



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

MEMORANDUM

Date: September 27, 2019
To: Council and Board
From: Julia Beaty, staff
Subject: 2020-2021 Black Sea Bass Specifications

The Council and Board will consider 2020-2021 specifications for black sea bass on Wednesday, October 9, 2019. Materials listed below are provided for consideration of this agenda item.

Please note that some materials are behind other tabs. Items are listed in reverse chronological order.

- 1) Monitoring Committee recommendation summary (*behind Tab 11*)
- 2) September 2019 Scientific and Statistical Committee meeting report (*behind Tab 18*)
- 3) Supplemental staff memo on 2020-2021 black sea bass specifications dated September 11, 2019
- 4) Staff memo on 2020-2021 black sea bass specifications dated September 4, 2019
- 5) Black sea bass 2019 operational stock assessment (*behind Tab 7*)
- 6) 2019 Advisory Panel Fishery Performance Report (*behind Tab 11*)
- 7) Additional written comments from advisors related to summer flounder, scup, and black sea bass Fishery Performance Reports (*behind Tab 11*)
- 8) 2019 Black Sea Bass Fishery Information Document

The Advisory Panel met via webinar on September 24, 2019. A summary of that meeting and additional comments from advisors related to that meeting will be added to the online briefing materials once they are available.



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MEMORANDUM

Date: September 11, 2019
To: Chris Moore, Executive Director
From: Julia Beaty, staff
Subject: Supplemental Information for Black Sea Bass 2020-2021 Specifications

This memo supplements the staff memo on 2020-2021 black sea bass specifications, dated September 4, 2019, available at: <http://www.mafmc.org/council-events/2019/sfsbsb-mc-sept-16-17>. This memo is intended to assist the Summer Flounder, Scup, and Black Sea Bass Monitoring Committee in their discussions of black sea bass catch and landings limits for 2020-2021.

The previous staff memo included potential 2020-2021 catch and landings limits assuming a 60% overfishing limit (OFL) coefficient of variation (CV). On September 10, 2019, the Scientific and Statistical Committee (SSC) approved an OFL CV of 100%. The catch and landings limits shown in Table 1 reflect the SSC's OFL and acceptable biological catch (ABC) recommendations.

The other tables and figures provided in this memo are intended to assist the Monitoring Committee in their discussions of 2020-2021 black sea bass commercial quotas and recreational harvest limits (RHLs), including discussions regarding estimates of expected discards and the implications of the 49% commercial / 51% recreational allocation of the landings portion of the ABC required under the joint Fishery Management Plan.

Note: Minor adjustments to the values in some tables and figures were made 9/13/2019.

Table 1: Currently implemented 2019 and interim 2020 black sea bass catch and landings limits and potential 2020 (revised) and 2021 catch and landings limits, based on the SSC's OFL and ABC recommendations. Values for standard/varying and averaged/constant ABC approaches are provided. The calculations for the ABC discards and landings portions and the proportions of discards by sector are based on values provided with the 2019 operational stock assessment (Table 3).

Management measure	2019 and interim 2020		2020 (revised) and 2021, standard ABC approach				2020 (revised) and 2021, average ABC approach				Basis
			2020		2021		2020		2021		
	mil lb	mt	mil lb	mt	mil lb	mt	mil lb	mt	mil lb	mt	
OFL	10.29	4,667	19.39	8,795	17.82	8,083	19.39	8,795	17.68	8,021	SSC recommendations based on stock assessment projections
ABC	8.94	4,055	15.70	7,123	14.43	6,546	15.07	6,835	15.07	6,835	SSC recommendations based on stock assessment projections and Council risk policy
ABC discards	1.76	799	3.84	1,741	3.53	1,600	3.68	1,671	3.68	1,671	24% of ABC, based on avg. 2016-2018 discards as % of catch (NEFSC estimates)
Projected com. discards	0.83	377	1.46	664	1.34	610	1.40	637	1.40	637	38% of ABC discards, based on avg. 2016-2018 % of discards by sector (NEFSC estimates)
Projected rec. discards	0.93	422	2.38	1,078	2.18	990	2.28	1,034	2.28	1,034	62% of ABC discards, based on avg. 2016-2018 % of discards by sector (NEFSC estimates)
Commercial ACL	4.35	1,974	7.28	3,301	6.69	3,033	6.98	3,167	6.98	3,167	49% of ABC landings portion + projected com. discards
Commercial ACT	4.35	1,974	7.28	3,301	6.69	3,033	6.98	3,167	6.98	3,167	Set equal to the ACL, no deduction for management uncertainty (staff recommendation)
Commercial quota	3.52	1,596	5.81	2,637	5.34	2,423	5.58	2,530	5.58	2,530	Com. ACT minus projected com. discards
Recreational ACL	4.59	2,083	8.43	3,822	7.74	3,513	8.09	3,668	8.09	3,668	51% of ABC landings portion + projected rec. discards
Recreational ACT	4.59	2,083	8.43	3,822	7.74	3,513	8.09	3,668	8.09	3,668	Set equal to the ACL, no deduction for management uncertainty (staff recommendation)
RHL	3.66	1,661	6.05	2,745	5.56	2,522	5.81	2,634	5.81	2,634	Rec. ACT minus projected rec. discards

Table 2: Potential 2020-2021 catch and landings limits, as shown in Table 1, but with discard proportions estimated based on the values used by the National Marine Fisheries Service Greater Atlantic Regional Fisheries Office (GARFO; Table 3).

Management measure	2019 and interim 2020		2020 (revised) and 2021, standard ABC approach				2020 (revised) and 2021, average ABC approach				Basis
			2020		2021		2020		2021		
	mil lb	mt	mil lb	mt	mil lb	mt	mil lb	mt	mil lb	mt	
OFL	10.29	4,667	19.39	8,795	17.82	8,083	19.39	8,795	17.68	8,021	SSC recommendations based on stock assessment projections
ABC	8.94	4,055	15.70	7,123	14.43	6,546	15.07	6,835	15.07	6,835	SSC recommendations based on stock assessment projections and Council risk policy
ABC discards	1.76	799	4.24	1,923	3.90	1,767	4.07	1,845	4.07	1,845	27% of ABC, based on avg. 2016-2018 discards as % of catch (GARFO estimates)
Projected com. discards	0.83	377	1.74	789	1.60	725	1.67	757	1.67	757	41% of ABC discards, based on avg. 2016-2018 % of discards by sector (GARFO estimates)
Projected rec. discards	0.93	422	2.50	1,135	2.30	1,043	2.40	1,089	2.40	1,089	59% of ABC discards, based on avg. 2016-2018 % of discards by sector (GARFO estimates)
Commercial ACL	4.35	1,974	7.36	3,336	6.76	3,066	7.06	3,202	7.06	3,202	49% of ABC landings portion + projected com. discards
Commercial ACT	4.35	1,974	7.36	3,336	6.76	3,066	7.06	3,202	7.06	3,202	Set equal to the ACL, no deduction for management uncertainty (staff recommendation)
Commercial quota	3.52	1,596	5.62	2,548	5.16	2,342	5.39	2,445	5.39	2,445	Com. ACT minus projected com. discards
Recreational ACL	4.59	2,083	8.35	3,787	7.67	3,480	8.01	3,633	8.01	3,633	51% of ABC landings portion + projected rec. discards
Recreational ACT	4.59	2,083	8.35	3,787	7.67	3,480	8.01	3,633	8.01	3,633	Set equal to the ACL, no deduction for management uncertainty (staff recommendation)
RHL	3.66	1,661	5.85	2,652	5.37	2,437	5.61	2,545	5.61	2,545	Rec. ACT minus projected rec. discards

Table 3: Commercial and recreational landings and dead discards during 2016-2018 based on values provided with the 2019 operational stock assessment and values used by GARFO. GARFO commercial discard values for 2018 are preliminary. GARFO does not generate recreational dead discard estimates and instead uses those provided by the Northeast Fisheries Science Center (i.e., the values provided with the 2019 operational stock assessment).

	2019 operational assessment							GARFO						
	2016		2017		2018		Avg	2016		2017		2018		Avg
	mil lb	mt	mil lb	mt	mil lb	mt		mil lb	mt	mil lb	mt	mil lb	mt	
Com. landings	2.50	1,133	3.99	1,808	3.34	1,514		2.59	1,174	3.99	1,808	3.41	1,550	
Com. dead disc.	1.67	757	2.26	1,027	1.59	722		1.27	575	2.60	1,180	2.58*	1,170*	
Rec. landings	13.52	6,131	12.55	5,692	8.84	4,008		12.05	5,465	11.48	5,208	7.92	3,593	
Rec. dead discards	3.07	1,391	3.60	1,634	2.28	1,033		3.07	1,391	3.60	1,634	2.28	1,033	
Total catch	20.75	9,412	22.40	10,161	16.04	7,277		18.98	8,605	21.67	9,830	16.19	7,346	
Discards as % of catch	23%		26%		24%		24%	23%		29%		30%		27%
Com. disc. as % of total disc.	35%		39%		41%		38%	29%		42%		53%		41%
Rec. disc. as % of total disc.	65%		61%		59%		62%	71%		58%		47%		59%

* Preliminary

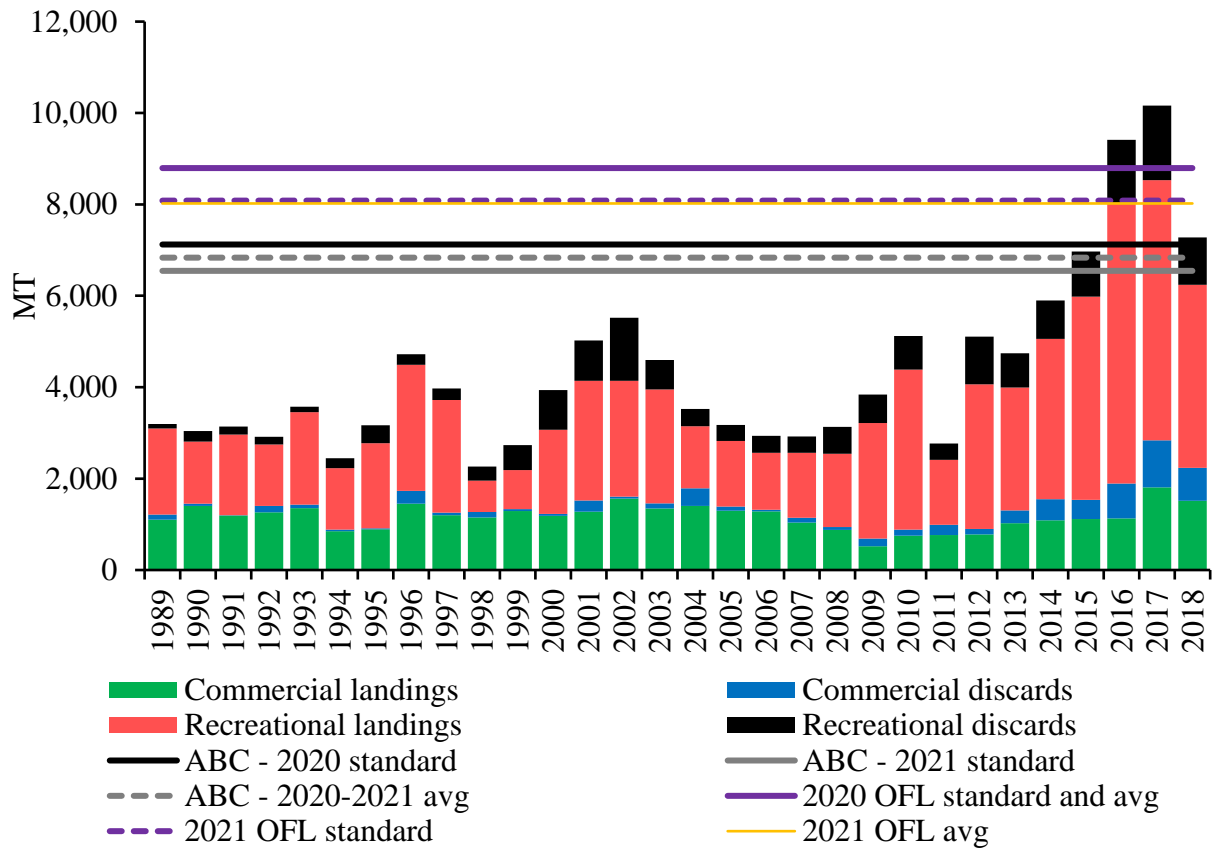


Figure 1: Commercial and recreational landings and discards, 1989-2018 compared to the 2020 and 2021 OFLs (purple and orange lines) and ABCs (black and gray lines) recommended by the SSC under the standard and averaged approaches. Landings and discards data provided by Gary Shepherd, Northeast Fisheries Science Center.

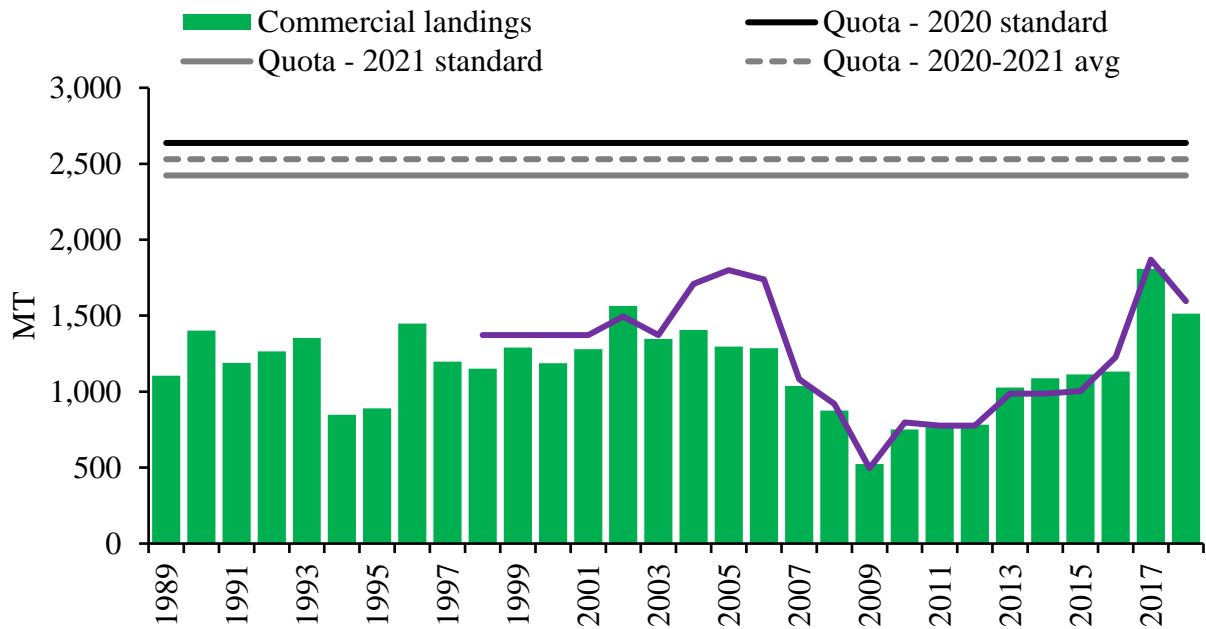


Figure 2: Commercial landings, 1989-2018 (green bars), compared to past quotas (purple line), and potential 2020-2021 quotas (black and gray lines; Table 1). Landings data provided by Gary Shepherd, Northeast Fisheries Science Center.

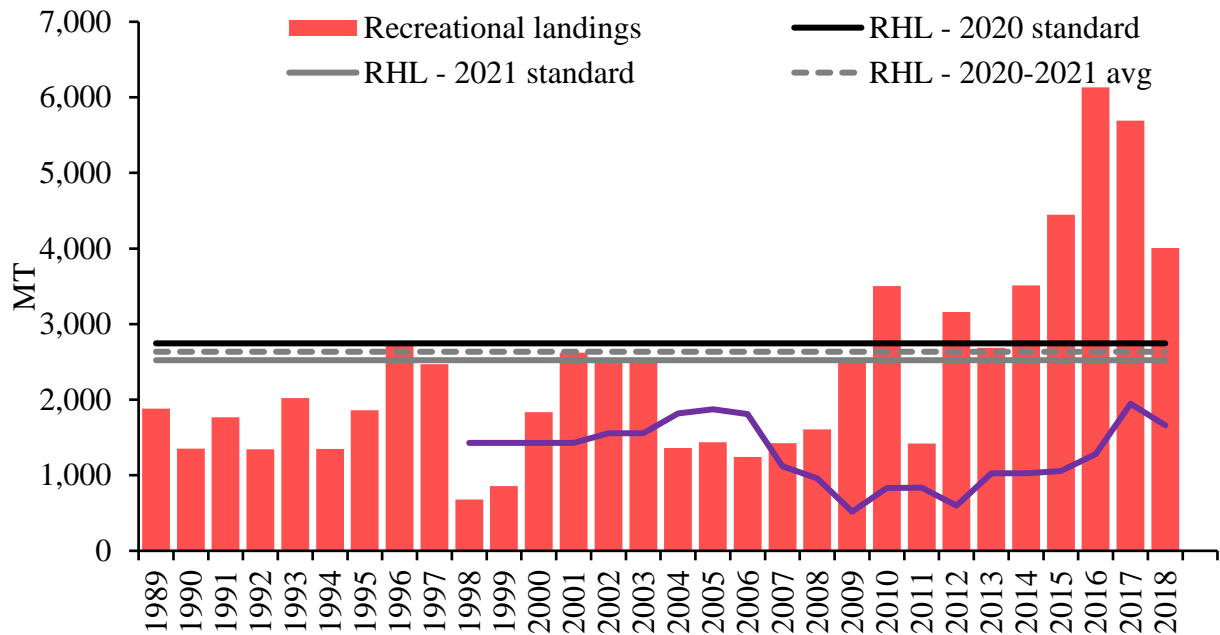


Figure 3: Recreational landings, 1989-2018 (red bars), compared to past RHLs (purple line), and potential 2020-2021 RHLs (black and gray lines; Table 1). Landings data provided by Gary Shepherd, Northeast Fisheries Science Center.

Table 4: Commercial and recreational landings and dead discards in metric tons, 1989-2018.
 (Source: personal communication, Gary Shepherd, Northeast Fisheries Science Center).
 Recreational dead discards in weight prior to 1989 are not available.

Year	Com land	Com disc	Rec land	Rec disc	Total catch	% Com catch	% Rec catch	% Com land	% Rec land
1989	1,105	109	1,881	99	3,194	38%	62%	37%	63%
1990	1,402	53	1,354	231	3,040	48%	52%	51%	49%
1991	1,190	10	1,766	175	3,142	38%	62%	40%	60%
1992	1,264	141	1,344	165	2,914	48%	52%	48%	52%
1993	1,353	78	2,022	120	3,573	40%	60%	40%	60%
1994	848	37	1,347	210	2,443	36%	64%	39%	61%
1995	889	24	1,860	397	3,171	29%	71%	32%	68%
1996	1,448	285	2,755	236	4,724	37%	63%	34%	66%
1997	1,197	55	2,470	251	3,973	32%	68%	33%	67%
1998	1,152	121	681	310	2,263	56%	44%	63%	37%
1999	1,290	45	856	545	2,736	49%	51%	60%	40%
2000	1,186	44	1,836	873	3,939	31%	69%	39%	61%
2001	1,279	240	2,621	886	5,025	30%	70%	33%	67%
2002	1,564	46	2,528	1,381	5,518	29%	71%	38%	62%
2003	1,347	114	2,492	641	4,595	32%	68%	35%	65%
2004	1,405	380	1,362	374	3,521	51%	49%	51%	49%
2005	1,297	89	1,437	350	3,173	44%	56%	47%	53%
2006	1,285	33	1,243	371	2,933	45%	55%	51%	49%
2007	1,037	104	1,425	354	2,920	39%	61%	42%	58%
2008	875	66	1,606	585	3,132	30%	70%	35%	65%
2009	523	167	2,525	623	3,838	18%	82%	17%	83%
2010	751	134	3,502	733	5,121	17%	83%	18%	82%
2011	765	227	1,421	358	2,771	36%	64%	35%	65%
2012	782	116	3,162	1,048	5,108	18%	82%	20%	80%
2013	1,027	278	2,685	749	4,739	28%	72%	28%	72%
2014	1,088	459	3,510	839	5,896	26%	74%	24%	76%
2015	1,113	423	4,448	985	6,969	22%	78%	20%	80%
2016	1,133	757	6,131	1,391	9,412	20%	80%	16%	84%
2017	1,808	1,027	5,692	1,634	10,162	28%	72%	24%	76%
2018	1,514	722	4,008	1,033	7,277	31%	69%	27%	73%
1989-2018 average						34%	66%	36%	64%
1989-1997 average (pre joint management)						38%	62%	39%	61%
1998-2018 average (post joint management)						32%	68%	34%	66%
2014-2018 average (most recent 5 years)						25%	75%	22%	78%

Table 5: Commercial and recreational landings in millions of pounds, Maine through Cape Hatteras, North Carolina, 1983-1992 (i.e., the years used to calculate the sector allocations implemented through Amendment 9). Commercial and recreational landings values and percentages based on an analysis done for Amendment 9 (1996) are also shown.

Year	Com. landings, current ACCSP*	Rec. landings, revised MRIP	% Com. landings updated	% Rec. landings updated	Com. landings Amend. 9	Rec. landings Amend. 9	% Com. landings Amend. 9	% Rec. landings Amend. 9
1983	3.34	4.86	41%	59%	3.34	4.08	45%	55%
1984	4.33	1.91	69%	31%	4.33	1.45	75%	25%
1985	3.42	3.66	48%	52%	3.42	2.10	62%	38%
1986	4.19	11.02	28%	72%	4.19	12.39	25%	75%
1987	4.17	1.83	70%	31%	4.17	1.92	68%	32%
1988	4.14	3.58	54%	46%	4.14	2.87	59%	41%
1989	2.92	5.3	36%	64%	2.92	3.29	47%	53%
1990	3.5	3.91	47%	53%	3.50	2.76	56%	44%
1991	2.81	4.84	37%	63%	2.81	4.19	40%	60%
1992	3.01	3.77	44%	56%	3.01	2.71	53%	47%
Avg			45%	55%			49%	51%

*ACCSP landings should be considered preliminary as they have not been validated by all states.

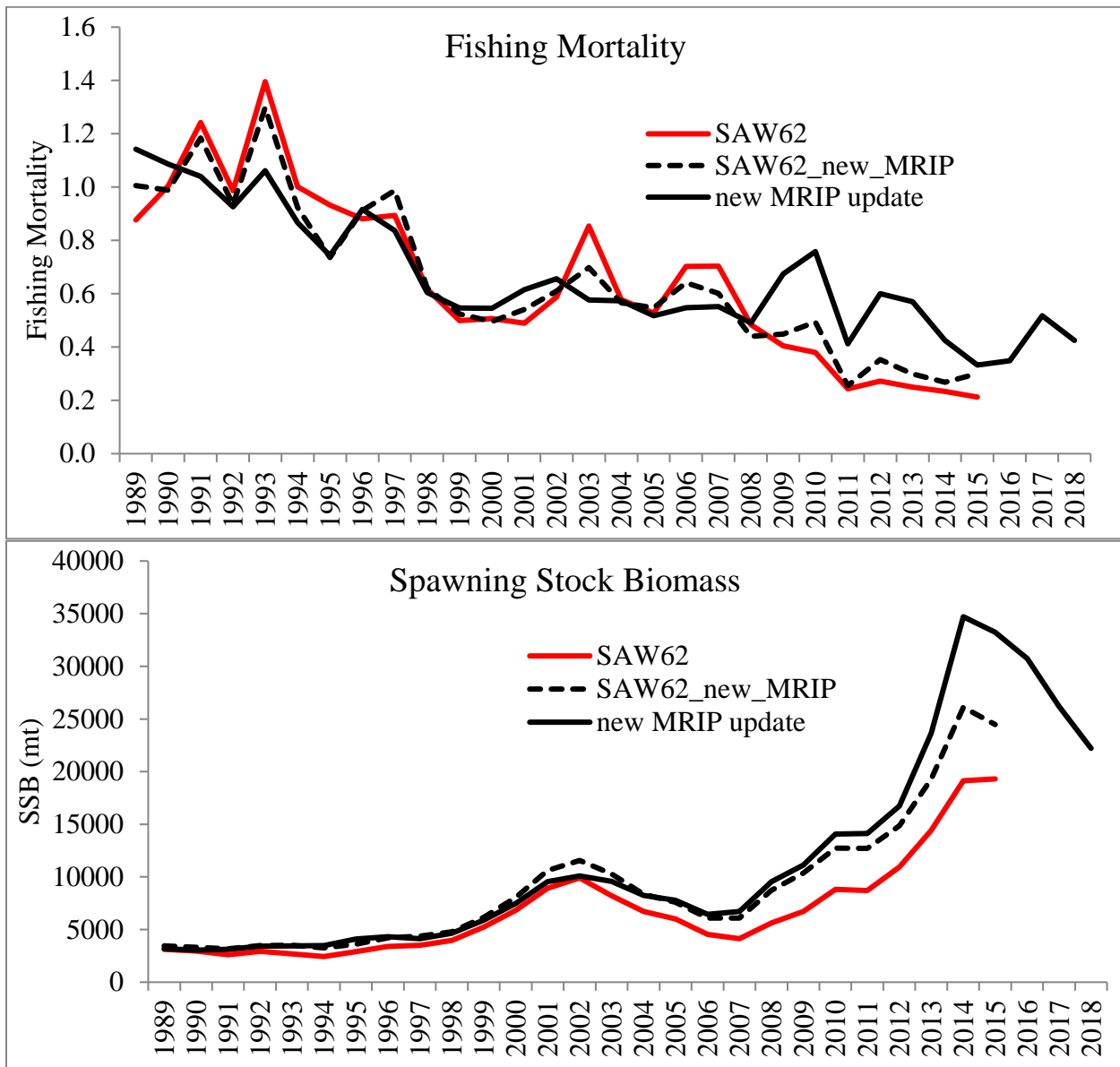


Figure 4: Estimates of fishing mortality (F) and spawning stock biomass based on bridge model runs completed as part of the 2019 operational stock assessment. The red line (SAW 62) represents estimates through 2015 based on the 2016 benchmark stock assessment. The dashed black line (SAW 62 new MRIP) represents estimates through 2015 based on the 2016 benchmark assessment model incorporating the revised MRIP data through 2015. The solid black line (new MRIP update) represents estimates from the 2019 operational stock assessment. This information can be used to gauge a rough estimate of the influence of the new MRIP data on the model output compared to the influence of other changes made in the model. For the F estimates, it should be noted that the 2016 benchmark estimated F for fully selected age 4-7 fish and the 2019 operational assessment estimated F for fully selected age 6-7 fish. For more information, see the 2019 operational assessment report, available at: <http://www.mafmc.org/ssc-meetings/2019/september-9-11>. Figure source: personal communication, Gary Shepherd, Northeast Fisheries Science Center.



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MEMORANDUM

DATE: September 4, 2019

TO: Chris Moore, Executive Director

FROM: Julia Beaty, Staff

SUBJECT: Revised Memo on 2020-2021 Black Sea Bass Specifications

Note: This memo is an updated version of the staff memo dated August 28, 2019. The values for spawning stock biomass and fishing mortality in 2018, Acceptable Biological Catch (ABC) projections for 2020-2021, and other catch and landings limits for 2020-2021 have been modified. An additional figure was also added (Figure 1). All other contents remain unchanged from the previous version of this memo.

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 revised 2020 and new 2021 catch and landings limits for black sea bass, as well as commercial management measures for 2020. Additional information on fishery performance and past management measures can be found in the 2019 Black Sea Bass Fishery Information Document and the 2019 Summer Flounder, Scup, and Black Sea Bass Fishery Performance Report developed by advisors.¹

A black sea bass operational stock assessment was peer reviewed and accepted in August 2019. This assessment incorporated fishery catch and fishery-independent survey data through 2018, including revised recreational catch data provided by the Marine Recreational Information Program (MRIP) for 1989-2018. The revised MRIP data are based on a new estimation methodology accounting for changes to the angler intercept methodology and the transition from a telephone-based effort survey to a mail-based effort survey. The revised estimates of catch and landings are several times higher than the previous estimates for shore and private boat modes, substantially raising the overall black sea bass catch and harvest estimates. For example, estimates of black sea bass harvest in weight for 2014-2018 using the revised methodology are on average 2.32 times the estimates using the old methodology.

The August 2019 operational assessment found that the black sea bass stock north of Cape Hatteras, North Carolina was not overfished and overfishing was not occurring in 2018 compared to the revised reference points calculated through the assessment. Spawning stock biomass (SSB) in 2018 was 73.65 million pounds (33,407 mt, adjusted for retrospective bias), 2.4 times the updated biomass reference

¹ Available at: <http://www.mafmc.org/sf-s-bsb>

point (i.e., $SSB_{MSY\ proxy} = SSB_{40\%} = 31.07$ million pounds/14,092 mt). The average fishing mortality rate (F) on fully selected ages 6-7 fish in 2018 was 0.42 (adjusted for retrospective bias), 91% of the updated fishing mortality threshold reference point (i.e., $F_{MSY\ proxy} = F_{40\%} = 0.46$).² The results of the 2019 operational assessment are described in more detail on pages 7-10.

Interim 2020 catch and landings limits for black sea bass were adopted by the Council and the Atlantic States Marine Fisheries Commission's (ASMFC's or Commission's) Summer Flounder, Scup, and Black Sea Bass Management Board (Board) in March 2019 (Table 1). These catch and landings limits are identical to those implemented for 2019 and are intended to be replaced as soon as possible with revised catch and landings limits based on the August 2019 operational stock assessment.

The Council's SSC is tasked with recommending a revised 2020 black sea bass ABC and a 2021 black sea bass ABC during their September 2019 meeting. Following that meeting, the Monitoring Committee will meet to recommend 2020-2021 Annual Catch Limits (ACLs), Annual Catch Targets (ACTs), commercial quotas, recreational harvest limits (RHLs), and any necessary modifications to commercial gear restrictions, minimum fish sizes, and other commercial measures. The Council and Board will meet jointly in October 2019 to review the recommendations of the SSC and Monitoring Committee, as well as input from advisors, and adopt revised catch and landings limits for 2020, new catch and landings limits for 2021, and any desired changes to the commercial management measures for 2020. Recreational management measures (bag limits, size restrictions, and open/closed seasons) for 2020 will be considered in late 2019 after preliminary recreational harvest estimates through August 2019 are available.

Two sets of ABC projections for 2020-2021 are available: one based on the standard approach and one based on an averaged ABC approach. The values in this memo assume an Overfishing Limit (OFL) coefficient of variation (CV) of 60% is used, consistent with past SSC recommendations. Under the standard approach, the ABC would vary across 2020 and 2021. The 2020 ABC (16.82 million pounds/7,627 mt) would be 88% greater than the current interim 2020 ABC (8.94 million pounds/4,055 mt). The 2021 ABC (14.60 million pounds/6,620 mt) would be 13% lower than the revised 2020 ABC, but 63% higher than the current interim 2020 ABC. Under the averaged ABC approach, the 2020 and 2021 ABCs would be identical at 15.71 million pounds (7,124 mt) a 75% increase compared to the current interim 2020 ABC. Catch and landings limits resulting from both ABC approaches are shown in Table 1. As described in more detail on pages 12-13, there are tradeoffs to both ABC approaches. Staff recommend the standard (varying) ABC approach.

Consistent with prior year's Monitoring Committee recommendations, staff recommend no reduction from the commercial and recreational ACLs to the sector-specific ACTs account for management uncertainty; therefore, the commercial and recreational ACTs would be set equal to their respective ACLs for 2020 and 2021.

The 2020 and 2021 commercial quotas and RHLs which result from subtracting expected discards from the sector-specific ACTs represent notable increases from the 2019 and interim 2020 limits (54-77%, depending on the ABC approach and year, Table 1). Increased commercial quotas will allow for increased commercial landings; however, despite notable potential RHL increases, recreational harvest will likely need to be restricted compared to recent levels. For example, estimated 2018 recreational

² A prepublication copy of the August 2019 operational stock assessment report prepared for the Council and the SSC is available at: <http://www.mafmc.org/ssc-meetings/2019/september-9-11>

harvest using the revised MRIP estimation methodology (7.92 million pounds/3,593 mt) was 22-31% higher than the potential revised 2020 RHL, and 31-41% higher than the potential 2021 RHL (depending on the ABC approach used). If 2019 harvest is similar to 2018 harvest, the 2020-2021 RHLs under either ABC approach will require more restrictive recreational bag limits, minimum fish sizes, and open seasons compared to recent years to prevent RHL overages.

It should be noted that the 2020 ABC under both the standard and averaged approach is high enough to accommodate 2018 levels of commercial and recreational catch accounting for the revised MRIP methodology (i.e., 15.33 million pounds/6,955 mt of total catch in 2018 compared to a 2020 ABC of 16.82 million pounds/7,627 mt or 15.71 million pounds/7,124 mt). Given this and the positive status of the stock, the need to restrict recreational harvest in 2020, while allowing a notable increase in commercial landings, is not based on a conservation concern, but rather on the Fishery Management Plan (FMP) requirement to allocate 49% of the landings portion of the ABC to the commercial fishery and 51% to the recreational fishery. These allocations were based on the proportion of landings by sector during 1983-1992. These sector allocations cannot be modified without an FMP amendment.

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 2020.

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Table 1: Currently implemented 2019 and interim 2020 black sea bass catch and landings limits and potential 2020 (revised) and 2021 catch and landings limits based on the standard and averaged ABC approaches. The standard approach is recommended by staff. The calculations for the ABC discards and landings portions and the proportions of discards by sector are based on values provided with the 2019 operational stock assessment. All values assume an OFL CV of 60%.

Management measure	2019 and interim 2020		2020 (revised) and 2021, standard ABC approach				2020 (revised) and 2021, average ABC approach				Basis
			2020		2021		2020		2021		
	mil lb	mt	mil lb	mt	mil lb	mt	mil lb	mt	mil lb	mt	
OFL	10.29	4,667	19.35	8,778	16.99	7,707	19.31	8,760	17.27	7,835	Stock assessment projections
ABC	8.94	4,055	16.81	7,627	14.59	6,620	15.71	7,124	15.71	7,124	Stock assessment projections and Council risk policy
ABC discards	1.76	799	4.11	1,864	3.57	1,618	3.84	1,741	3.84	1,741	24% of ABC, based on avg. 2016-2018 discards as % of catch
Projected com. discards	0.83	377	1.57	711	1.36	617	1.46	664	1.46	664	38% of ABC discards, based on avg. 2016-2018 % of discards by sector
Projected rec. discards	0.93	422	2.54	1,154	2.21	1,001	2.38	1,078	2.38	1,078	62% of ABC discards, based on avg. 2016-2018 % of discards by sector
Commercial ACL	4.35	1,974	7.79	3,534	6.76	3,068	7.28	3,301	7.28	3,301	49% of ABC landings portion + proj. com. discards
Commercial ACT	4.35	1,974	7.79	3,534	6.76	3,068	7.28	3,301	7.28	3,301	Set equal to the ACL, no deduction for management uncertainty
Commercial quota	3.52	1,596	6.23	2,824	5.40	2,451	5.81	2,637	5.81	2,637	Com. ACT minus projected com. discards
Recreational ACL	4.59	2,083	9.02	4,093	7.83	3,552	8.43	3,823	8.43	3,823	51% of ABC landings portion + proj. rec. discards
Recreational ACT	4.59	2,083	9.02	4,093	7.83	3,552	8.43	3,823	8.43	3,823	Set equal to the ACL, no deduction for management uncertainty
RHL	3.66	1,661	6.48	2,939	5.62	2,551	6.05	2,745	6.05	2,745	Rec. ACT minus projected rec. discards

Introduction

The Magnuson-Stevens Fishery Conservation and Management Act requires the Council's SSC to provide scientific advice for fishery management decisions, including recommendations on ABCs, prevention of overfishing, and achieving maximum sustainable yield (MSY). The SSC recommends ABCs that address scientific uncertainty. The Council's catch limit recommendations cannot exceed the ABCs recommended by the SSC.

The Monitoring Committee recommends management measures to achieve the SSC's recommended ABCs. Specifically, the Monitoring Committee recommends ACLs, ACTs, commercial quotas, RHLs, and management measures designed to achieve but not exceed the catch and landings limits.

Black sea bass are cooperatively managed by the Council and the ASMFC. The Council and the ASMFC's Summer Flounder, Scup, and Black Sea Bass Management Board meet jointly each year to consider SSC and Monitoring Committee recommendations, as well as Advisory Panel input, before deciding on proposed catch limits and other management measures. The Council and Board may set specifications for these three species for up to three years at a time. The Council and Board submit their recommendations to NMFS. NMFS reviews, implements, and enforces federal fisheries regulations.

Recent Catch and Landings

Commercial and recreational landings declined slightly from 2017 to 2018 (Table 2). According to dealer data, commercial fishermen landed 3.41 million pounds (1,550 mt) of black sea bass in 2018, about 97% of the commercial quota (3.52 million pounds/1,596 mt). According to the 2019 operational assessment,³ commercial dead discards were 1.59 million pounds in 2018 (722 mt). As such, commercial removals (landings and dead discards) in 2018 totaled 5.11 million pounds (2,318 mt), 17% higher than the 2018 commercial ACL (4.35 million pounds/1,974 mt). The regulations for commercial black sea bass Accountability Measures for ACL overages do not require overage paybacks when the overage is due to higher than expected commercial discards and when biomass is above the biomass target, both of which were true for black sea bass in 2018.

According to the revised MRIP data, recreational fishermen from Maine through Cape Hatteras, NC harvested 7.92 million pounds (3,593 mt) of black sea bass in 2018. This estimate should not be compared to the 2018 RHL as the RHL did not account for the revised MRIP estimates. MRIP staff provided back-calculated estimates based on the old MRIP methodology which suggest that 3.82 million pounds (1,731 mt) of recreational black sea bass harvest would have been estimated for 2018 based on the old MRIP methodology. This is about 4% higher than the 2018 RHL (3.66 million pounds/1,661 mt). According to the 2019 operational assessment,⁴ recreational dead discards totaled 2.30 million pounds in 2018 (1,044 mt). A rough estimate of recreational dead discards in "old MRIP units" can be calculated by dividing the value calculated through the assessment by 2.85, the average ratio of revised to old MRIP estimates during 2013-2017. This results in 806,892 pounds (366 mt) of recreational discards in "old MRIP units." This suggests that total 2018 recreational catch in old MRIP units was about 4.62 million pounds (2,097 mt) and exceeded the recreational ACL (4.59 million pounds/2,083 mt) by less

³ A prepublication copy of the August 2019 operational stock assessment report prepared for the Council and the SSC is available at: <http://www.mafmc.org/ssc-meetings/2019/september-9-11>

⁴ See previous footnote.

than 1%. Recreational catch (harvest and discards) in 2018 based on the new estimation methodology was estimated to be 10.22 million pounds (4,637 mt).

NMFS will perform separate 2018 ACL overage evaluations as part of the rulemaking for 2020-2021 specifications. The overage amounts calculated by NMFS may vary from those shown here.

As of August 10, about 2.11 million pounds of black sea bass had been landed by commercial fishermen in 2019, corresponding to 60% of the 2019 commercial quota (3.52 million pounds/1,596 mt, Table 3). Preliminary estimated recreational harvest through June 2019 totaled 1.71 million pounds based on the revised MRIP estimation methodology (Table 4). This recreational harvest estimate should not be compared to the 2019 RHL as that RHL was based on the 2016 stock assessment which was completed prior to the transition to the new MRIP estimation methodology.

Table 2: Black sea bass commercial and recreational landings relative to quotas and RHLs (in millions of pounds), 2014-2018. The RHL overage/underage evaluation is based on recreational harvest estimates using the old MRIP-estimation methodology.

Year	Com. landings	Com. quota	Quota overage/underage	Rec. harvest (old MRIP estimates)	RHL	RHL overage/underage	Rec. harvest (new MRIP estimates)
2014	2.18	2.17	0%	3.67	2.26	+62%	6.93
2015	2.46	2.21	+11%	3.79	2.33	+63%	7.82
2016	2.59	2.71	-4%	5.19	2.82	+84%	12.05
2017	3.99	4.12	-3%	4.16	4.29	-3%	11.48
2018	3.41	3.52	-3%	3.82	3.66	+4%	7.92

Table 3: 2019 black sea bass commercial landings by state through the week ending August 10, 2019 with data reported through August 14, 2019, according to preliminary data from NMFS weekly quota reports available at: <https://www.greateratlantic.fisheries.noaa.gov/aps/monitoring/blackseabass.html>.

State	Landings (lb)
ME	1
NH	300
MA	287,823
RI	304,888
CT	18,910
NY	162,985
NJ	371,500
DE	76,655
MD	259,801
VA	405,594
NC	227,025
Other	202
Total	2,115,684
2019 Commercial Quota	3,520,000
Percent of Quota Landed	60%

Table 4: Preliminary recreational black sea bass harvest estimates, waves 1-3 (January - June), 2019. (Source: personal communication, NMFS Fisheries Statistics Division, August 21, 2019; <https://www.st.nmfs.noaa.gov/recreational-fisheries/data-and-documentation/queries/index>). These estimates should not be compared to the 2019 RHL as the 2019 RHL did not account for the new MRIP estimation methodology.

State	Harvest (lb)
ME	0
NH	0
MA	690,355
RI	15,153
CT	166,702
NY	135,165
NJ	586,821
DE	11,613
MD	67,412
VA	29,970
NC (north of Cape Hatteras)	3,353
Total	1,706,544

Stock Status and Biological Reference Points

A black sea bass operational stock assessment was peer reviewed and accepted in August 2019. This assessment retained the model structure of the previous benchmark stock assessment, completed in 2016,⁵ and incorporated fishery data and fishery-independent survey data through 2018, including revised recreational data provided by MRIP for 1989-2018. The following information is based on the prepublication draft of the August 2019 operational assessment prepared for use by the Council and SSC.⁶

As with the 2016 benchmark assessment, the 2019 operational 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 sub-units were used to develop stock-wide reference points. As with the 2016 benchmark assessment, the peer reviewers of the 2019 operational assessment concluded that “although the two-area model had a more severe retrospective pattern in opposite directions in each area sub-unit than when a single unit was assumed, it provides reasonable model estimates after the retrospective corrections and combining the two spatial units. Thus, even though reference points are generated and stock status determinations are conducted for each subunit, the combined projections should be used.”

Due to the lack of a stock/recruit relationship, a direct calculation of MSY and associated reference points (F and SSB) was not feasible and proxy reference points were used. SSB calculations and SSB reference points account for mature males and females. Due to the addition of a second selectivity time block for the non-trawl fleet in the 2019 operational assessment (1989-2008 and 2009-2018, compared to 1989-2015 in the 2016 benchmark assessment), the age at full selection changed from 4-7 in the 2016

⁵ 62nd Northeast Stock Assessment Workshop (2016) assessment report and peer review summaries are available at: <https://www.nefsc.noaa.gov/saw/reports.html>

⁶ Available at: <http://www.mafmc.org/ssc-meetings/2019/september-9-11>

benchmark assessment to 6-7 in the 2019 operational assessment. The reference points and terminal year SSB and F estimates from the 2016 benchmark assessment and 2019 operational assessment are shown in Table 5.

A comparison of the 2018 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 2018. SSB in 2018 was estimated at 73.65 million pounds (33,407 mt, adjusted for retrospective bias), 2.4 times the updated biomass reference point (i.e., $SSB_{MSY\ proxy} = SSB_{40\%} = 31.07$ million pounds/14,092 mt). The average fishing mortality rate on fully selected ages 6-7 fish in 2018 was 0.42 (adjusted for retrospective bias), 91% of the updated fishing mortality threshold reference point (i.e., $F_{MSY\ proxy} = F_{40\%} = 0.46$; Table 5). The 2018 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 144.7 million fish. The 2015 year class was the second largest at 79.4 million fish. Recruitment of the 2017 year class as age 1 in 2018 was estimated at 16.0 million, well below the 1989-2018 average of 36 million fish (Figure 2).

Table 5: Black sea bass biological reference points from the 2016 benchmark stock assessment and 2019 operational stock assessment.

Reference Points and terminal year SSB and F estimates	2016 benchmark stock assessment⁷ Data through 2015	2019 operational stock assessment⁸ Data through 2018
$SSB_{MSY\ proxy} = SSB_{40\%}$ (biomass target)	21.31 mil lb / 9,667 mt	31.07 mil lb / 14,092 mt
$\frac{1}{2} SSB_{MSY}$ (biomass threshold defining an overfished status)	10.66 mil lb / 4,834 mt	15.53 mil lb / 7,046 mt
Terminal year SSB	48.89 mil lb / 22,176 mt (2015) Adjusted for retrospective bias 230% of SSB_{MSY}	73.65 mil lb / 33,407 mt (2018) Adjusted for retrospective bias 240% of SSB_{MSY}
$F_{MSY\ proxy} = F_{40\%}$ (threshold defining overfishing)	0.36	0.46
Terminal year F	0.27 (2015) Adjusted for retrospective bias Fully selected ages 4-7 25% below F_{MSY}	0.42 (2018) Adjusted for retrospective bias Fully selected ages 6-7 9% below F_{MSY}

⁷ 62nd Northeast Stock Assessment Workshop (2016) assessment report and peer review summaries are available at: <https://www.nefsc.noaa.gov/saw/reports.html>

⁸ A prepublication copy of the August 2019 operational stock assessment report is available at: <http://www.mafmc.org/ssc-meetings/2019/september-9-11>

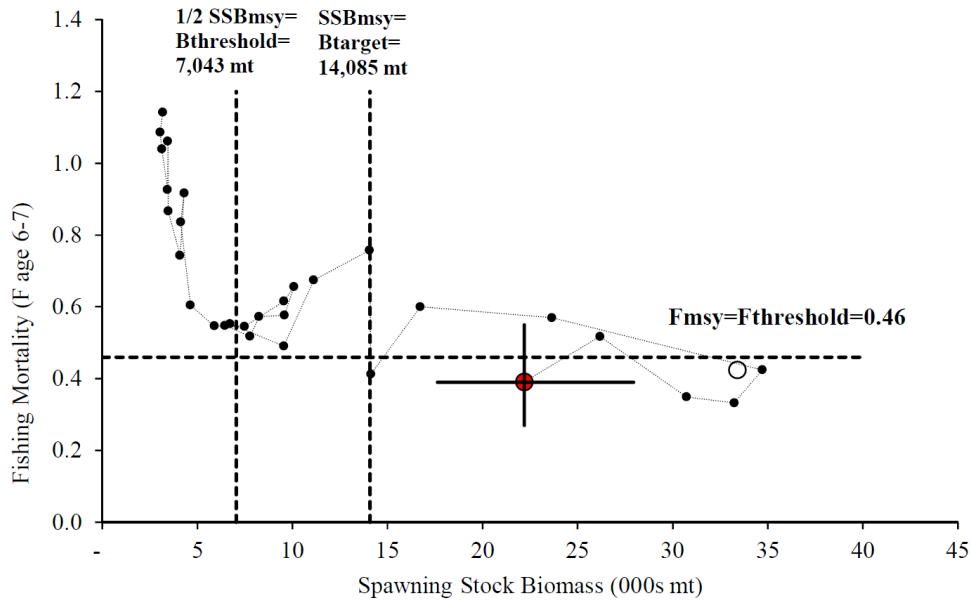


Figure 1: Estimates of black sea bass spawning stock biomass and fully-recruited fishing mortality relative to the updated biological reference points from the 2019 operational stock assessment. The red filled circle with 90% confidence intervals shows the un-adjusted 2018 estimates. The open circle shows the retrospectively adjusted estimates for 2018. (Source: prepublication copy of the August 2019 operational stock assessment report dated 9/4/2019.)

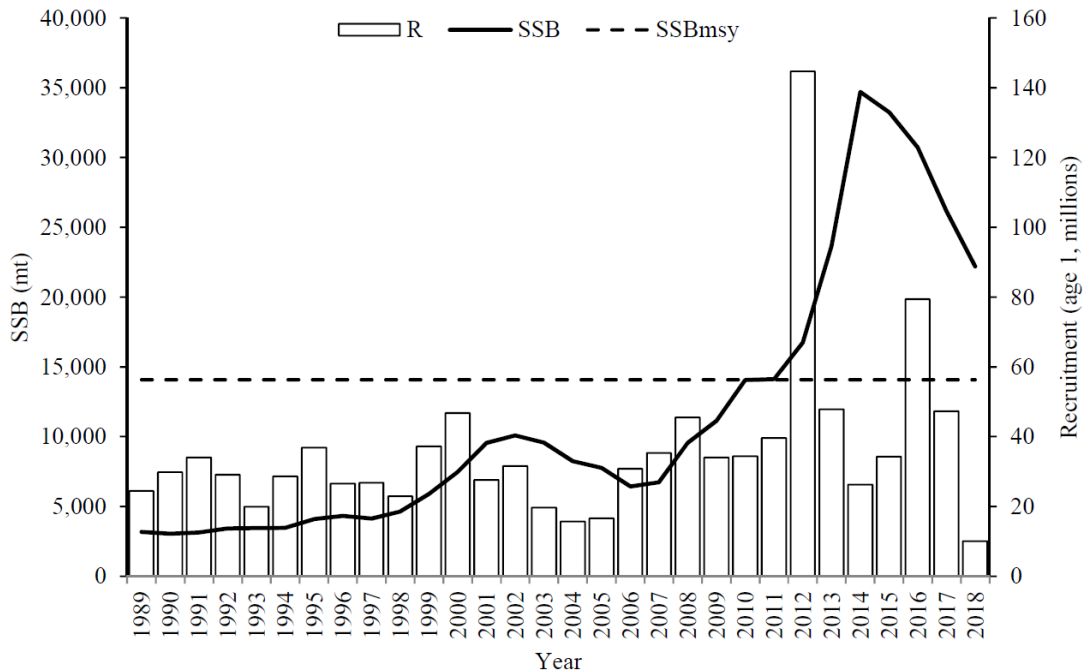


Figure 2: Black sea bass SSB and recruitment, 1989-2018 from the 2019 operational stock assessment. The horizontal dashed line is the updated biomass reference point. (Source: prepublication copy of the August 2019 operational stock assessment report dated 9/4/2019.)

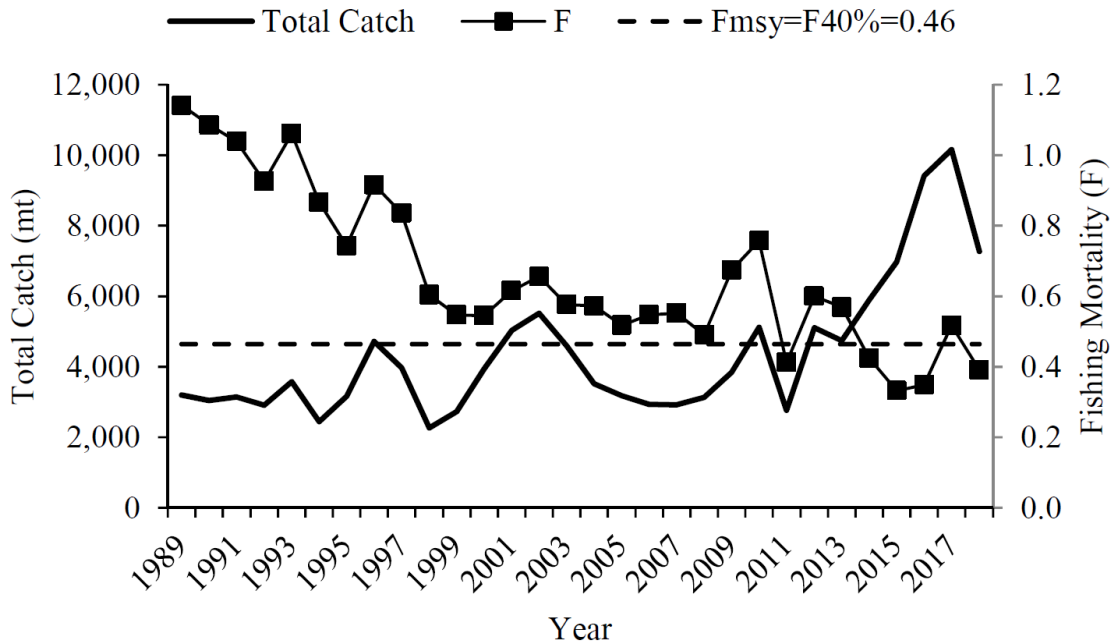


Figure 3: Total black sea bass catch and fishing mortality, 1989-2018, from the 2019 operational stock assessment. (Source: prepublication copy of the August 2019 operational stock assessment report dated 9/4/2019.)

Review of Prior SSC Recommendations

The SSC reviewed the 2016 benchmark stock assessment and recommended ABCs for 2017-2019 during their January 2017 meeting. They recognized substantial improvements compared to previous assessments and accepted the OFL estimates from the assessment for management use. They considered relevant sources of uncertainty in the OFL and applied an OFL coefficient of variation (CV) of 60%. The 2016 benchmark assessment conducted a thorough analysis and simulation testing of the protogynous hermaphroditic life history of black sea bass. Based on this, the SSC concluded that no additional buffer for an atypical life history should be applied under the Council’s ABC risk policy; therefore, a 40% probability of overfishing was used in combination with the 60% OFL CV to derive ABCs for 2017-2019.⁹

The SSC considered the following to be the most significant sources of uncertainty associated with the OFLs and ABCs derived from the 2016 benchmark stock assessment:

- The natural mortality rate used in the assessment — because of the protogynous hermaphroditic life history of black sea bass, the assumption of a constant natural mortality rate for both sexes may not adequately capture the dynamics in natural mortality;
- 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.

In July 2018, the SSC reviewed their previously recommended 2019 ABC. They noted that fishery and survey catch, landings, and discards through 2017 showed evidence of an above average 2015 year

⁹ A summary of the January 2017 SSC meeting is available at: <http://www.mafmc.org/ssc-meetings/2017/jan-25>

class. Their previously recommended 2019 ABC did not account for this year class as this information had not been incorporated into a stock assessment or biomass projections. Without an updated assessment or biomass projections, the SSC agreed that they could not justify revisions their previous OFL and ABC recommendations to account for the 2015 year class. As such, they recommended no changes to their previously recommended 2019 ABC of 3,617 mt (7.97 million pounds).¹⁰

The Council and Board adopted the SSC’s 2019 ABC recommendation; however, NMFS implemented a slightly higher 2019 ABC based on a sensitivity analysis of various recruitment scenarios which was not available prior to SSC, Council, or Board decision making in 2018.¹¹

2020-2021 OFL and ABC Projections

Table 6 and Table 7 show projected ABCs based on the standard and averaged approaches, respectively. In Table 6, the value for ABC total catch in 2019 is the assumed 2019 catch calculated based on an adjustment to the ABC implemented by NMFS for 2019. It was assumed that the implemented 2019 ABC would be fully caught; however, the expected recreational contribution to that catch was adjusted to account for the fact that the ABC implemented for 2019 did not incorporate the revised MRIP estimates. The expected recreational contribution to the ABC implemented for 2019 was multiplied by 2.85, the average ratio of revised to old MRIP estimates for 2013-2017. This resulted in an expected 2019 total catch of 7,917 mt (17.45 million pounds). In Table 7, the ABC total catch value for 2019 is calculated based on an OFL at F_{MSY} and a 40% probability of overfishing.

The OFL total catch values in the tables below are catches in each year fishing prior to calculation of the associated annual ABC. 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. Recruitment was sampled from the estimates for 2000-2018. The Council’s ABC risk policy for a stock with a typical life history was applied, resulting in an ABC p^* (i.e., probability of overfishing) of 40%. A CV of 60% was applied to the OFL, consistent with past SSC recommendations. During their September 2019 meeting, the SSC will discuss the appropriate OFL CV and may apply a different value.

Table 6: 2020-2021 OFL and ABC projections based on the standard ABC approach. See text above for more information. Note: 2019 ABC total catch represents expected catch in 2019, not the implemented 2019 ABC. (Source: personal communication, Gary Shepherd, Northeast Fisheries Science Center.)

Year	OFL total catch		ABC total catch		ABC F	ABC p^*	SSB	
	MT	Mil. lb	MT	Mil. lb			MT	Mil. lb
2019	--	--	7,917	17.45	0.33	--	27,629	60.91
2020	8,778	19.35	7,627	16.81	0.39	0.4	22,661	49.96
2021	7,707	16.99	6,620	14.59	0.39	0.4	21,119	46.56

¹⁰ A summary of the July 2018 SSC meeting is available at: <http://www.mafmc.org/ssc-meetings/2018/july-17-18>

¹¹ More information is available in the Federal Register notice implementing the final rule for 2019 black sea bass specifications (89 FR 64482, 12/17/2018), available at: <https://www.federalregister.gov/documents/2018/12/17/2018-27213/fisheries-of-the-northeastern-united-states-summer-flounder-scup-and-black-sea-bass-fisheries-2019>

Table 7: 2020-2021 OFL and ABC projections based on the averaged ABC approach. Note: 2019 ABC total catch represents expected catch in 2019, not the implemented 2019 ABC. (Source: personal communication, Gary Shepherd, Northeast Fisheries Science Center.)

Year	OFL total catch		ABC total catch		ABC F	ABC p*	SSB	
	MT	Mil. lb	MT	Mil. lb			MT	Mil. lb
2019	--	--	8,736	19.26	0.4	--	27,885	61.48
2020	8,760	19.31	7,124	15.71	0.32	0.33	22,930	50.55
2021	7,835	17.27	7,124	15.71	0.32	0.43	21,746	47.94

Staff Recommendations for 2020-2021 ABCs

The SSC has been asked to recommend two sets of ABCs for 2020-2021, one based on the standard approach and one based on the averaging approach. The Council and Board will decide on the preferred approach.

The averaged ABC approach would allow for stable catch and landings limits across two years and would allow for a higher 2021 ABC than the standard approach (Table 1); however, it would require a lower 2020 ABC than under the standard approach. There is a 3% difference in estimated SSB in 2021 between the two approaches (Table 6 and Table 7).

Under the standard approach, the revised 2020 ABC (16.82 million pounds/7,627 mt) would be 88% greater than the 2019 and interim 2020 ABC (which are identical at 8.94 million pounds/4,055 mt). The ABC would then decrease by 13% in 2021 (to 14.60 million pounds/6,620 mt). Under the averaged ABC approach, the 2020 and 2021 ABCs would be identical at 15.71 million pounds (7,124 mt), a 76% increase compared to the 2019 and interim 2020 ABC (Table 1).

Although both approaches will allow for notable increases compared to past ABCs, this will not necessarily translate into socioeconomic benefits for all sectors of the fishery. As shown in Table 1, the 2020 and 2021 commercial quotas and RHLs have the potential to increase by 54-77% compared to the 2019 and interim 2020 limits depending on the ABC approach and the year. Increased commercial quotas will allow for increased commercial landings; however, recreational harvest will need to be restricted compared to recent levels to prevent an RHL overage, even under potential 54-77% increases in the RHL. This is due to the fixed allocation percentages defined in the FMP and the revisions to the MRIP data which show much higher recreational harvest than previously estimated. It should be noted that the 2020 ABC under both the standard and averaged approach is high enough to accommodate 2018 levels of commercial and recreational catch accounting for the revised MRIP methodology (i.e., 15.33 million pounds/6,955 mt of total catch in 2018 compared to a 2020 ABC of 16.82 million pounds/7,627 mt or 15.71 million pounds/7,124 mt). Recreational harvest in 2019 may differ from 2018 and cannot be reliably predicted with currently available data (i.e., preliminary data through June 2019).

The standard ABC approach will allow for a higher ABC in 2020 than the averaged approach; therefore, it will require less of a restriction on the recreational fishery in 2020 compared to the averaged approach. However, it will require greater restrictions in 2021 compared to the averaged approach. Both approaches have the potential for disproportionately negative socioeconomic impacts to the recreational sector compared to the commercial sector resulting from the combination of the new MRIP data and the fixed allocation percentages in the FMP.

Given the potential impacts to the recreational sector, the standard ABC approach is recommended by staff over the averaged approach in anticipation of potential future modifications to the 2021 RHL. For example, the Council is considering revisions to their ABC risk policy through a framework action. Final action is expected in December 2019, with potential implementation in 2020. In addition, the Council and Board may initiate a management action to consider revising the 49% commercial and 51% recreational allocation specified in the FMP; however, it is unlikely that changes to the sector allocations will be implemented in time to impact 2021 specifications.

Updated estimates of SSB, F, and recruitment are expected to be available in 2021 to inform 2022-2023 specifications. Unless an interim data update (i.e., updated fishery and survey data without updated estimates of SSB, F, and recruitment) shows strong signals of unexpected changes in the stock, it is unlikely that the 2021 catch and landings limits will be updated in 2020 based on biological, fishery, or survey data.

Other Management Measures

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 discards to calculate sector-specific ACLs.

The ABC landings allocation percentages were implemented through Amendment 9 (1996) and first came into effect in 1998. These allocations were based on the proportions of commercial and recreational landings during 1983-1992. As shown in Figure 4, these percentages do not reflect the current understanding of the proportion of catch and landings from the commercial and recreational sectors based on the 2019 operational assessment, which incorporated the revised time series of MRIP data. Because these allocation percentages are defined in the FMP, they cannot be modified without an FMP action such as an amendment.

The methodology to calculate ABC landings and discards portions and sector-specific discards is not prescribed in the FMP and can be modified by the Monitoring Committee on an annual basis. Typically, the ABC landings and discards portions are calculated based on the average proportion of total catch that was landed and discarded during the most recent three years for which information is available. Expected commercial and recreational discards are calculated by applying the most recent three year average of total discards by sector to the ABC discards portion (Table 1). This requires the assumption that patterns in landings and discards will be similar in future years as in past years. Changes in regulations, availability, year class strength, market demand, and other factors can impact patterns in landings and discards from one year to the next. For example, the potential increase in the commercial quota from 2019 to 2020 could result in a lower proportion of commercial discards in 2020. As previously stated, the potential increase in the RHL will likely require restrictions on the recreational fishery compared to 2019 due to the changes in the MRIP data and the fixed allocation percentages in the FMP. This could increase the proportion of discards in the recreational sector. The Monitoring Committee should discuss the methodology for calculating expected discards during their September 2019 meeting.

The staff recommendation for the standard ABC approach and the discard projection methodology

described above result in a revised 2020 commercial ACL of 7.79 million pounds (3,534 mt) and a revised 2020 recreational ACL of 9.02 million pounds (4,093 mt). They result in a 2021 commercial ACL of 6.76 million pounds (3,068 mt) and a 2021 recreational ACL of 7.83 million pounds (3,552 mt, Table 1).

The averaged ABC approach and the discard projection methodology described above result in 2020 and 2021 commercial ACLs of 7.28 million pounds (3,301 mt) and 2020 and 2021 recreational ACLs of 8.43 million pounds (3,823 mt, Table 1).

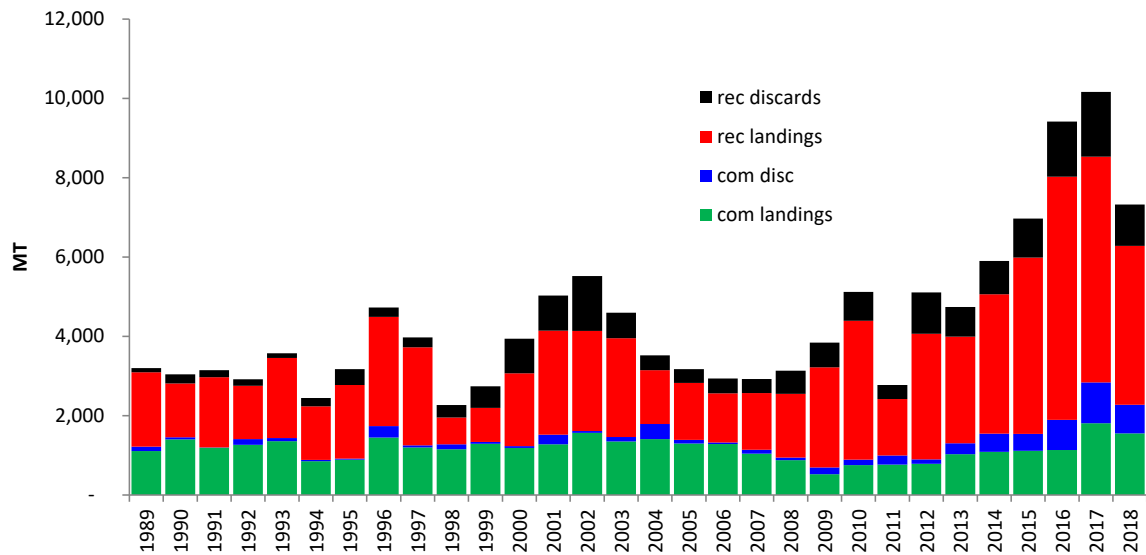


Figure 4: Total black sea bass catch (mt), 1989-2018. Recreational landings and discards are based on the revised MRIP estimation methodology. Values should not be compared to the catch and landings limits in those years as those catch and landings limits did not account for the revised MRIP estimation methodology. (Source: personal communication, Gary Shepherd, Northeast Fisheries Science Center.)

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 have generally been near the commercial quotas for most of the past five years (2014-2018, Table 2). The commercial quota monitoring system is timely and typically successful in constraining landings to the commercial quota. In contrast, the recreational fishery exceeded the RHL in several recent years, with substantial overages prior to 2017 (based on the old MRIP data, Table 2). It should be noted that the revised time series of MRIP data was released in July 2018 and was first incorporated into a stock assessment in August 2019; therefore, past RHLs did not account for these revised estimates. Past RHLs should not be compared against the revised estimates. In addition, the

Monitoring Committee has noted that these recreational overages occurred when the stock was rapidly expanding and availability to anglers was very high. At the same time, due to the lack of an approved stock assessment prior to 2017, the RHLs were set at levels not reflective of the large and increasing stock abundance. Analysis using the 2016 stock assessment indicated that RHLs during the few years prior to 2017 would have been approximately double those implemented if they had been set using the new assessment model, and overages would likely not have occurred to the same degree.

In recent years, the Monitoring Committee and the ASMFC’s Technical Committee have been working to develop new and alternative methodologies to evaluate management uncertainty in the recreational fishery, the predictability and uncertainty in recreational catch estimates, and the influence of recreational regulations on harvest. These Committees plan to continue to work to make improvements to the evaluation process for recreational measures.

Consistent with previous Monitoring Committee 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.

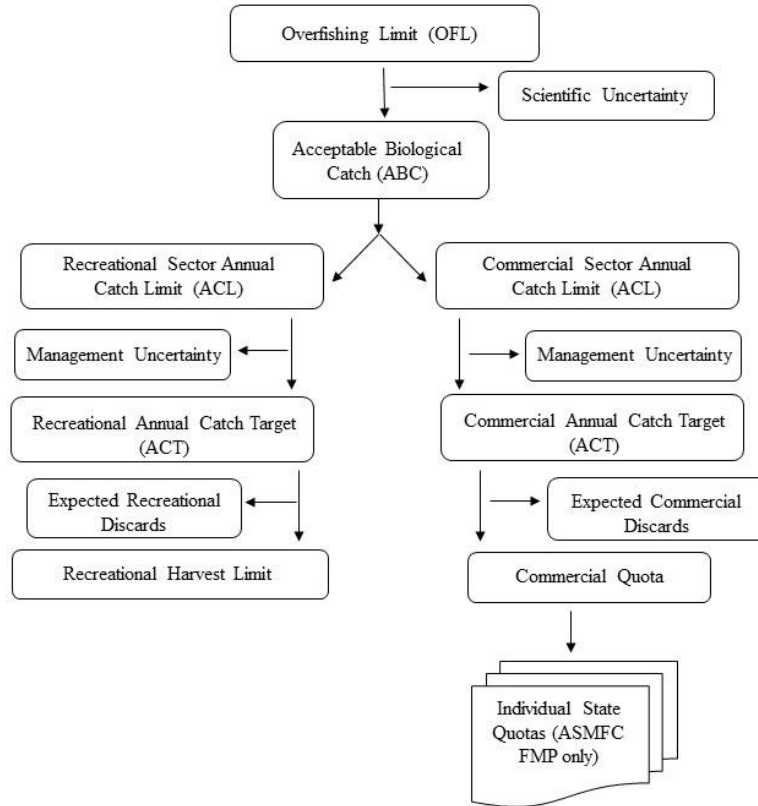


Figure 5: Flowchart for black sea bass catch and landings limits.

Commercial Quotas and Recreational Harvest Limits

Projected discards are subtracted from the sector-specific ACTs to derive annual commercial quotas and RHLs. As previously stated, expected commercial and recreational discards are typically calculated by applying the most recent three year average of total discards by sector to the ABC discards portion (Table 1). This requires the assumption that patterns in landings and discards will be similar in future

years as in past years. Changes in regulations, availability, year class strength, market demand, and other factors can impact patterns in landings and discards from one year to the next. For example, the potential increase in the commercial quota from 2019 to 2020 could result in a lower proportion of commercial discards in 2020. The potential increase in the RHL will likely require restrictions on the recreational fishery compared to 2019 due to the changes in the MRIP data and the fixed allocation percentages in the FMP. This could increase the proportion of discards in the recreational sector. The Monitoring Committee should discuss the methodology for calculating expected discards during their September 2019 meeting.

Data provided with the 2019 operational stock assessment suggest that 38% of total discards during 2016-2018 were attributable to the commercial fishery and 62% to the recreational fishery. The proportion attributable to the recreational fishery increased compared to previous years (e.g., 53% during 2015-2017 based on data available in 2018). This is due in part to the revisions to the MRIP data which suggest that recreational catch, harvest, and discards are higher than previously estimated.

The standard ABC approach and the discard projection methodology described above result in a revised 2020 commercial quota of 6.23 million pounds (2,824 mt) and a revised 2020 RHL of 6.48 million pounds (2,939 mt). These represent increases of 77% compared to the 2019 and interim 2020 commercial quota and RHL. The resulting 2021 commercial quota is 5.40 million pounds (2,451 mt) and the resulting 2021 RHL is 5.62 million pounds (2,551 mt). These represent increases of 54% compared to the 2019 and interim 2020 commercial quota and RHL, but decreases of 13% compared to the revised 2020 commercial quota and RHL under this approach (Table 1).

The averaged ABC approach and the discard projection methodology described above result in a 2020 and 2021 commercial quota of 5.81 million pounds (2,637 mt) and a revised 2020 RHL of 6.05 million pounds (2,745 mt). These represent increases of 65% compared to the 2019 and interim 2020 commercial quota and RHL (Table 1).

As described above, the increase in the commercial quota under either approach will allow for increased commercial landings; however, the increased RHLs will require restrictions in the recreational fishery as the increased RHLs are lower than the revised MRIP estimates for recreational harvest in recent years.

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 ASMFC adopted modifications to the circle vent size in black sea bass pots/traps, effective in 2007, based on the findings of a Council and ASMFC 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 Council and ASMFC's Monitoring and Technical Committees conducted a thorough review of the commercial management measures which can be modified through specifications.¹² The committees, and subsequently the Council and Board, indicated that further exploration of some 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 project which analyzed the selectivity of multiple codend mesh sizes relative to summer flounder, black sea bass and scup retention 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 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.¹³

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). Input from the commercial fishing industry should be sought before any minimum mesh size changes are considered.

Staff will continue to work with the Monitoring Committee and Advisory Panel in 2019 to further analyze and consider potential changes to mesh size regulations. At this time, staff recommend no changes to the commercial gear regulations and commercial minimum fish size for 2020.

Recreational Management Measures

In 2018 and 2019, the Council and ASMFC provided states the opportunity to open their recreational black sea bass fisheries during the month of February under specific conditions. States were required to opt in to this fishery. Participating states were required to have a 12.5 inch minimum fish size limit and a 15 fish possession limit during February 2018 and 2019 (identical to the federal recreational measures during May 15 - December 31). Participating states were required to adjust their recreational management measures during the rest of the year to account for expected February harvest to help ensure that the coast-wide RHL was not exceeded. Expected February harvest by state was 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.

Only North Carolina and Virginia opted to open their recreational black sea bass fisheries in February 2018 and 2019. No black sea bass were harvested in North Carolina in February 2018. An estimated 55

¹² The summary report is available at: http://www.mafmc.org/s/Tab11_SF-S-BSB-Commercial-Measures.pdf.

¹³ 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

pounds of black sea bass were landed by recreational fishermen in North Carolina in February 2019. It was estimated that 4,826-5,206 pounds of black sea bass were landed by recreational fishermen in Virginia in February 2018 and 10,082 pounds were landed in Virginia in 2019.

During their joint meeting in October 2019, the Council and Board will consider providing states the opportunity to open their recreational fisheries in February 2020 under the same conditions as in 2018 and 2019. Changes to these conditions, including modifications of the expected levels of February harvest by state based on the new MRIP data, cannot be made in time to impact the 2020 fishery. Changes may be considered for the 2021 February recreational fishery.

Other management measures used to achieve 2020 RHL (i.e., the bag, size, and season limits for the rest of 2020) will be considered after the first four waves (i.e., January - August) of preliminary 2019 recreational harvest data are available (expected October 2019). The Monitoring Committee will meet in November 2019 to review these data and make recommendations regarding any necessary changes in the recreational possession limits, minimum sizes, and seasons.



Black Sea Bass Fishery Information Document

August 2019

This document provides a brief overview of the biology, stock condition, management system, and fishery performance for black sea bass (*Centropristis striata*) with an emphasis on 2018. Data sources include unpublished National Marine Fisheries Service (NMFS) fisheries-independent trawl survey data, commercial fish dealer reports, vessel trip reports (VTRs), permit data, and Marine Recreational Information Program (MRIP) data. All data should be considered preliminary. For more resources on black sea bass management, including previous Fishery Information Documents, please visit <http://www.mafmc.org/sf-s-bsb>.

Key Facts

- Black sea bass is not overfished and overfishing is not occurring. In 2015 (the most recent year for which peer reviewed and approved stock status information is available), spawning stock biomass was more than double the target level and fishing mortality was 25% below the threshold level which defines overfishing. An updated stock assessment was peer reviewed in August 2019; however, final results from that peer review are not currently available.
- About 3.41 million pounds of black sea bass were landed by commercial fishermen in 2018. In 2018, commercial fish dealers paid an average of \$3.49 per pound for black sea bass.
- Recreational fishermen harvested an estimated 7.92 million pounds of black sea bass in 2018, mostly from private vessels.

Basic Biology

Black sea bass are distributed from the Gulf of Maine through the Gulf of Mexico. Genetic studies have identified three stocks within that region. This document focuses on the black sea bass stock from the Gulf of Maine through Cape Hatteras, North Carolina.

Adult and juvenile black sea bass are mostly found on the continental shelf. Young of the year (i.e., fish less than one year old) can be found in estuaries. Adults show strong site fidelity during the summer and prefer to be near structures such as rocky reefs, coral patches, cobble and rock fields, mussel beds, and shipwrecks. Black sea bass migrate to offshore wintering areas starting in the fall. During the winter, young of the year are distributed across the shelf and adults and juveniles are found near the shelf edge. During the fall, adults and juveniles off New York and north move offshore and travel along the shelf edge to as far south as Virginia. Most return to northern inshore areas by May. Black sea bass off New Jersey to Maryland travel southeast to the shelf edge during the late fall. Black sea bass off Virginia and Maryland travel a shorter distance due east to the shelf edge, which is closer to shore than in areas to the north.^{1,2}

Black sea bass are protogynous hermaphrodites, meaning they are born female and some later transition to males, usually around 2-5 years of age. Male black sea bass are either of the dominant or subordinate type. Dominant males are larger than subordinate males and develop a bright blue nuchal hump during the spawning season. About 25% of black sea bass are male at 15 cm (about 6 inches), with increasing proportions of males at larger sizes until about 50 cm, when about 70-80% of black sea bass are male. Results from a simulation model highlight the importance of subordinate males in the spawning success of this species. This increases the resiliency of the population to exploitation compared to other species with a more typical protogynous life history. About half of black sea bass are sexually mature by 2 years of age and 21 cm (about 8 inches) in length. Black sea bass reach a maximum size of about 60 cm (about 24 inches) and a maximum age of about 12 years.^{2, 3}

Black sea bass in the mid-Atlantic spawn in nearshore continental shelf areas at depths of 20-50 meters. Spawning usually takes place between April and October. During the summer, adult black sea bass share habitats with tautog, hakes, conger eel, sea robins and other migratory fish species. Essential fish habitat for black sea bass consists of pelagic waters, structured habitat, rough bottom, shellfish, sand, and shell, from the Gulf of Maine through Cape Hatteras, North Carolina. Juvenile and adult black sea bass mostly feed on crustaceans, small fish, and squid. The Northeast Fisheries Science Center (NEFSC) food habits database lists spiny dogfish, Atlantic angel shark, skates, spotted hake, summer flounder, windowpane flounder, and monkfish as predators of black sea bass.¹

Status of the Stock

A benchmark stock assessment for black sea bass was peer-reviewed and approved in December 2016. An updated stock assessment model was peer reviewed in early August 2019; however, final results from that assessment were not available at the time of writing this document. The protogynous life history, structure-orienting behavior, and potential spatial stock structure of black sea bass posed challenges for previous analytical assessments of this species, resulting in several prior assessments not being approved for management use. The 2016 benchmark stock assessment was successful in evaluating and addressing many of these concerns and subsequently was approved through a peer review process.

The 2016 benchmark assessment indicated that the stock north of Cape Hatteras, North Carolina was not overfished and overfishing was not occurring in 2015, the terminal year of the assessment. Spawning stock biomass (SSB; i.e., mature female and male biomass) averaged around 6 million pounds from the late 1980's and early 1990's and then steadily increased from 1997 to 2002 when it reached 18.7 million pounds. SSB then declined until 2007 (8.9 million pounds), followed by a steady increase through 2015 with SSB at its highest estimated level (Figure 1). SSB in 2015 was 48.89 million pounds (22,176 mt), 2.3 times SSB at maximum sustainable yield, $SSB_{MSY} = 21.31$ million pounds (9,667 mt).²

The fishing mortality rate (F) in 2015 was 0.27, 25% below the fishing mortality threshold reference point that defines overfishing ($F_{MSY\ proxy} = F_{40\%} = 0.36$; Figure 2). Fishing mortality was very high in the early 1990's but declined and stabilized after 1997 once joint management by the Mid-Atlantic Fisheries Management Council (Council) and Atlantic States Marine Fisheries Commission (Commission) began. Fishing mortality has been below the F reference point since 2011.²

Recruitment was relatively constant during 1989-2015, with the exception of large spikes from the 1999 and 2011 year classes (i.e., fish spawned in those years). The 1999 year class was estimated at 37.3 million fish. The 2011 year class was estimated at 68.9 million fish, nearly three times the 1989-2015 average. The 2011 year class had a major impact on recent stock dynamics and was much more prevalent in the states of Massachusetts through New York compared to New Jersey and south.²

Final peer reviewed and approved estimates of SSB, fishing mortality, and recruitment after 2015 are not available at this time. Fishery and fishery-independent survey data through 2017 indicate that biomass continues to be high and the 2015 year class appears to be above average both in northern areas (ME-NY) and southern areas (NJ-NC).⁴

Black sea bass recently underwent an operational assessment for use in management for 2020 and beyond and will be final by the end of August. The assessment will include the revised MRIP values and is expected to change the current biological reference points and estimated biomass and fishing mortality. New assessment information was not available during the development of this fishery information document.

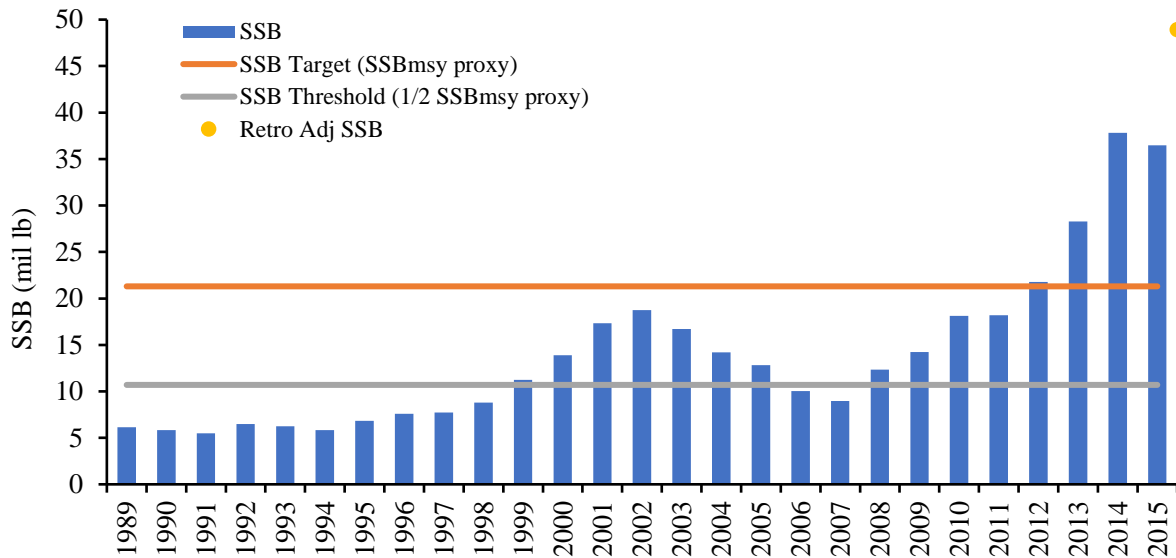


Figure 1: Black sea bass spawning stock biomass, 1989 - 2015, and biomass reference points from the 2016 benchmark stock assessment. The 2015 retro-adjusted spawning stock biomass value was generated to correct for retrospective bias in the assessment model and is used as the estimate to compare to the reference points.²

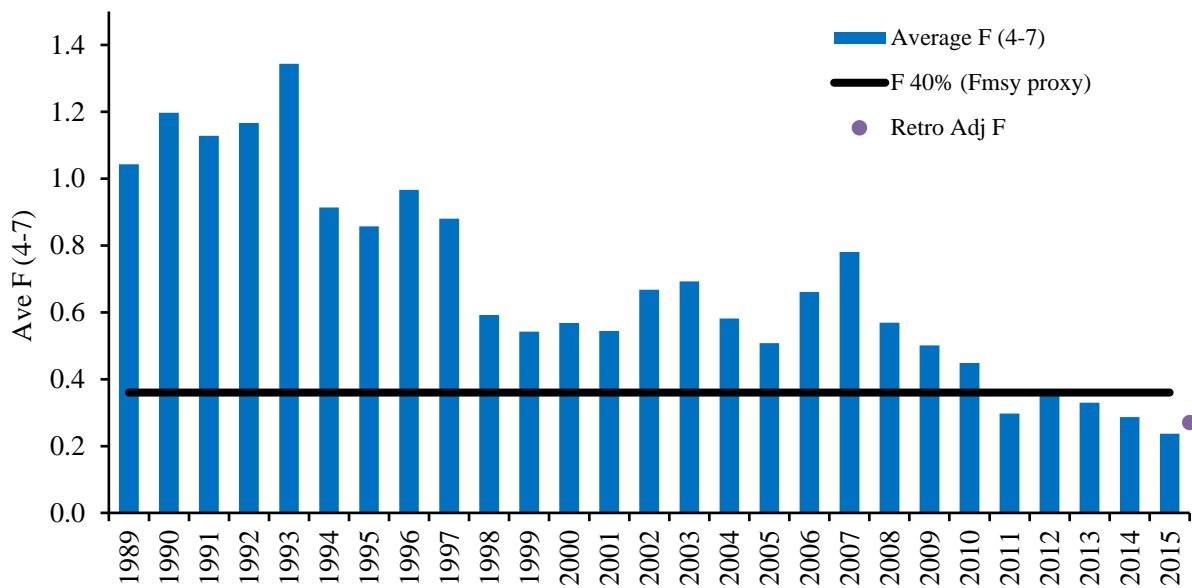


Figure 2: Fishing mortality rate on black sea bass ages 4-7 and the FMSY PROXY reference point from the 2016 benchmark stock assessment. The 2015 retro-adjusted fishing mortality rate was generated to correct for retrospective bias present in the assessment model and is used as the estimate to compare to the reference points.²

Management System and Fishery Performance

Management

The Council and the Commission work cooperatively to develop commercial and recreational fishery regulations for black sea bass from Maine through Cape Hatteras, North Carolina. The Council and Commission work in conjunction with NMFS, which serves as the federal implementation and enforcement entity. This cooperative management endeavor was developed because a significant portion of the catch is taken from both state waters (0-3 miles offshore) and federal waters (3-200 miles offshore). This joint management program began in 1996 with the approval of amendment 9 to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan (FMP). The original FMP and subsequent amendments and frameworks are available at: www.mafmc.org/fisheries/fmp/sf-s-bsb.

Commercial and recreational black sea bass fisheries are managed using catch and landings limits, commercial quotas, recreational harvest limits (RHLs), minimum fish sizes, open and closed seasons, gear regulations, permit requirements, and other provisions.

The Council's Scientific and Statistical Committee recommends annual Acceptable Biological Catch (ABC) levels for black sea bass. The Council and Commission must either approve the ABC recommended by the Scientific and Statistical Committee or approve a lower ABC. The ABC is divided into commercial and recreational Annual Catch Limits (ACLs), based on the landings allocations prescribed in the FMP (i.e., 49% commercial, 51% recreational) and the recent distribution of discards between the commercial and recreational fisheries. The Council first implemented recreational and commercial ACLs, with a system of overage accountability, in 2012.

The Council and Commission also approve commercial and recreational annual catch targets (ACTs), which are set equal to or less than the respective ACLs to account for management uncertainty. To date, the black sea bass ACTs have always been set equal to the ACLs. The ABC, ACLs, and ACTs are catch limits which account for both landings and discards, while the commercial quota and RHL are landing limits. The commercial quota and RHL are calculated by subtracting expected discards from the respective ACTs.

Table 1 shows black sea bass catch and landings limits from 2009 through 2019, as well as commercial and recreational landings through 2018. Total landings (commercial and recreational) peaked in 2017, when approximately 15.5 million pounds of black sea bass were landed. About 11.3 million pounds of black sea bass were landed by commercial and recreational fishermen from Maine through Cape Hatteras, North Carolina in 2018 (Figure 3).^{5,6}

Recreational data are available from MRIP. In July 2018, MRIP released revisions to their time series of recreational catch and landings estimates based on adjustments for a revised angler intercept methodology and a new effort estimation methodology, including a transition from a telephone-based effort survey to a mail-based effort survey. The revised estimates of catch and landings are several times higher than the previous estimates for shore and private boat modes, substantially raising the overall black sea bass catch and harvest estimates, as shown on page 13. The RHLs and other management measures through 2019 were based on the previous MRIP estimates. Once the revised estimates are incorporated into a peer reviewed and accepted stock assessment (expected August 2019), they will be used to derive RHLs and other management measures for future years.

Table 1: Summary of catch and landings limits, and landings for commercial and recreational black sea bass fisheries from Maine through Cape Hatteras, NC 2009 through 2019. All values are in millions of pounds unless otherwise noted.

Management measure	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
ABC	--	4.50	4.50	4.50	5.50	5.50	5.50	6.67	10.47	8.94	8.94
Commercial ACL	--	--	--	1.98	2.60	2.60	2.60	3.15	5.09	4.35	4.35
Commercial quota ^a	1.09	1.76	1.71	1.71	2.17	2.17	2.21	2.71	4.12	3.52	3.52
Commercial landings	1.18	1.68	1.69	1.72	2.40	2.18	2.46	2.59	3.99	3.41	--
% of commercial quota landed	108%	95%	99%	101%	111%	100%	111%	96%	97%	97%	--
Recreational ACL	--	--	--	1.86	2.90	2.90	2.90	3.52	5.38	4.59	4.59
RHL ^a	1.14	1.83	1.78	1.32	2.26	2.26	2.33	2.82	4.29	3.66	3.66
Recreational landings, previous MRIP estimates	2.56	3.19	1.17	3.18	2.46	3.67	3.79	5.19	4.16	3.82	--
% of RHL harvested (based on previous MRIP estimates) ^b	225%	174%	66%	241%	109%	162%	163%	184%	97%	104%	--
Recreational landings, revised MRIP estimates	5.70	8.07	3.27	7.04	5.68	6.93	7.82	12.05	11.48	7.92	--

^a The commercial quotas and RHLs for 2006-2014 account for deductions for the Research Set Aside program.

^b The percent of RHL harvested is based on a comparison of the RHL to the previous or old MRIP estimates. The RHLs did not account for the new MRIP estimates, which were released in July 2018 and were not incorporated into a stock assessment until 2019; therefore, it would be inappropriate to compare past RHLs to the revised MRIP estimates.

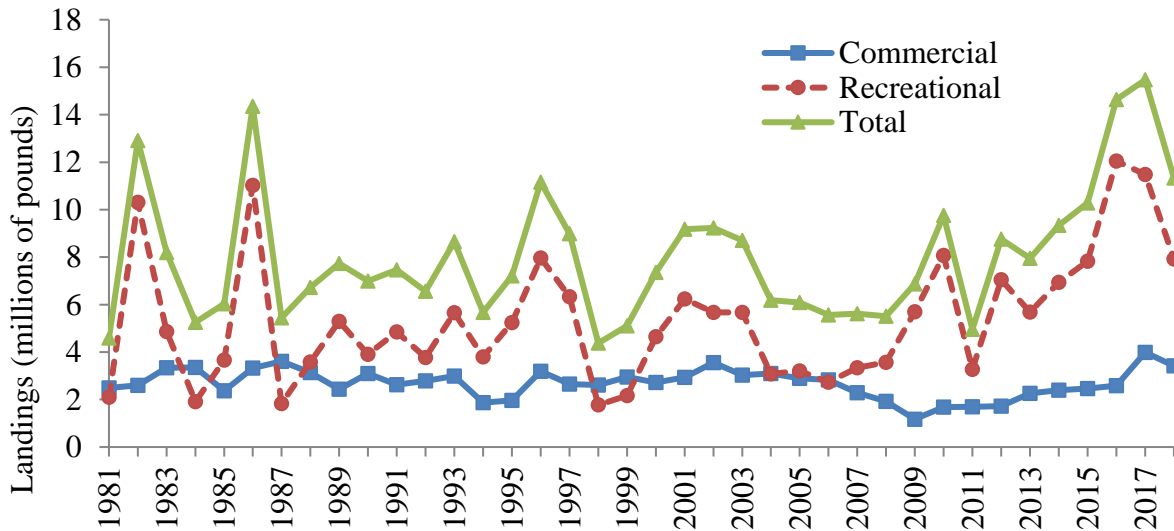


Figure 3: Commercial and recreational black sea bass landings in millions of pounds from Maine through Cape Hatteras, North Carolina, 1981-2018. Recreational landings are based on the revised MRIP numbers.^{5,6}

Commercial Fishery

Commercial landings of black sea bass peaked in 2017 at 3.99 million pounds, and reached a low of 1.18 million pounds in 2009 (Figure 3). About 3.42 million pounds of black sea bass were landed by commercial fishermen in 2018, corresponding to approximately 97% of the commercial quota (Table 1).⁶

Black sea bass are a valuable commercial species. Their value has increased disproportionately compared to moderate increases in landings in recent years. Total black sea bass ex-vessel value (adjusted to 2018 dollars to account for inflation) from Maine through North Carolina increased steadily from 1994 through 2006, followed by a few years of decline. Ex-vessel value again rose steadily from 2009 through 2018. Ex-vessel value peaked in 2017 at \$12.0 million and was only slightly lower at \$11.9 million in 2018. Average price per pound also increased steadily during 1994-2018 and peaked at \$3.49 per pound, on average, during 2018 (Figure 4).⁶

According to federal VTR data, statistical area 616, which includes important fishing areas near Hudson Canyon, was responsible for the largest percentage of commercial black sea bass catch (landings and discards) in 2018 (i.e., 49%). Statistical area 621, off southern New Jersey, Delaware, and Maryland accounted for the second highest proportion of catch (8%), followed by statistical area 537, south of Massachusetts and Rhode Island (6%), and statistical area 613, south of Long Island (5%; Table 2, Figure 5). Statistical area 539, off Rhode Island, accounted for only 4% of total catch, but had the highest number of trips which reported black sea bass catch on federal VTRs in 2018 (1,848 trips).⁸

In 2018, most commercial landings from state and federally-permitted vessels occurred in New Jersey (20%) and Virginia (18%).⁶ The percentage of landings by state is driven by and closely matches the state-by-state commercial quota allocations managed by the Commission (Table 3). These allocations are not contained in the Council’s FMP. States set measures to achieve their state-specific commercial quotas.

At least 100,000 pounds of black sea bass were landed in each of 12 ports in 8 states from Maine through North Carolina in 2018. These 12 ports accounted for over 70% of all commercial black sea bass landings in 2018 (Table 4).⁶ Detailed community profiles developed by the NEFSC Social Science Branch can be found at www.mafmc.org/communities/.

A total of 213 federally-permitted dealers from Maine through North Carolina purchased black sea bass in 2018. More dealers bought black sea bass in New York than in any other state (Table 5).⁶

A moratorium permit is required to fish commercially for black sea bass in federal waters. In 2018, 662 federal commercial black sea bass permits were issued.⁷

A minimum commercial black sea bass size limit of 11 inches total length has been in place since 2002. There is no federal waters black sea bass possession limit; however, states set possession limits for state waters.

Federal VTR data indicate that 72% of the black sea bass caught by federal commercial permit holders from Maine to North Carolina in 2018 was caught with bottom otter trawl gear. About 18% was caught with fish pots and traps, 4% in lobster traps, and 3% with hand lines. Other gear types each accounted for 1% or less of total commercial catch.⁸

Any federally-permitted vessel which uses otter trawl gear and catches more than 500 pounds of black sea bass from January through March, or more than 100 pounds from April through December, must use nets with a minimum mesh size of 4.5-inch diamond mesh applied throughout the codend for at least 75 continuous meshes forward of the end of the net. Pots and traps used to commercially harvest black sea bass must have two escape vents with degradable hinges in the section known as the parlor. The escape vents must measure 1.375 inches by 5.75 inches if rectangular, 2 inches by 2 inches if square, or have a diameter of 2.5 inches if circular.

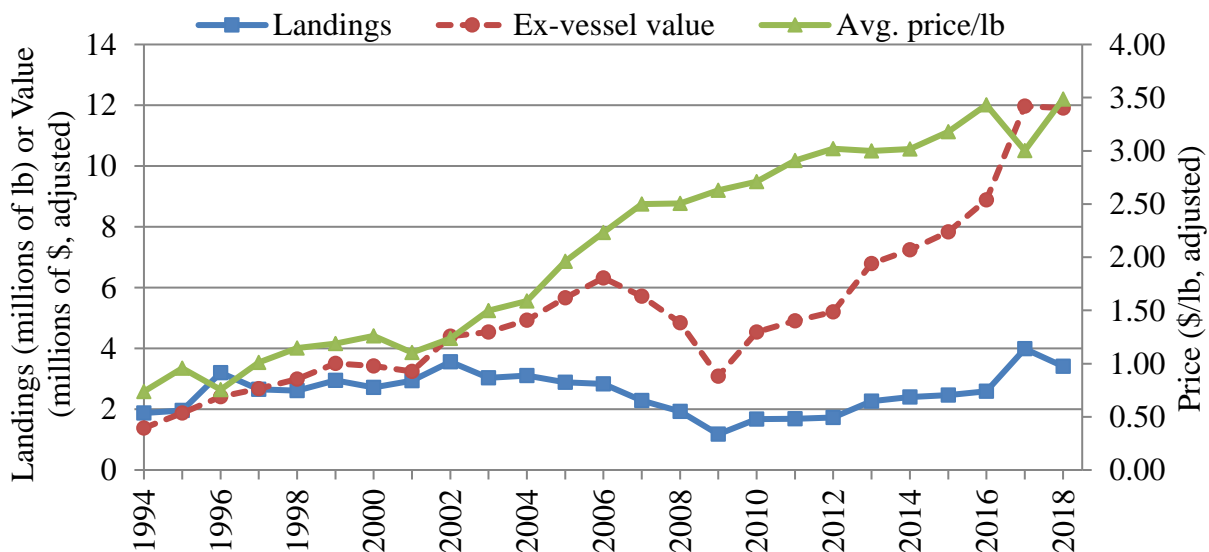


Figure 4: Landings, ex-vessel value, and average price for black sea bass, ME-NC, 1994-2018. Ex-vessel value and price are adjusted to real 2018 dollars using the Gross Domestic Product Price Deflator.⁷

Table 2: Statistical areas that accounted for at least 5% of the total commercial black sea bass catch in 2018, with associated number of trips.⁹

Statistical Area	Percent of 2018 Commercial Black Sea Bass Catch	Number of Trips
616	49%	812
621	8%	300
537	6%	882
613	5%	1,037

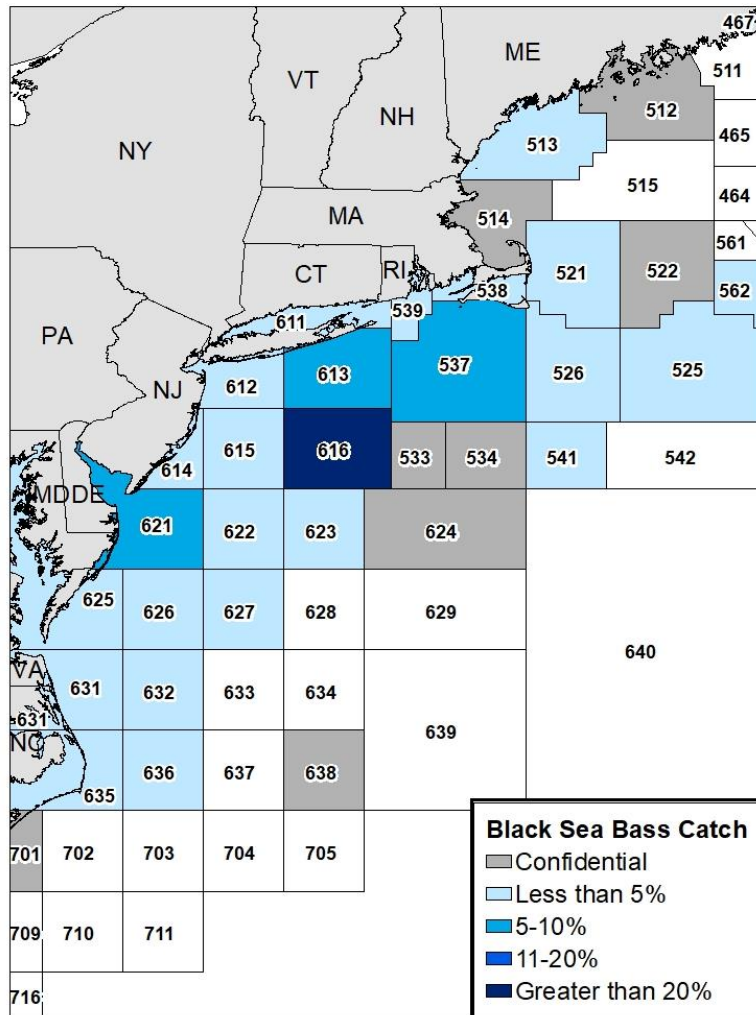


Figure 5: Proportion of black sea bass catch by statistical area in 2018 based on federal VTR data. Statistical areas marked “confidential” are associated with fewer than three vessels and/or dealers.

Table 3: Allocation of commercial black sea bass quota among states under the Commission’s FMP.

State	Allocation (percent)
Maine	0.5
New Hampshire	0.5
Massachusetts	13.0
Rhode Island	11.0
Connecticut	1.0
New York	7.0
New Jersey	20.0
Delaware	5.0
Maryland	11.0
Virginia	20.0
North Carolina	11.0
Total	100

Table 4: Ports reporting at least 100,000 pounds of black sea bass landings in 2018, associated number of vessels, and percentage of total commercial landings. Ports with more than 100,000 pounds of black sea bass, but fewer than three associated vessels and/or dealers are not shown.⁷

Port name	Pounds of black sea bass landed	% of total commercial black sea bass landed	Number of vessels landing black sea bass
POINT PLEASANT, NJ	415,020	12%	237
POINT JUDITH, RI	284,122	8%	2,829
OCEAN CITY, MD	253,410	7%	70
NEWPORT NEWS, VA	237,708	7%	19
BEAUFORT, NC	221,988	6%	155
NEW BEDFORD, MA	200,784	6%	858
HAMPTON, VA	198,406	6%	48
CAPE MAY, NJ	140,002	4%	125
MONTAUK, NY	137,263	4%	419
CHINCOTEAGUE, VA	106,651	3%	68

Table 5: Dealers, by state, reporting purchases of black sea bass in 2018.⁷

State	MA	RI	CT	NY	NJ	DE	MD	VA	NC
Number of dealers	33	34	14	51	30	3	8	14	26

Recreational Fishery

The Council develops coast-wide regulations for the recreational black sea bass fishery in federal waters, including a minimum size, a possession limit, and open and closed seasons (Table 6).

The Commission and member states develop recreational measures in state waters (Table 7).

As previously described, MRIP released a revised time series of recreational fishery data in July 2018. The revised catch, harvest, and effort estimates for black sea bass are substantially higher than the previous estimates, largely due to increased estimates for private anglers (Figure 6). Information presented in this section is based on the revised estimates.

Between 1981 and 2018, recreational catch of black sea bass from Maine through Cape Hatteras, NC was lowest in 1984 at 4.73 million fish and was highest in 2017 at about 41.0 million fish. Recreational harvest in weight was highest in 2016 at 12.05 million pounds; however, harvest in numbers of fish was highest in 1986 at 19.28 million fish. Recreational harvest in weight was lowest in 1981 at 1.53 million pounds, while harvest in numbers of fish was lowest in 1998 at 1.56 million fish.

In 2018, an estimated 3.99 million black sea bass, at about 7.92 million pounds, were harvested by recreational anglers from Maine through Cape Hatteras, North Carolina (Figure 3, Table 8). These numbers should not be compared against the RHLs in the respective years as the RHLs were based on the previous MRIP estimation methodology. Back-calculated estimates of harvest using the previous estimation methodology suggest that 3.82 million pounds of black sea bass were harvested by recreational anglers from Maine through Cape Hatteras, NC in 2018, about 104% of the 2018 RHL.⁵

In 2018, 58% of black sea bass harvested by recreational fishermen from Maine through North Carolina (in numbers of fish) were caught in state waters and about 42% in federal waters (Table 9). Most of the recreational harvest in 2018 was landed in New Jersey (26%), New York (21%), Rhode Island (18%), Massachusetts (17%), and Connecticut (10%; Table 10).⁵

For-hire vessels carrying passengers in federal waters must obtain a federal party/charter permit. In 2018, 806 party and charter boats held federal recreational black sea bass permits.⁷

About 87% of the recreational black sea bass harvest in 2018 was caught by anglers fishing on private or rental boats, about 12% from anglers aboard party or charter boats, and 1% from anglers fishing from shore (Table 11).⁵

Table 6: Federal black sea bass recreational measures, Maine - Cape Hatteras, NC, 2007 - 2019.

Year	Min. size	Possession limit	Open season
2007-2008	12"	25	Jan 1 - Dec 31
2009	12.5"	25	Jan 1 - Oct 5
2010-2011	12.5"	25	May 22 - Oct 11; Nov 1 - Dec 31
2012	12.5"	25	May 19 - Oct 14; Nov 1 - Dec 31
2013	12.5"	20	May 19 - Oct 14; Nov 1 - Dec 31
2014	12.5"	15	May 19 - Sept 18; Oct 18 - Dec 31
2015-2017	12.5"	15	May 15 - Sept 21; Oct 22 - Dec 31
2018-2019	12.5"	15	May 15 - Dec 31

Table 7: State waters black sea bass recreational measures in 2018 and 2019. All measures remained unchanged from 2018 to 2019 except for the season in Massachusetts.

State	Min. Size (inches)	Possession Limit	Open Season
Maine	13	10 fish	May 19 - Sept 21; Oct 18 - Dec 31
New Hampshire	13	10 fish	Jan 1 - Dec 31
Massachusetts	15	5 fish	2018: May 19 - Sept 12
			2019: May 18 - Sept 8
Rhode Island	15	3 fish	Jun 24 - Aug 31
		7 fish	Sept 1 - Dec 31
Connecticut private & shore	15	5 fish	May 19 - Dec 31
CT authorized party/charter monitoring program vessels	15	5 fish	May 19 - Aug 31
		7 fish	Sept 1 - Dec 31
New York	15	3 fish	Jun 23 - Aug 31
		7 fish	Sept 1 - Dec 31
New Jersey	12.5	10 fish	May 15 - Jun 22
		2 fish	Jul 1 - Aug 31
		10 fish	Oct 8 - Oct 31
	13	5 fish	Nov 1 - Dec 31
Delaware	12.5	15 fish	May 15 - Dec 31
Maryland	12.5	15 fish	May 15 - Dec 31
Virginia	12.5	15 fish	Feb 1 - 28; May 15 - Dec 31
North Carolina, North of Cape Hatteras (35° 15'N)	12.5	15 fish	Feb 1 - 28; May 15 - Dec 31

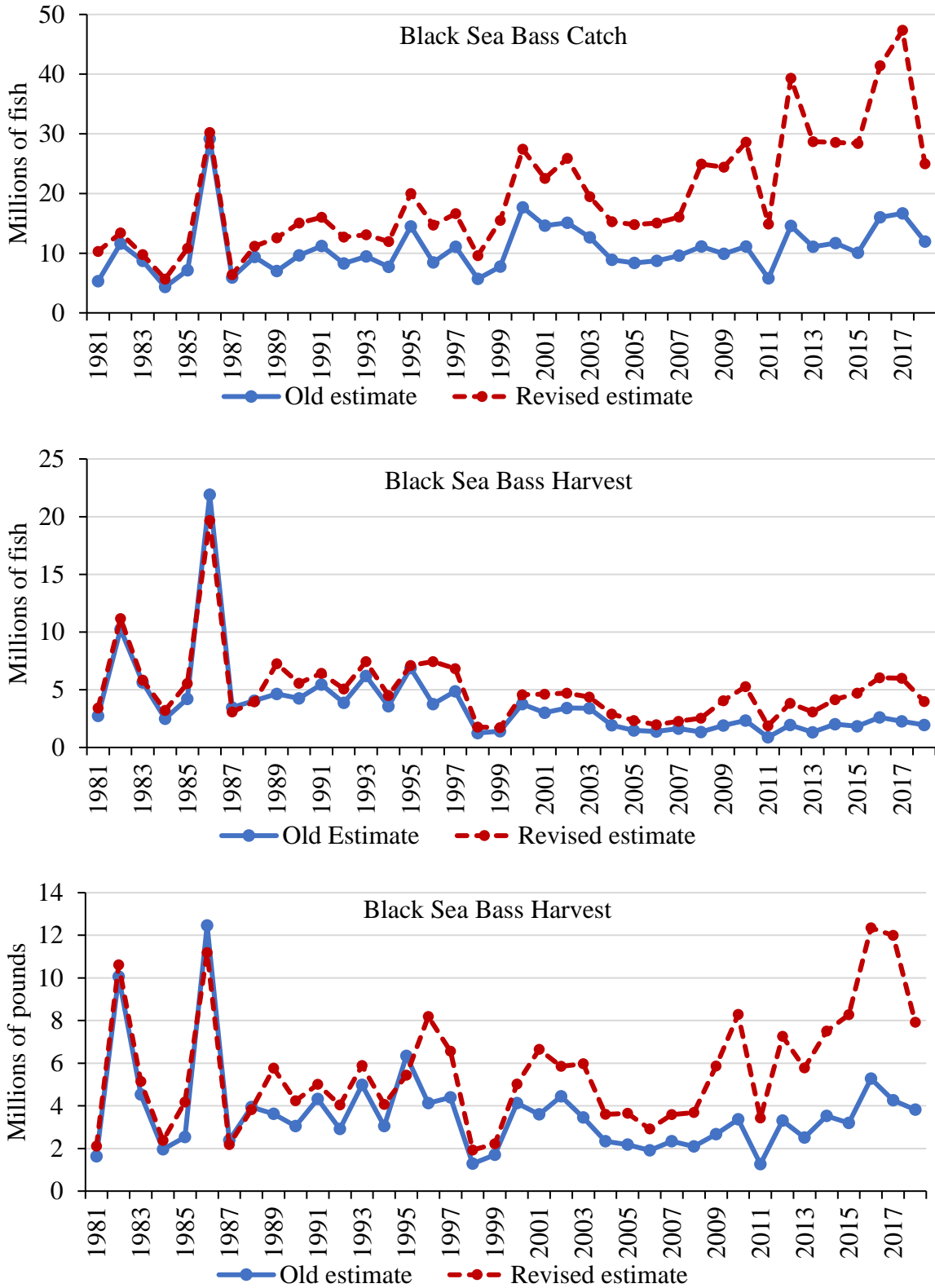


Figure 6: Recreational black sea bass catch in numbers of fish and harvest in numbers of fish and pounds, ME - NC, 1981 - 2017 based on old and revised MRIP estimates.⁵

Table 8: Estimated recreational black sea bass catch and harvest from Maine through Cape Hatteras, North Carolina, 2009-2018, based on the revised MRIP estimates.⁶

Year	Catch (millions of fish)	Harvest (millions of fish)	Harvest (millions of pounds)	% of catch retained
2009	23.12	3.92	5.70	17%
2010	26.42	5.10	8.07	19%
2011	12.47	1.78	3.27	14%
2012	34.95	3.69	7.04	11%
2013	25.71	3.01	5.68	12%
2014	23.29	3.81	6.93	16%
2015	23.17	4.39	7.82	19%
2016	35.80	5.84	12.05	16%
2017	41.00	5.70	11.48	14%
2018	24.99	3.99	7.92	16%

Table 9: Estimated percentage of black sea bass recreational landings (in numbers of fish) in state and federal waters, from Maine through North Carolina, 2009 through 2018, based on the revised MRIP estimates.⁶

Year	State waters	Federal waters
2009	56%	44%
2010	54%	46%
2011	50%	50%
2012	63%	37%
2013	60%	40%
2014	59%	41%
2015	67%	33%
2016	56%	44%
2017	39%	61%
2018	58%	42%
2009-2018 average	56%	44%
2016-2018 average	51%	49%

Table 10: State-by-state contribution (as a percentage) to total recreational harvest of black sea bass (in number of fish), Maine through Cape Hatteras, North Carolina, 2016 - 2018, based on the revised MRIP estimates.⁶

State	2016	2017	2018	2016-2018 average
Maine	0%	0%	0%	0%
New Hampshire	0%	0%	0%	0%
Massachusetts	13%	10%	17%	13%
Rhode Island	9%	6%	18%	11%
Connecticut	11%	9%	10%	10%
New York	52%	42%	21%	38%
New Jersey	9%	26%	26%	20%
Delaware	2%	2%	2%	2%
Maryland	4%	3%	4%	4%
Virginia	1%	2%	2%	2%
North Carolina	0%	0%	0%	0%

Table 11: Percent of total recreational black sea bass landings (in numbers of fish) by recreational fishing mode, Maine through North Carolina, 1981-2018, based on the revised MRIP estimates.⁶

Year	Shore	Party/charter	Private/rental	Total Number of Fish in Millions
1981	52%	19%	29%	5.85
1982	2%	57%	41%	15.04
1983	7%	62%	31%	6.89
1984	12%	29%	59%	6.39
1985	10%	35%	55%	7.98
1986	15%	52%	33%	21.33
1987	6%	15%	79%	4.26
1988	11%	26%	63%	4.69
1989	13%	30%	57%	8.65
1990	17%	30%	53%	6.01
1991	12%	31%	57%	7.28
1992	4%	39%	57%	5.89
1993	3%	56%	41%	8.00
1994	12%	34%	54%	5.54
1995	14%	49%	37%	7.64
1996	5%	64%	31%	8.33
1997	1%	73%	26%	7.41
1998	3%	43%	54%	2.17
1999	5%	14%	81%	2.18
2000	10%	26%	64%	5.17
2001	2%	42%	56%	5.61
2002	2%	33%	65%	5.34
2003	1%	34%	65%	4.86
2004	1%	18%	81%	4.53
2005	1%	21%	78%	3.47
2006	7%	21%	72%	3.10
2007	3%	30%	67%	3.02
2008	1%	17%	82%	3.33
2009	2%	11%	87%	4.59
2010	1%	9%	90%	6.41
2011	2%	14%	84%	2.64
2012	1%	17%	82%	4.37
2013	2%	7%	91%	3.63
2014	3%	14%	83%	4.92
2015	0%	11%	89%	5.12
2016	4%	8%	88%	6.39
2017	1%	9%	90%	6.30
2018	1%	12%	87%	4.34
1981-2018 average	7%	29%	64%	6.02
2016-2018 average	2%	10%	88%	5.68

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- ⁵ Personal communication from the National Marine Fisheries Service, Fisheries Statistics Division. Accessed July 8, 2019. Available at: <https://www.st.nmfs.noaa.gov/recreational-fisheries/data-and-documentation/queries/index>
- ⁶ Unpublished NMFS commercial fish dealer data (i.e., “AA tables”, which include both state and federal dealer data).
- ⁷ Unpublished NMFS permit data.
- ⁸ Unpublished NMFS VTR data.