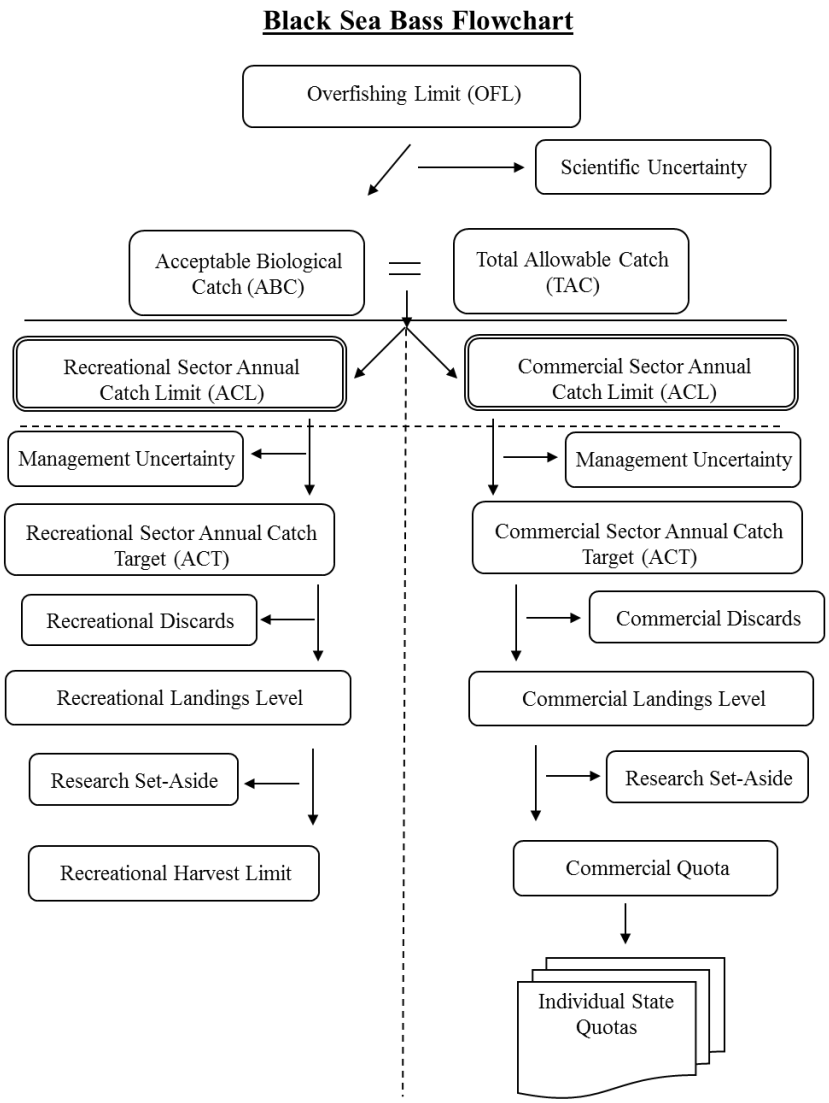

Figure 1: Flowchart for black sea bass catch and landings limits.

Annual Catch Targets

The Monitoring Committee is responsible for recommending Annual Catch Targets (ACTs), which are intended to account for management uncertainty, for the Council and Board's consideration. The Monitoring Committee is responsible for considering all relevant sources of management uncertainty in the black sea bass fishery and providing the technical basis, including any formulaic control rules, for any reduction in catch when recommending an ACT. The ACTs, technical basis for ACT recommendations, and sources of management uncertainty should be described and provided to the Council. The relationships between the recreational and commercial ACTs and other catch components are given in Figure 1.

Management uncertainty is comprised of two parts: uncertainty in the ability of managers to control catch and uncertainty in quantifying the true catch (i.e., estimation errors). Management uncertainty can occur because of a lack of sufficient information about the catch (e.g., due to late reporting, underreporting,

and/or misreporting of landings or discards) or because of a lack of management precision (i.e., the ability to constrain catch to desired levels).

The sector-specific landings performance in recent years indicates that the commercial landings have generally been near the commercial quotas for most of the past five years with less than a 2% difference between landings and the quota over this time period. The commercial quota monitoring system is timely and typically successful in constraining landings to the commercial quota. In contrast, the recreational fishery has generally exceeded its harvest limits in recent years, with periodic substantial overages (Table 4). The Monitoring Committee has noted that extremely high availability of black sea bass, largely due to a substantial 2011 year class, is resulting in recreational overages despite very restrictive management measures. In recent years, the Monitoring Committee has indicated that it would address recreational management uncertainty during the process for setting recreational measures in each year. Specifically, the Monitoring Committee has continued to address management uncertainty in the recreational fishery by re-evaluating the methodologies used to propose recreational measures and calculate effective recreational adjustments. The Monitoring and Technical Committees held a recreational data workshop in the fall of 2015 to review recreational data use and to develop tools to inform future recreational analyses. The Committees should continue to work to make improvements to the evaluation process for recreational measures. Staff recommend no reduction in catch from the recreational or commercial ACLs so that each sector's ACT is set equal to the ACL.

Table 4: Black sea bass commercial and recreational fishery performance relative to quotas and harvest limits, 2011-2015.

Year	Commercial Landings (mil lb)[a]	Commercial Quota (mil lb)	Percent Overage(+)/ Underage(-)	Recreational Landings (mil lb)[b]	Recreational Harvest Limit (mil lb)	Percent Overage(+)/ Underage(-)
2011	1.69	1.71	-1%	1.17	1.78	-34%
2012	1.72	1.71	+1%	3.19	1.32	+142%
2013	2.26	2.17	+4%	2.46	2.26	+9%
2014	2.18	2.17	0%	3.67	2.26	+62%
2015	2.29	2.21	+4%	3.79	2.33	+63%
5-yr Avg.	-	-	+1.6%	-	-	+48.4%

[a] Source: NMFS dealer data as of December 31, 2016. [b] Source: NMFS MRIP database through Wave 5 as of December 12, 2016; recreational landings north of Cape Hatteras, NC.

Commercial Quotas and Recreational Harvest Limits

Projected discards are removed to derive landings limits, which include annual commercial quotas and recreational harvest limits. The sum of the commercial quota and recreational harvest limit is equivalent to the total allowable landings in a given year. Based on the ABC and ACT recommendations above, after subtracting sector-specific projected discards, staff recommend a commercial quota of 4.12 million pounds (1,869 mt) in 2017, and a recreational harvest limit of 4.29 million pounds (1,945 mt) in 2017. Staff recommend a 2018 commercial quota of 3.39 million pounds (1,537 mt) and a 2018 recreational harvest limit of 3.53 million pounds (1,599 mt). Staff recommend a 2019 commercial quota of 2.94 million pounds (1,334 mt) and a 2019 recreational harvest limit of 3.06 million pounds (1,388 mt; Table 1).

As mentioned earlier in the memo, the NMFS published revised final 2017 specifications[13] for black sea bass due to the commercial fishery exceeding the 2015 ACL. The commercial fishery exceeded the 2015 commercial landings quota by 3.8%; while discards were over three times higher than anticipated and accounted for 44.4% of the total commercial catch. This resulted in the ACL being exceeded and a reduction in the previously implemented 2017 ACT by nearly 850,000 pounds. As a result of this information, the Council initiated a framework to consider adding flexibility in the commercial black sea bass Accountability Measures (AMs) based on stock status.

The new stock assessment provides updated scientific information and a greater understanding of the black sea bass resource, particularly in 2015 and beyond. This new information provides a foundation to reevaluate the specifications that were in place in 2015 and its implications for 2017. Staff recommends that the NMFS not apply the overage in the 2015 commercial ACL to the 2017 commercial ACT for the following reasons:

- The 2015 specifications were derived without an approved stock assessment using a constant catch approach where an OFL could not be specified. This was a conservative approach and was overly restrictive in setting specifications at a time when the stock was rapidly growing and expanding due in large part to a strong 2011 year class.
- Due to the uncertainly regarding the fishery and resource at the time and without an assessment, a limited time series of data that that did not include information about the 2011 year class was used to make projections and apportion the ABC between landings and discards. This did not allow for a full evaluation regarding the implications of the 2011 year class, which was as its peak in 2015, and appropriately project commercial sector discards in 2015.
- The newly approved stock assessment provides a much more comprehensive and robust picture regarding the sea bass stock in 2015 and represents best available science to guide management decisions.
    - The new assessment essentially creates a new baseline for developing new specifications. The 2017 projections and specifications are not linked to the previously implemented 2015 ABC and ACL specifications that were established under a different application using different methods and data.
- If the current assessment was available to set 2015 specifications, initial analysis indicates the 2015 ABC would have been more than double what was actually implemented.
    - The fishery has forgone yield with the restrictive quota that was in place for 2015. The 2015 commercial ACL would not have been exceeded using the new stock assessment information.
- 2015 is the terminal year of current assessment and indicates stock is not overfished and overfishing not occurring and this has been the stock status for the last five years.
    - SSB is estimated to be 2.3 times higher than the target and 4.6 times higher than the threshold.
    - Higher 2015 commercial discards, above those projected for the implemented 2015 ACL, were estimated and used in the assessment and did not impact the stock status.
- The stock assessment projections for 2017 also utilize the higher commercial discard amounts within the total catch estimates to produce the 2017 OFL.

[13] https://www.gpo.gov/fdsys/pkg/FR-2016-12-22/pdf/2016-30876.pdf.

- The recent higher commercial discards estimated within the stock assessment, including 2015, are accounted for in the staff recommended 2017 ABC and commercial ACL. Under the staff recommended specifications, discards now account for a much greater portion of the ABC and in the commercial ACL for 2017. In fact, projected commercial discards for the updated 2017 specifications (970,000 pounds) are more than double those originally set for 2017 (440,000 pounds) using old data and methodologies.
- Therefore, implementing the 2015 ACL overage to the reduce the 2017 ACT is in essence a double deduction of the overage.

- Discard estimates can be uncertain and variable for many species and there are discrepancies between different estimation methods that produce year specific discard estimates. This can create an uncertain process in which to develop one value/estimate to apply a deduction in the ACT and further evaluation is warranted.

The ASMFC allocates the commercial quota to each state based on the allocation percentages given in Table 4.

Table 3: The Commission state-by-state commercial allocation percentages.

State	Allocation (percent)
ME	0.5
NH	0.5
MA	13.0
RI	11.0
CT	1.0
NY	7.0
NJ	20.0
DE	5.0
MD	11.0
VA	20.0
NC	11.0
Totals	100

Recreational management measures (possession limits, size limits, and seasons) that will be used to achieve the harvest limit for the recreational fishery in 2017 are being developed in parallel to changes in catch and landings limits, with the intention of implementing new measures as soon as possible in 2017. Specific recreational measures cannot be recommended until a revised 2017 ABC and recreational harvest limit are recommended by the SSC and Monitoring Committee. However, staff are working to compile the information necessary to recommend recreational adjustments as soon as possible once an updated harvest limit recommendation becomes available. Updated MRIP data through wave 5, 2016 became available in mid-December 2016, and will be used to develop 2017 recreational measures. Preliminary data for the complete 2016 fishing year is expected to become available in February 2017 and may be used during the development of state waters measures, if applicable.

The Monitoring Committee will meet on January 26, 2017 to recommend commercial quotas and recreational harvest limits for 2017-2019, following the SSC's ABC recommendations. The Monitoring Committee will also review updated MRIP data for 2016, and to the extent possible, recommend any necessary changes in the recreational management. Given the performance of the recreational fishery

relative to the recreational harvest limit in recent years, management measures (i.e., minimum size, possession limits, and seasons) should be implemented that are designed to achieve the recreational harvest limit while preventing the recreational ACL from being exceeded. A separate memo describing updated recreational performance and possible recreational strategies for 2017 will be distributed to the Monitoring Committee prior to their meeting.

Commercial Gear Regulations and Minimum Fish Size

Management measures in the commercial black sea bass fishery, other than quotas and harvest limits (i.e., minimum fish size, gear requirements, etc.), have remained constant since 2007.

Amendment 9 in 1996 incorporated black sea bass into the Summer Flounder FMP, and established an initial minimum fish size of 9 inches total length as part of an effort to reduce fishing mortality on immature black sea bass and increase spawning stock biomass. The Council and Commission increased the commercial minimum size to 10 inches TL in 1998, and to 11 inches TL in 2002. The 11-inch minimum size has remained unchanged since 2002.

Amendment 9 also established gear regulations that became effective in December of 1996, and were modified in 1998 and again in 2002. Current regulations, unchanged since 2002, state that trawl vessels whose owners have a black sea bass moratorium permit and possess 500 pounds or more of black sea bass from January 1 through March 31, or 100 pounds from April 1 through December 31 (i.e., the threshold or incidental possession limits), must fish with nets that have a minimum mesh size of 4.5-inch diamond mesh applied throughout the codend for at least 75 continuous meshes forward of the terminus of the net. For codends with less than 75 meshes, the entire net must have a minimum mesh size of 4.5-inch diamond mesh.

The Council and Commission adopted modifications to the circle vent size in black sea bass pots/traps, effective in 2007, based on the findings of a Council and Commission sponsored workshop. The minimum circle vent size requirements for black sea bass pots/traps were increased from 2.375 inch to 2.5 inch. The requirements of 1.375 inch x 5.75 inch for rectangular vents and 2 inch for square vents remained unchanged. In addition, 2 vents are required in the parlor portion of the pot/trap.

In the fall of 2015, the Council and Commission's Monitoring and Technical Committees conducted a thorough review of current commercial management measures. The Committees, and subsequently the Council and Board, indicated that further exploration of some of these measures may be justified. Specifically, for black sea bass, this included assessing the feasibility of a common minimum mesh size for summer flounder, scup, and black sea bass, as well as summarizing past studies on mesh sizes and pot/trap configuration requirements for all three species. Stemming from this discussion, the Council funded a proposal received under the Council's 2016-2017 Collaborative Fisheries Research Program. This project proposes to analyze the selectivity of multiple codend mesh sizes relative to summer flounder, black sea bass and scup retention in the commercial bottom trawl fishery in the Mid-Atlantic region.[14] The results of this study should be available in mid-2017 and may inform future consideration of adjustments to the black sea bass, scup, and/or summer flounder mesh sizes. At this time, staff do not recommend any changes to the current commercial measures, including the 11-inch minimum fish size, seasonal mesh size requirements and thresholds (4.5-inch mesh with 500 lb trigger from January-March

[14] Proposal and background documents available at: http://www.mafmc.org/collaborative-research/.

and 100 lb trigger from April-December), or other gear requirements (current pot/trap vent requirements detailed above).