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Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: July 19, 2021

To: Chris Moore, Executive Director

From: Julia Beaty, staff

Subject: 2022-2023 Black Sea Bass Specifications

Executive Summary

This memorandum includes information to assist the Mid-Atlantic Fishery Management Council's (Council's) Scientific and Statistical Committee (SSC) and Monitoring Committee in recommending 2022-2023 catch and landings limits for black sea bass, as well as black sea bass commercial management measures for 2022.

The black sea bass stock from Maine through Cape Hatteras, North Carolina is cooperatively managed by the Council and the Atlantic States Fishery Management (Commission). Additional information on fishery performance and past management measures can be found in the 2021 Black Sea Bass Fishery Information Document and the 2021 Summer Flounder, Scup, and Black Sea Bass Fishery Performance Report developed by advisors.[1]

A black sea bass management track stock assessment was peer reviewed and accepted in June 2021. This assessment found that the black sea bass stock north of Cape Hatteras, North Carolina was not overfished and overfishing was not occurring in 2019 compared to revised reference points. Spawning stock biomass (SSB) in 2019 was 65.63 million pounds (29,769 mt, adjusted for retrospective bias), 2.1 times the updated biomass reference point (i.e., $SSB_{MSY\ proxy} = SSB_{40\%}$=31.84 million pounds/14,441 mt). The average fishing mortality rate (F) on fully selected ages 6-7 fish in 2019 was 0.39 (adjusted for retrospective bias), 85% of the updated fishing mortality threshold reference point (i.e., $F_{MSY\ proxy} = F_{40\%} = 0.46$).[2]

The Magnuson-Stevens Fishery Conservation and Management Act requires the Council's SSC to provide scientific advice for fishery management decisions, including recommendations for Acceptable Biological Catch limits (ABCs), prevention of overfishing, and achieving maximum sustainable yield. The Council's catch limit recommendations for the upcoming fishing year(s) cannot exceed the ABCs recommended by the SSC.

[1] Available at: https://www.mafmc.org/fishery-performance-reports
[2] A draft of the 2021 management track stock assessment report prepared for the peer review and for Council and SSC consideration is available at: https://www.mafmc.org/ssc-meetings/2021/july21-23

Based on the SSC's recommended 2022-2023 ABCs, the Monitoring Committee will recommend commercial and recreational Annual Catch Limits (ACLs) and Annual Catch Targets (ACTs), commercial quotas, and recreational harvest limits (RHLs). The Monitoring Committee will also consider whether any revisions are needed to the commercial management measures (minimum fish size, minimum mesh size, and mesh exemption programs) for 2022.

The Council will meet jointly with the Commission's Summer Flounder, Scup, and Black Sea Bass Management Board (Board) in August 2021 to review the recommendations of the SSC and Monitoring Committee, as well as input from the Advisory Panel, and adopt catch and landings limits for 2022-2023 and any desired changes to the commercial management measures for 2022. Recreational bag limits, size restrictions, and open/closed seasons for 2022 will be considered in late 2021 after preliminary recreational harvest estimates through August 2021 are available.

This document includes two sets of ABC projections for 2022-2023 based on the 2021 management track assessment: one allowing for identical ABCs across the two years and one allowing for variable ABCs across the two years. Assumptions related to the projections are described on pages 10-12. Note that the assumption used in this memo regarding total 2021 dead catch differs from that used in the projections included in the draft assessment document. The SSC may recommend ABCs based on different assumptions.

Table 1 lists the commercial and recreational ACLs and ACTs, as well as commercial quotas and RHLs, resulting from the ABC projections provided in this memo. These sector-specific catch and landings limits assume no changes are made to the method used to calculate expected black sea bass dead discards in each sector. The Monitoring Committee may recommend different values for these catch and landings limits.

Staff do not recommend any changes to the current federal commercial management measures, including the minimum fish size, mesh size requirements and associated incidental possession limits, or pot/trap gear requirements for 2022.

Table 1: Implemented 2021 black sea bass catch and landings limits, as well as potential 2022-2023 catch and landings limits under constant and variable ABCs. Catch and landings limits in 2022 and 2023 are based on the staff recommended assumptions for ABC projections and discard calculations described later in this document.

Mgmt Measure	2021		2022 & 2023, avg ABCs recommended)		2022 & 2023, varying ABCs				Basis
					2022		2023		
	mil lb	mt	mil lb	mt	mil lb	mt	mil lb	mt	
OFL	17.68	8,021	19.26 (2022); 17.34 (2023)	8,735 (2022); 7,865 (2023)	19.26	8,735	17.01	7,716	Stock assessment projections
ABC	17.45	7,916	17.76	8,056	18.86	8,555	16.66	7,557	Stock assessment projections and Council risk policy
Expected com. dead discards	3.43	1,556	3.42	1,553	3.63	1,649	3.21	1,456	Calculated based on assumption that com. dead disc. would be 36% of com. catch in all 3 years (2016-2018 and 2017-2019 avg.)
Expected rec. dead discards	1.58	719	1.90	863	2.02	917	1.79	810	Calculated based on assumption that rec dead disc would be 20% of rec catch in 2021 (2016-2018 avg) and 23% of rec catch in 2022 & 2023 (2017-2019 avg)
ABC landings	12.44	5,641	12.43	5,640	13.20	5,990	11.66	5,291	ABC - expected com. and rec. dead discards
Com. ACL	9.52	4,320	9.51	4,316	10.10	4,583	8.93	4,048	49% of ABC landings portion + expected com. disc.
Com. ACT	9.52	4,320	9.51	4,316	10.10	4,583	8.93	4,048	Equal to the ACL; no deduction for management uncertainty
Com. quota	**6.09**	**2,764**	**6.09**	**2,763**	**6.47**	**2,934**	**5.71**	**2,592**	Com. ACT minus expected com. dead discards
Rec. ACL	7.93	3,596	8.25	3,740	8.76	3,972	7.74	3,509	51% of ABC landings portion + expected rec. disc.
Rec. ACT	7.93	3,596	8.25	3,740	8.76	3,972	7.74	3,509	Equal to the ACL; no deduction for management uncertainty
RHL	**6.34**	**2,877**	**6.34**	**2,877**	**6.74**	**3,055**	**5.95**	**2,699**	Rec. ACT minus expected rec. dead discards

Recent Catch and Landings

The COVID-19 pandemic impacted data collection in both the recreational and commercial fisheries in 2020. Commercial fisheries observer data collection was suspended from mid-March through mid-August 2020. Recreational data collection through the Access Point Angler Intercept Survey (APAIS) was suspended starting in late March or April and resumed between May and August 2020, depending on the state. Commercial seafood dealer reporting, submission of vessel trip reports (VTRs), and MRIP effort sampling through mail and phone surveys continued uninterrupted throughout 2020.

MRIP staff used imputation methods to fill 2020 data gaps resulting from temporary suspension of APAIS sampling with data collected in 2018 and 2019. These proxy data match the time, place, and fishing modes that would have been sampled had APAIS sampling continued uninterrupted. Proxy data were combined with observed data to produce 2020 catch estimates using the standard estimation methodology. When complete 2021 data are available in 2022, MRIP staff will evaluate the effects of including 2021 data (e.g., alongside 2019 data and instead of 2018 data) in the imputation. Because these effects are unknown, the agency cannot predict whether it will seek to revise the 2020 catch estimates in 2022.

Estimates of dead discards in both sectors in 2020 are not currently available. The method for estimating the weight of recreational discards relies on age and length information that is not complete at this time. Commercial dead discard estimates are not available for 2020 due to data gaps resulting from the temporary suspension of observer data collection. At this time, it is not known if alternative methodologies will be developed to generate 2020 commercial discard estimates. Estimates of dead discards in both sectors through 2019 are available in the draft 2021 management track stock assessment report.[3]

Commercial and recreational landings increased each year from 2018 through 2020. Commercial landings totaled about 4.21 million pounds in 2020, the highest level since the start of the joint Council/Commission management program in 1998. Commercial landings typically closely follow the commercial quota and the 2020 quota (5.58 million pounds) was higher than any previous quota (Table 2). The 2020 commercial quota was not fully landed in large part due to impacts of the COVID-19 pandemic on market demand.

Based on data reported through July 7, 2021, about 2.38 million pounds of black sea bass have been landed by commercial fishermen from Maine through Cape Hatteras, NC in 2021, corresponding to 39% of the 2021 commercial quota (6.09 million pounds; Table 3).

Recreational landings are more variable than commercial landings. In 2020, recreational landings totaled 9.05 million pounds, the highest level since 2016 and 2017, which are years with recreational harvest estimates that have been identified by the SSC and Monitoring Committee as implausibly high outliers. Recreational landings in 2020 were about 56% greater than the RHL (5.81 million pounds; Table 2). This recreational overage was not unexpected as the Council and Board agreed to leave the recreational bag, size, and season limits unchanged in 2020 despite an anticipated RHL overage. This was viewed as a temporary solution to allow more time to consider how to fully transition the management system to use of the revised time series of MRIP data released in 2018, including ongoing considerations related to the commercial/recreational allocations and many changes to recreational fisheries management

[3] Available at: https://www.mafmc.org/ssc-meetings/2021/july21-23

under consideration through the ongoing Recreational Reform Initiative.[4] The Council and Board also agreed to leave the recreational bag, size, and season limits unchanged in 2021 for similar reasons, despite a similar anticipated RHL overage in 2021.

As of this memo, recreational estimates for 2021 are only available through wave 2 (March/April), which does not provide meaningful insights into 2021 recreational harvest given that the recreational black sea bass fishery was closed through at least May 15, 2021 in all states except for Virginia and New Hampshire.

Table 2: Black sea bass commercial and recreational landings relative to quotas and RHLs (in millions of pounds), 2016-2020, and quota and RHL for 2021. The RHL overage/underage evaluation is based on recreational harvest estimates using the old MRIP-estimation methodology through 2018 and the revised MRIP estimates for 2020. 2019 estimates in the old MRIP units are not available. RHLs prior to 2020 should not be compared to harvest in the new MRIP units because those RHLs did not account for revisions to the data. As described above, the 2020 MRIP harvest estimate is partially based on imputed values.

Year	Com. landings	Com. quota	Quota overage/ underage	Rec. harvest (old MRIP estimates)	Rec. harvest (revised MRIP estimates)	RHL	RHL overage/ underage
2016	2.59	2.71	-4%	5.19	12.05	2.82	+84%
2017	4.01	4.12	-3%	4.16	11.50	4.29	-3%
2018	3.46	3.52	-2%	3.82	7.92	3.66	+4%
2019	3.53	3.52	0%	--	8.61	3.66	--
2020	4.21	5.58	-25%	--	9.05	5.81	+56%
2021	--	6.09	--	--	--	6.34	--

[4] More information on the Summer Flounder, Scup, and Black Sea Bass Commercial/Recreational Allocation Amendment is available at: https://www.mafmc.org/actions/sfsbsb-allocation-amendment. More information on the Recreational Reform Initiative is available at: https://www.mafmc.org/actions/recreational-reform-initiative

Table 3: 2021 black sea bass commercial landings by state, according to preliminary data reported through July 7, 2021. Data accessed July 13, 2020 from https://www.fisheries.noaa.gov/new-england-mid-atlantic/commercial-fishing/quota-monitoring-greater-atlantic-region.

State	Landings (lb)
ME	0
NH	0
MA	11,263
RI	349,189
CT	39,878
NY	200,961
NJ	666,053
DE	180,300
MD	414,650
VA	354,617
NC	165,714
Total	2,382,625
2021 Commercial Quota	6,090,000
Percent of Quota Landed	**39%**

Stock Status and Biological Reference Points

A black sea bass management track stock assessment was peer reviewed and accepted in June 2021. The following information is based on the draft assessment report prepared for the peer review and for use by the Council and SSC.[5] This assessment retained the model structure of the 2016 benchmark stock assessment[6] and incorporated fishery data and fishery-independent survey data through 2019. Data from 2020 were not incorporated due to significant gaps in some data sets as a result of the COVID-19 pandemic and the time required to consider how to best address those gaps.

As with the 2016 benchmark assessment, the 2021 management track assessment has a regional structure. The stock was modeled as two separate sub-units (north and south) divided at approximately Hudson Canyon. Each sub-unit was modeled separately and the average F and combined biomass and SSB across the two sub-units were used to develop stock-wide reference points.

Due to the lack of a stock/recruit relationship, a direct calculation of maximum sustainable yield (MSY) and associated reference points (F and SSB) is not feasible and proxy reference points were used. SSB calculations and SSB reference points account for mature males and females. The updated reference points are shown in Table 5 alongside the reference points from the previous assessment for comparison.

[5] A draft of the 2021 management track stock assessment report prepared for the peer review and for Council and SSC consideration is available at: https://www.mafmc.org/ssc-meetings/2021/july21-23

[6] 62nd Northeast Stock Assessment Workshop (2016) assessment report and peer review summaries are available at: https://www.nefsc.noaa.gov/saw/reports.html

A comparison of the 2019 SSB and F estimates to the reference points suggests that the black sea bass stock north of Cape Hatteras, North Carolina was not overfished and overfishing was not occurring in 2019. SSB in 2019 was estimated at 65.63 million pounds (29,769 mt, adjusted for retrospective bias), 2.1 times the updated biomass reference point (i.e., $SSB_{MSY\ proxy} = SSB_{40\%}$=31.84 million pounds/14,441 mt). The average fishing mortality rate on fully selected ages 6-7 fish in 2019 was 0.39 (adjusted for retrospective bias), 85% of the updated fishing mortality threshold reference point (i.e., $F_{MSY\ proxy} = F_{40\%} = 0.46$; Table 5). The 2019 estimates of F and SSB were adjusted for internal model retrospective error (Figure 1). Figure 2 and Figure 3 show the time series of estimated SSB, recruitment, fishing mortality, and catch without retrospective adjustments.

The 2011 year class was estimated to be the largest in the time series at 170.4 million fish. The 2015 year class was the second largest at 93.8 million fish. Recruitment of the 2017 year class as age 1 in 2018 was estimated at 14.9 million, well below the 1989-2019 average of 39 million fish. However, the 2018 year class was above average at an estimated 46.2 million fish (79.4 million with the retrospective adjustment) at age 1 in 2019 (Figure 2).

Table 4: Black sea bass biological reference points from the 2019 operational stock assessment and the 2021 management track assessment.

Reference points and terminal year SSB and F estimates	**2019 operational stock assessment**[7] Data through 2018	**2021 management track stock assessment**[8]
$SSB_{MSY\ proxy} = SSB_{40\%}$ (biomass target)	31.07 mil lb / 14,092 mt	31.84 mil lb / 14,441 mt
½ SSB_{MSY} (biomass threshold defining an overfished status)	15.53 mil lb / 7,046 mt	15.92 mil lb / 7,221 mt
Terminal year SSB	73.65 mil lb / 33,407 mt (2018) Adjusted for retrospective bias 240% of SSB_{MSY}	65.63 mil lb / 29,769 mt (2019) Adjusted for retrospective bias 210% of SSB_{MSY}
$F_{MSY\ proxy} = F_{40\%}$ (threshold defining overfishing)	0.46	0.46
Terminal year F	0.42 (2018) Adjusted for retrospective bias Fully selected ages 6-7 9% below F_{MSY}	0.39 (2019) Adjusted for retrospective bias Fully selected ages 6-7 15% below F_{MSY}

[7]A draft of the 2021 management track stock assessment report prepared for the peer review and for Council and SSC consideration is available at: https://www.mafmc.org/ssc-meetings/2021/july21-23

[8] Draft available at: https://www.mafmc.org/council-events/2021/ssc-july-21-23

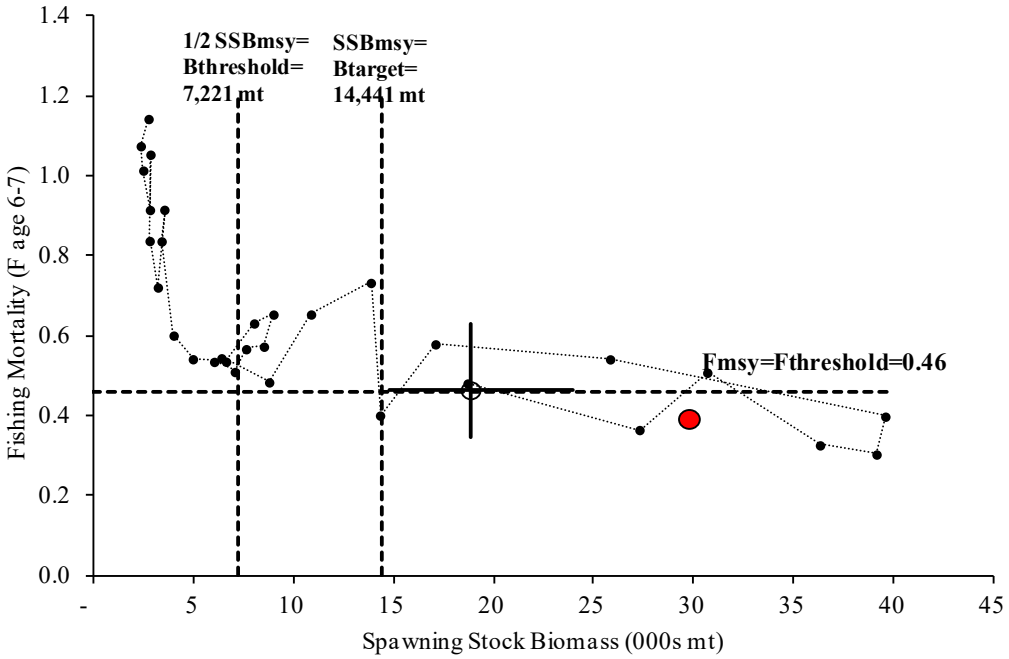

Figure 1: Estimates of black sea bass spawning stock biomass (SSB) and fully-recruited fishing mortality (F, peak at ages 6-7) relative to the updated 2021 biological reference points. Open circle with 90% confidence intervals shows the assessment point estimates. The filled circle shows the retrospectively adjusted estimates. Source: 2021 management track assessment.

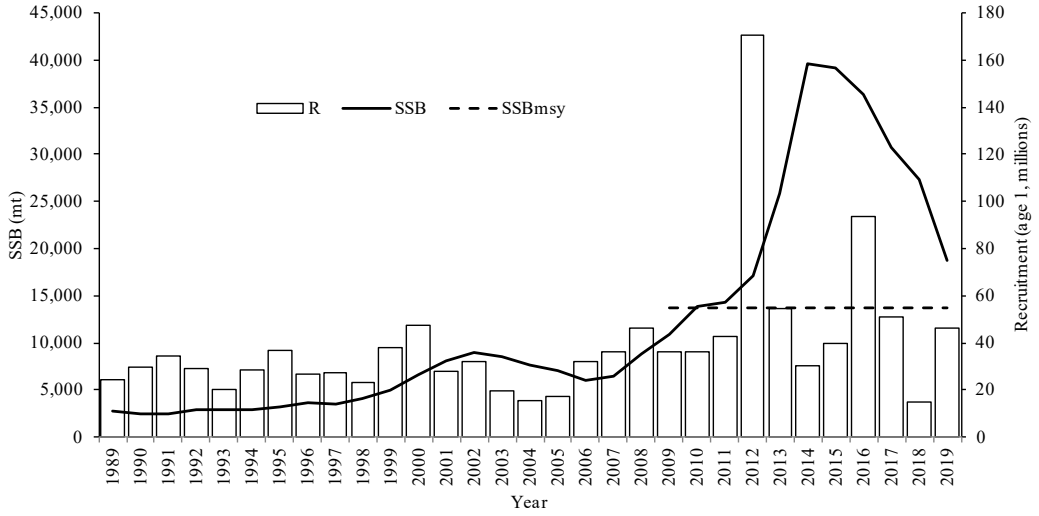

Figure 2: Black sea bass spawning stock biomass (SSB; solid line) and recruitment at age 0 (R; vertical bars) by calendar year. The horizontal dashed line is the updated SSB_{MSY} proxy = $SSB_{40\%}$ =14,441 mt. Source: 2021 management track assessment. Note that SSB and recruitment estimates were adjusted for a retrospective pattern in the stock assessment. The un-adjusted values are shown in this figure. Adjusted SSB in 2019 for comparison against the SSB_{MSY} proxy reference point is 29,769 mt. The adjusted recruitment value for 2019 is 79.4 million.

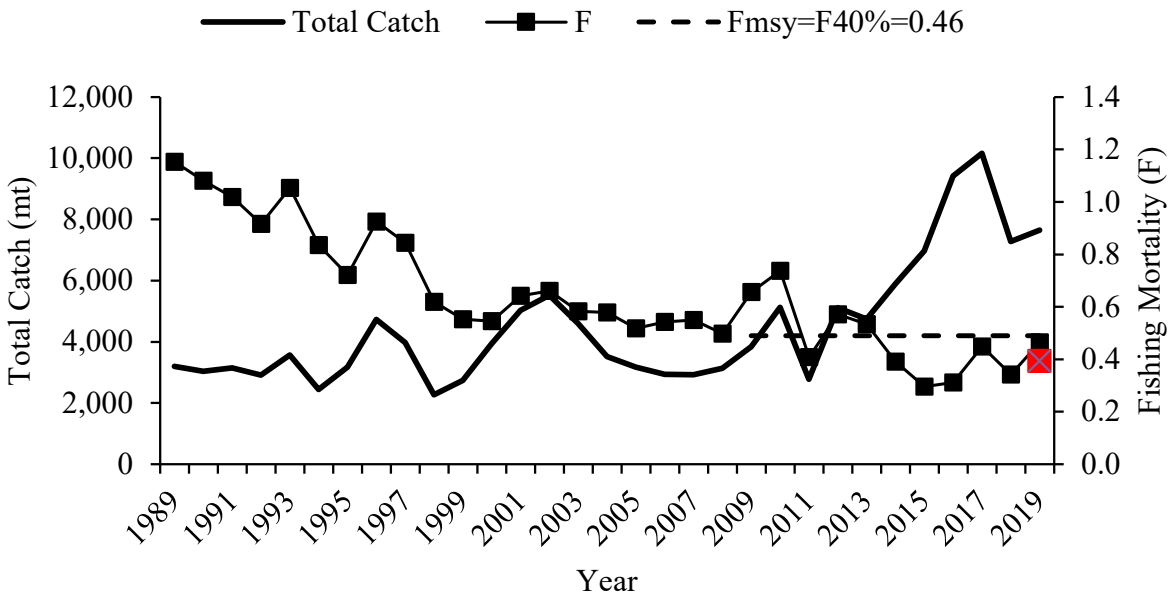

Figure 3: Total fishery catch (metric tons; mt; solid line) and fishing mortality (F, peak at age 6-7; squares) for black sea bass. The horizontal dashed line is the updated F_{MSY} proxy = $F_{40\%}$ = 0.46. The red square Is the retrospectively adjusted fishing mortality value for 2019. Source: 2021 management track assessment.

Review of Prior SSC Recommendations

In September 2019, the SSC recommended 2020 and 2021 ABCs for black sea bass based on stock status information and projections from the 2019 operational stock assessment. In July 2020, the SSC revised their 2021 ABC recommendation based only on a change in the Council's risk policy which allowed for a higher probability of overfishing for highly abundant stocks than the previous risk policy.

The SSC applied a 100% coefficient of variance (CV) to the overfishing limit (OFL) when developing their ABC recommendations for 2020-2021. This represents an increase from the 60% OFL CV used for their 2017-2019 ABC recommendations.[9] A higher OFL CV results in a greater buffer between the OFL and the ABC to account for scientific uncertainty. However, it should be noted that under the Council's revised risk policy which allows for a 49% probability of overfishing for stocks that are at least 150% of the biomass target level (which includes black sea bass), the OFL CV has a lesser impact on the ABC for very abundant stocks compared to the previous risk policy which allowed a maximum 40% probability of overfishing.

The following text was copied directly from the SSC's September 2019 meeting summary[10] and describes their rationale for applying a 100% OFL CV for 2020-2021:

- There is a strong retrospective bias present in the assessment results and this pattern differs between the two spatial sub-areas.
- The fishery has a large recreational component (~60-80% of total harvest in recent years), and thus a substantial reliance on MRIP. Updated MRIP numbers differ substantially from the old estimates, and the updated estimate for one year (2016) was considered

[9] The SSC's 2017-2019 ABC recommendations and supporting rationale are summarized here: https://www.mafmc.org/s/January-2017-SSC-Report.pdf

[10] Available at: https://www.mafmc.org/s/September-2019-SSC-Meeting-ReportRevised.pdf

implausible owing to high variance in wave-specific data.
- Spatially explicit models were implemented in the 2016 benchmark assessment, and there were detailed efforts to explore the consequences of the misspecification of the spatial resolution of these models on perceptions of stock status.
- There were broadly consistent patterns in the fishery independent indices.

The SSC determined the following to be the most significant sources of scientific uncertainty associated with determination of the 2020-2021 OFLs and ABCs in September 2019:

- The retrospective pattern was large enough to need the corrections (outside the 90% confidence intervals), and the additional uncertainty caused by applying the correction is unclear. The model for the northern sub-area has a larger retrospective pattern than the model for the southern sub-area.
- 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.
- The nature of exchanges between the spatial regions defined in the assessment model.
- The extent to which the spatial structure imposed reflects the dynamics within the stock. The combination of the values from the northern and southern sub-areas is done without weighting based on landings or biomass. It is unclear whether or how the uncertainty should be treated when the biological reference points are combined using simple addition.
- Future effects of temperature on stock productivity and range are highly uncertain.

Staff Recommendations for 2022-2023 OFL and ABC Projections

The SSC is asked to recommend two sets of ABCs for 2022-2023, one allowing for varying catch and landings limits across the two years and one allowing for constant catch and landings limits based on an ABC that is the average of the ABCs under the varying approach. This will allow the Council and Board to select between these two options during their August 2021 joint meeting.

Table 6 and Table 7 show projected ABCs based on the varying and averaged approaches, respectively. The projections were made separately for the northern and southern sub-units at F_{MSY}=0.46, then combined for total OFL and ABC calculations.

Both sets of projections assume a 100% OFL CV, based on past SSC recommendations. Recruitment was sampled from the estimates for 2000-2019. The Council's risk policy was applied, resulting in a probability of overfishing (p*) of 49%.

These projections also apply a staff-recommended assumption regarding total dead catch in 2020 and 2021. It was assumed that total dead catch in 2020 and 2021 will be equal to the respective ABCs, with an adjustment for a 2020 recreational harvest overage and an assumed 2021 recreational overage (Table 2). Specifically, it was assumed that 2021 recreational harvest would be the same as estimated 2020 recreational harvest. Total dead catch in 2020 and 2021 was assumed to be the ABC plus the difference between the 2020 recreational harvest estimate and the 2020 or 2021 RHL. It was assumed that 2021 recreational harvest will be equal to 2020 recreational harvest given that the bag, size, and season limits were the same across both years. This assumption results in an ABC overage of about 25% in both 2020 and 2021. Note that this

assumption differs from that used in the draft assessment document, which assumed 2021 catch would equal the ABC.

Total dead catch in 2020 is currently unknown, given the data gaps in commercial and recreational dead discard information described above. Future recreational harvest and future dead discards in both sectors are always challenging to predict. However, it is reasonable to assume that the ABC will be exceeded in both 2020 and 2021 due to recreational harvest that significantly exceeded the RHL in 2020 and is likely to also exceed the 2021 RHL given the recent scale of harvest (Table 2) and the virtually unchanged recreational bag, size, and season limits during 2018-2021. As previously stated, the Council and Board acknowledged that a 2021 RHL overage was likely when they agreed to leave the bag, size, and season limits unchanged. They recommended this as a short-term approach to prevent major negative impacts to the recreational sector while further considering how management may need to adapt to the revised MRIP data (e.g., through the ongoing Commercial/Recreational Allocation Amendment) and other improvements to recreational fisheries management under consideration through the Recreational Reform Initiative.

The SSC may recommend a different OFL CV and/or different projection assumptions during their July 2021 meeting. Northeast Fisheries Science Center staff may be able to provide revised projections at the request of the SSC.

The staff recommendations described in this memo result in a 2022 and 2023 ABC under the averaged approach that is 2% lower than the 2021 ABC. Under the varying approach, they result in a 2022 ABC that is 8% greater than the 2021 ABC and a 2023 ABC that is 12% lower than the 2022 ABC.

Council staff recommend that the Council and Board implement constant catch and landings limits in 2022 and 2023 based on the averaged ABC to provide predictability and stability in management measures for the commercial and recreational sectors across the two years.

Table 5: 2022-2023 OFL and ABC projections based on the **varying ABC** approach under the staff recommended projection assumptions. See text above for more information. (Source: personal communication, Kiersten Curti, Northeast Fisheries Science Center.)

Year	Assumed Catch		OFL		ABC		ABC F	ABC p*	SSB		B/ B_{MSY}
	MT	Mil. lb	MT	Mil. lb	MT	Mil. lb			MT	Mil. lb	
2020	8,310	18.32	8,795	19.39	6,835	15.07	0.33	N/A	26,375	58.15	1.83
2021	9,149	20.17	8,021	17.68	7,916	17.45	0.40	N/A	25,057	55.24	1.74
2022	8,555	18.86	8,735	19.56	8,555	18.86	0.41	0.49	22,637	49.91	1.57
2023	7,557	16.66	7,716	17.01	7,557	16.66	0.41	0.49	19,538	43.07	1.35

Table 6: 2020-2021 OFL and ABC projections based on the **averaged ABC** approach under the staff recommended projection assumptions. (Source: personal communication, Kiersten Curti, Northeast Fisheries Science Center.)

Year	Assumed Catch		OFL		ABC		ABC F	ABC p*	SSB		B/ B_{MSY}
	MT	Mil. lb	MT	Mil. lb	MT	Mil. lb			MT	Mil. lb	
2020	8,310	18.32	8,795	19.39	6,835	15.07	0.33	N/A	26,375	58.15	1.83
2021	9,149	20.17	8,021	17.68	7,916	17.45	0.40	N/A	25,057	55.24	1.74
2022	8,055	17.76	8,735	19.26	8,056	17.76	0.38	0.46	22,897	50.48	1.59
2023	8,055	17.76	7,865	17.34	8,056	17.76	0.43	0.51	19,683	43.39	1.36

Other Management Measures

Expected Commercial and Recreational Dead Discards

It is necessary to calculate expected dead discards by sector to derive the 2022 and 2023 commercial and recreational ACLs, commercial quota, and RHL from the ABC. The methodology to calculate sector-specific dead discards to calculate ACLs and landings limits is not prescribed in the FMP and can be modified on an annual basis.

Staff recommend continued use of the discard calculation methodology used when setting the 2021 black sea bass catch and landings limits. This method differs from that used for summer flounder and scup. Prior to the 2021 specifications, the method for calculating expected black sea bass dead discards was similar to that used for summer flounder. In 2020, the Monitoring Committee, Council, and Board agreed that a different method was needed for black sea bass to help prevent future ACL overages as the black sea bass ACL in both sectors had been exceeded every year since at least 2015, all or in part due to under-estimated future dead discards when setting the catch and landings limits.

The method used for 2021 specifications and recommended for 2022-2023 specifications assumes that dead discards as a proportion of total dead catch in each sector will be equal to the average proportions over the last three years (i.e., commercial dead discards will be 36% of commercial catch and recreational dead discards will be 23% of recreational catch based on NEFSC data for 2017-2019; as previously stated, complete information on 2020 discards is not currently available). The calculations also account for the required 49% commercial, 51% recreational allocation of the amount of the ABC that is expected to be landed. When the Monitoring Committee first developed this method in 2019, they noted that commercial black sea bass landings tend to closely follow changes in the quota and that dead discards tend to scale up or down with increases or decreases in landings (Figure 4). A similar trend is evident in the recreational fishery, though the relationship is not as strong as in the commercial fishery (Figure 5). The Monitoring Committee noted that sector-specific dead discards as a proportion of sector-specific dead catch were relatively consistent during recent years, even under varying landings limits and highly variable recreational harvest estimates (including 2016 and 2017, two years with outlier recreational estimates). Therefore, they agreed that it would be appropriate to use a recent three-year average of the proportion of total dead catch in each sector that is discarded when calculating the black sea bass catch and landings limits. This differs from the previous method in that it starts with sector-specific assumptions about discards, rather than first starting with an assumption about the proportion of the total ABC which will be landed vs. discarded.

Under the averaged ABC listed in Table 7, this method results in 3.42 million pounds (1,553 mt) of expected commercial black sea bass dead discards and 1.90 million pounds (863 mt) of expected recreational black sea bass dead discards in 2022 and 2023. Under the varying ABCs listed in Table 6, this method results in 3.63 million pounds (1,649 mt) of expected commercial black sea bass dead discards and 2.02 million pounds (917 mt) of expected recreational black sea bass dead discards in 2022 and 3.21 million pounds (1,456 mt) of expected commercial black sea bass dead discards and 1.79 million pounds (810 mt) of expected recreational black sea bass dead discards in 2023. These values were used to calculate the ACLs, ACTs, commercial quotas, and RHLs listed in the following sections and in Table 1.

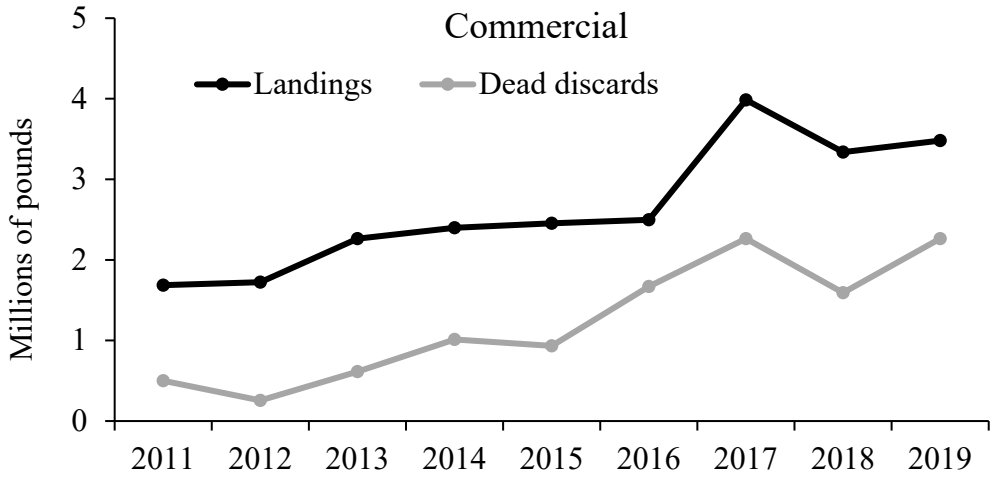

Figure 4: Commercial black sea bass landing and dead discards in millions of pounds, 2011-2019. Source: 2021 management track assessment.

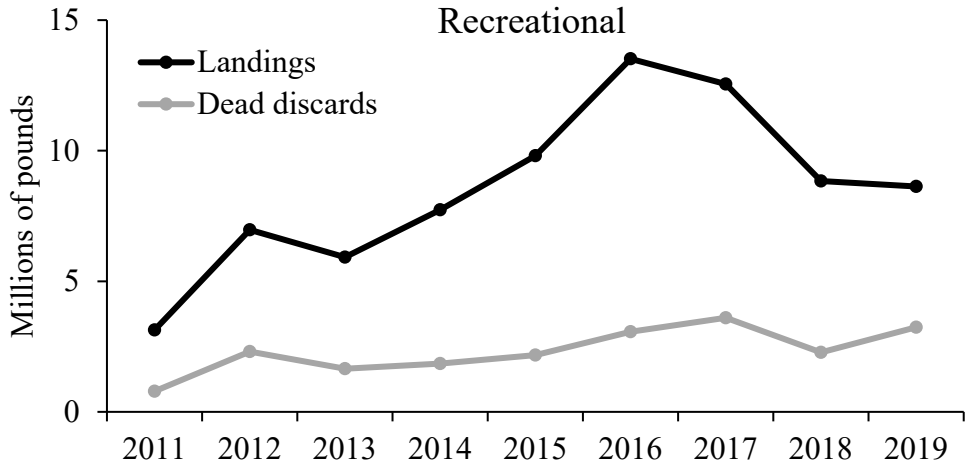

Figure 5: Recreational black sea bass landing and dead discards in millions of pounds, 2011-2019. Source: 2021 management track assessment.

Recreational and Commercial ACLs

Based on the allocation percentages defined in the FMP, 49% of the total allowable landings (i.e., the proportion of the ABC that is expected to be landed as opposed to discarded) are allocated to the commercial fishery and 51% to the recreational fishery. These allocations are combined with expected commercial and recreational dead discards to calculate sector-specific ACLs.

The 49% commercial/51% recreational landings-based allocation was implemented through Amendment 9 (1996) and first came into effect in 1998. This allocation was based on the proportions of commercial and recreational landings during 1983-1992. These allocation percentages do not reflect the current understanding of the proportion of catch and landings from the commercial and recreational sectors, in large part due to recent major changes in how the recreational harvest estimates are calculated. The Council and Board are developing an FMP amendment to consider changes to these allocations, with final action expected in December 2021. Any changes to these allocations cannot be implemented for the 2022 catch and landings limits. If changes to these allocations are approved, this may result in modifications to the 2023

catch and landings limits. Because final action on this amendment has not yet taken place, staff recommend setting 2022-2023 specifications based on the current commercial/recreational allocation and revising the 2023 specifications in 2022 if necessary based on any approved changes to the allocations.

The staff recommendations described above for ABC projections and discard calculations result in a commercial ACL of 9.51 million pounds (4,316 mt) and a recreational ACL of 8.25 million pounds (3,740 mt) in 2022 and 2023 under the averaged ABC approach. Under the varying ABC approach, they result in a 2022 commercial ACL of 10.10 million pounds (4,583 mt), a 2022 recreational ACL of 8.76 million pounds (3,972 mt), a 2023 commercial ACL of 8.93 million pounds (4,048 mt), and a 2023 recreational ACL of 7.74 million pounds (3,509 mt; Table 1).

Recreational and Commercial ACTs

ACTs are set less than or equal to the sector-specific ACLs to account for management uncertainty (Figure 5). 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 Monitoring Committee considers all relevant sources of management uncertainty in the black sea bass fishery when recommending ACTs.

Commercial landings are typically very close to the commercial quotas (Table 2). The commercial quota monitoring system is timely and generally successful in constraining landings to the quota. Recreational landings compared to the RHL are much more variable (Table 2). Recreational harvest is estimated through a statistical survey design (i.e., the MRIP program), as opposed to mandatory vessel and dealer reporting in the commercial fishery which is more of a census of the entire commercial fishery. The commercial fisheries are also mostly limited access (with some exceptions at the state level) and the commercial fisheries can be closed in-season when landings approach the quota. The recreational fisheries for these species are all open access and there is no in-season closure authority due to the timing of recreational data availability. For these reasons, recreational landings can be more difficult to constrain and predict than commercial landings.

When considering the scale of the RHL overages and underages shown in Table 2, it is important to note that the RHL was not set based on a peer reviewed and accepted stock assessment until 2017. The 2016 RHL was likely lower than it would have been had an approved stock assessment been available to set catch and landings limits that were reflective of biomass levels at that time. In addition, as previously described, the notable RHL overage in 2020 was the result of the Council and Board leaving the bag, size, and season limits unchanged despite an expected overage. They recommended this as a short-term approach to prevent major negative impacts to the recreational sector while further considering how management may need to adapt to the revised MRIP data (e.g., through the ongoing Commercial/Recreational Allocation Amendment) and other improvements to recreational fisheries management under consideration through the Recreational Reform Initiative.

The goal of the Recreational Reform Initiative is to provide more stability in the recreational bag, size, and season limits from year to year, greater flexibility in the management process, and recreational accessibility aligned with availability. Specific changes could include greater consideration of stock status when setting recreational management measures, better addressing

uncertainty in the MRIP data when setting measures, and other changes. This is an ongoing effort.

Consistent with previous Monitoring Committee, Council, and Board recommendations, staff recommend no reduction from the 2020-2021 recreational or commercial ACLs to account for management uncertainty, such that each sector's ACT is set equal to the ACL.

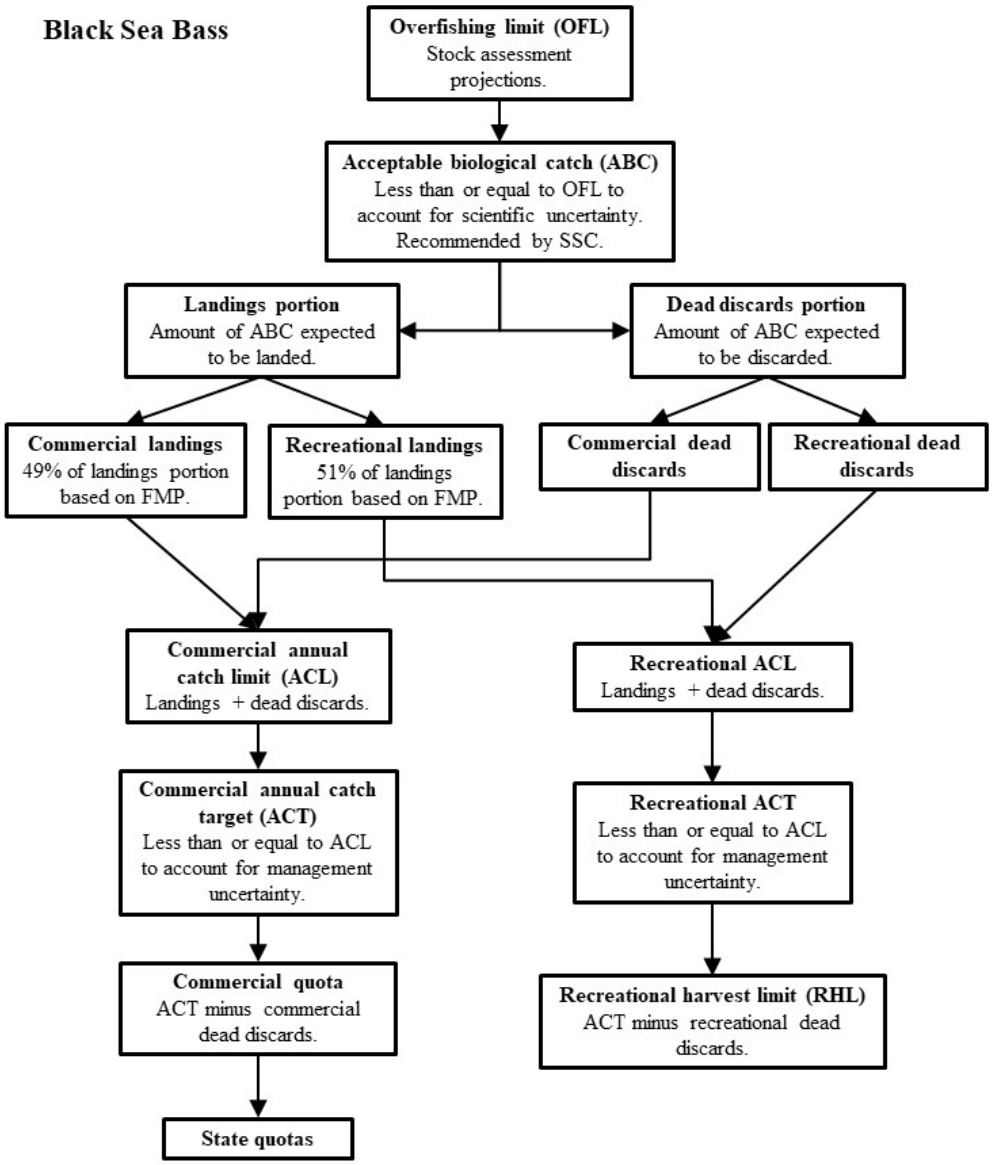

Figure 6: Flowchart for black sea bass catch and landings limits.

Commercial Quotas and Recreational Harvest Limits

Expected dead discards in each sector are subtracted from the sector-specific ACTs to derive annual commercial quotas and RHLs. The staff recommendation for calculating dead discards is described above.

Based on the recommendations outlined in this memo, the averaged ABC approach would result in a commercial quota of 6.09 million pounds (2,763 mt) and an RHL of 6.34 million pounds (2,877 mt) in both 2022 and 2023, virtually identical to the commercial quota and RHL implemented in 2021.

The varying ABC approach would result in a commercial quota of 6.47 million pounds (2,934 mt) and an RHL of 6.74 million pounds (3,055 mt) in 2022, about 6% higher than the commercial quota and RHL implemented in 2021. The varying ABC approach would result in a commercial quota of 5.71 million pounds (2,592 mt) and an RHL of 5.95 million pounds (2,699 mt) in 2023, about 11% lower than what would be in place for 2022.

Commercial Gear Regulations and Minimum Fish Size

Amendment 9 (1996) established a minimum fish size of 9 inches total length. The commercial minimum fish size was increased to 10 inches in 1998, and to 11 inches in 2002. The 11-inch minimum size has remained unchanged since 2002.

Amendment 9 also established gear regulations that became effective in December 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 or more from April 1 through December 31, must fish with nets that have a minimum mesh size of 4.5-inch diamond mesh 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 inches to 2.5 inches. The requirements of 1.375 inches x 5.75 inches for rectangular vents and 2 inches for square vents remained unchanged. In addition, two vents are required in the parlor portion of the pot/trap.

In the fall of 2015, the Monitoring Committee conducted a thorough review of the commercial management measures which can be modified through specifications.[11] This review indicated that further exploration of potential modifications to some measures may be justified. Specifically, for black sea bass, this included assessing the feasibility of a common trawl minimum mesh size with summer flounder and scup. Stemming from this discussion, the Council funded a project which analyzed the selectivity of multiple codend mesh sizes relative to retention of these three species in the commercial bottom trawl fisheries. Results confirmed that the current minimum mesh sizes for all three species are effective at releasing most fish smaller than the commercial minimum sizes (i.e., 14 inches total length for summer flounder, 9 inches total length for scup, and 11 inches total length for black sea bass). The study was not able to identify a common mesh size for all three species that would be effective at minimizing discards

[11] The summary report is available at: http://www.mafmc.org/s/Tab11_SF-S-BSB-Commercial-Measures.pdf.

under the current minimum fish size limits. However, the authors concluded that a common mesh size of 4.5 or 5 inches diamond for scup and black sea bass would be effective at releasing undersized fish.[12]

The Monitoring Committee reviewed the results of this study in 2018 and recommended no changes to the commercial minimum mesh sizes for 2019. They recommended clarification of the Council's objectives regarding consideration the mesh sizes (e.g., establishing a common minimum mesh size, minimizing discards, and/or maintaining or increasing catches of legal-sized fish). A few advisors have requested continued consideration of a standardized minimum mesh size across two or more of the species.

Staff will continue to work with the Monitoring Committee and Advisory Panel to further analyze and consider potential changes to mesh size regulations. However, given other workload constraints, it is not likely that additional work on this topic can be done in 2021. At this time, staff recommend no changes to the black sea bass commercial gear regulations for 2022.

Recreational Management Measures

Starting in 2018, the Council and Commission have provided states the opportunity to open their recreational black sea bass fisheries during the month of February under specific conditions. States must opt into this fishery. Participating states are required to have a 12.5 inch minimum fish size limit and a 15 fish possession limit during February (identical to the federal recreational measures during May 15 - December 31). Participating states are required to adjust their recreational management measures during the rest of the year to account for expected February harvest to help ensure that the participation in this optional opening does not increase the total annual harvest. Expected February harvest by state is pre-defined based on an analysis of vessel trip report data from federally permitted for-hire vessels in February 2013, the last year that the recreational fishery was open in February prior to 2018. Staff recommend no changes to this program for 2022. If the Council and Board desire changes to the February recreational opening, they should recommend those changes in August 2021 to allow time for any necessary rule making to implement the changes.

The recreational bag, size, and season limits for March - December 2022 will be considered in late 2021 after the first four waves (i.e., January - August) of preliminary 2021 recreational harvest data are available (expected October 2021). The Monitoring Committee will meet in November 2021 to review these data and make recommendations regarding any necessary changes in the recreational possession limits, minimum sizes, and seasons.

[12] Hasbrouck, E., S. Curatolo-Wagemann, T. Froelich, K. Gerbino, D. Kuehn, P. Sullivan, J. Knight. 2018. Determining Selectivity and Optimum Mesh Size to Harvest Three Commercially Important Mid-Atlantic Species - A Report to the Mid-Atlantic Fishery Management Council and the Atlantic States Marine Fisheries Commission. Available at: http://www.mafmc.org/s/Tab08_SFSBSB-Mesh-Selectivity-Study-Apr2018.pdf